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The Role of Big Data in Identifying Modern Financial Fraud: A Case Study of Zoneco Group

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Abstract: With the development of market economy and modern science and technology, some listed companies' financial frauds are constantly discovered and exposed. Taking Zoneco as a case, combining with fraud triangle theory, this paper analyzes the background, causes and means of financial fraud in enterprises, which is different from the traditional way of combining financial statement data analysis with on-the-spot inventory. This paper discusses that modern big data technology provides a more innovative and intuitive method for identifying fraud, and broadens the way for maintaining the stability for the securities market.

Keywords: Zoneco group, financial fraud, fraud triangle theory, big data technology

1. Introduction

With the vigorous development of the economy and society and the innovation revolution of computer technology, intelligent devices and social platforms provide good trading media for business and trade. More and more information and data need to be collected, integrated, managed and disposed of by various enterprises. As a result, big data technology arises at the historic moment. The characteristics of big data are roughly explained by 5 "v", volume refers to the size of the data, variety refers to the diversity of data types, veracity refers to the speed of obtaining the data, and acidity refers to the quality and value of the data, which refers to creating high value at low cost [1].

At the same time, the number of listed companies has expanded, but the market supervision is weak. Many cases of financial fraud have occurred one after another. Therefore, identifying financial fraud is a matter of value and significance for the whole society. However, many effective prediction methods have already been proposed by academic circles. For example, MacCarthy proposed using Altman Z-score and Beneish M-model to detect the fact of financial fraud of Enron [2]. Perols et al. said that it can show the suspicion of financial fraud by analyzing the financial statement data [3].

Based on the development of big data and the importance of predicting financial fraud, modern society can give full play to the role of big data technology. Financial fraud is a kind of company that forges a good operating condition by covert means, which is not easy to be identified by the outside world. However, big data technology can be linked with the financial industry and use its own advantages to prevent and identify financial fraud of listed companies more quickly and

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accurately, so as to achieve the purposes of protecting various stakeholders, building a good industry atmosphere and maintaining the market environment. Therefore, it is necessary to study it.

This paper will discuss the role of big data technology in the identification of modern financial fraud through case analysis. The article will be divided into six parts. The second part will review the classic literature, such as discussing the traditional methods of identifying financial fraud and other related previous studies. The third part of the article will introduce the case analysis method, and the fourth part will conduct a comprehensive analysis and investigation around the relevant data of the financial fraud case in Zoneco. The fifth part will analyze the advantages and applications of big data technology. Finally, the sixth part of the article will summarize and discuss the conclusions of this study and the future research direction.

2. Literature Review

2.1. Financial Fraud

With the development of modern society, the methods of financial fraud of listed companies are becoming more and more hidden, and the methods are becoming more and more complicated and diverse. In the past, a large number of scholars have proposed corresponding detection models or theoretical methods. Altman Z-score and Beneish m-score, Data Analytics, Financial statement analysis and other traditional measurement methods are used to predict corporate financial fraud [2-4]. At the same time, some scholars put forward the relevant factors that may cause financial fraud: individual rights, industry systems and standards [5-6]. Subair puts forward the influence of the characteristics of the board of directors on the possibility of corporate financial fraud, involving the level of knowledge, relevant expertise, degree of diligence, etc., and finally draws the conclusion that an enterprise with an excellent leader will reduce the occurrence of fraud [7].

These articles put forward various forecast models which can effectively identify the financial fraud of traditional enterprises, but they all rely excessively on the data of financial statements. When financial statements are tampered or manipulated, the authenticity and effectiveness of data support are questionable, but big data technology can skip the digital trap and provide powerful identification tool for regulators. Therefore, under the background that few researchers in the current academic circle have mentioned the impact of big data on the detection of financial fraud, this article can make up for certain academic gaps and contribute an innovative force to social research.

2.2. Big Data

The concept of big data was first proposed by famous scholars Viktor Mayer-Schönberger and Kenneth Cukier in 2008. In their book "The Age of Big Data", big data refers to a huge amount of information. It does not use the shortcut of random analysis, but uses the method of all data to help enterprises make decisions. With the mature development of big data technology, it has been applied to all walks of life. The financial sector uses blockchain technology to identify financial fraud, the administrative sector uses big data technology to create people's welfare, and the transportation sector uses big data technology to reduce congestion and traffic accident risks to improve the performance of urban transportation systems [8-10]. In the medical field, real-time monitoring and management of health is performed through mobile programs and the like so as to reduce the overall cost of prevention and treatment of chronic diseases, and the like. In addition, with the rapid development of cloud computing, supercomputers and other technologies, the cost of applying big data technology to business analysis has been significantly reduced [11]. Therefore, it is necessary for us to study how to apply big data technology to business governance and play an

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outstanding role in monitoring financial fraud, which is of great significance to enterprise management, institutional supervision and market environment.

3. Research Methodology

3.1. Case Analysis

In academic research, case analysis refers to taking the actual problems as cases, through the research and analysis of all aspects of them, in order to achieve the purpose of analyzing the theory, argument and conclusion. Supported by factual arguments, it can analyze problems more vividly, enhance the persuasion and credibility of the article, and effectively prevent unrealistic problems such as separation from reality. This article will cite the financial fraud cases of Zoneco Company for comprehensive analysis.

3.2. The Theoretical Model Method

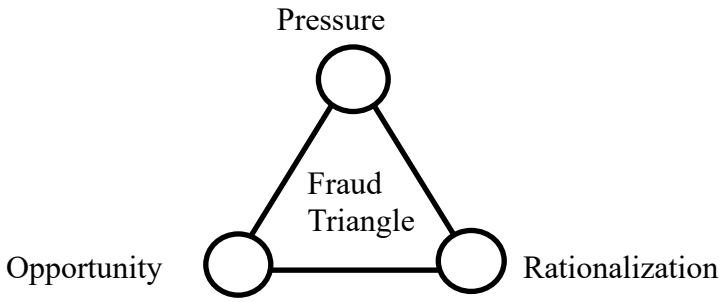

Figure 1: The fraud triangle.

This article will introduce the fraud triangle theory to analyze the financial fraud model of Zoneco Company. The fraud triangle theory was proposed by W.Steve Albrecht, founder of the association of certified frauds (ACFE). He believed that the fraud in an enterprise consists of three elements: pressure, opportunity and rationalization. This theory is not only included in the audit standard, but also widely cited in the academic and scientific research circles to demonstrate corporate fraud, becoming the most common and popular fraud theory [12].

4. Case Analysis

4.1. Background

Zoneco Group is a comprehensive marine enterprise with the main business of marine aquaculture, cold chain logistics, aquatic product processing, sightseeing and tourism. It was listed on the Shenzhen Stock Exchange in 2006. However, during the company's operating cycle, many scandals broke out in Zoneco Group, which aroused great attention in the industry. In October 2014, the Group announced that "more than 1 million Japanese scallops were attacked by a cold water group, resulting in a total harvest". In January 2018, "a large number of scallops starved to death due to insufficient food due to precipitation"; April 2019 "Scallop Collective Migration Run"; November 2019 "Collective Natural Death of Scallop".

The huge and unprovoked losses made the industry deeply suspicious, but the Shenzhen Stock Exchange ordered it to fail in its self-examination. The CSRC did not find any false behaviors in its first inspection. Finally, it sent a professional investigation team to go deep into the group and discovered many serious illegal behaviors such as inflated costs and false reporting of performance

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changes in Zoneco by using Beidou navigation and positioning technology. Fraud seriously disrupted the order of the securities market and harmed the interests of many investors. In 2020, the CSRC imposed a fine of 600,000 yuan on Zoneco Group, imposed unequal fines on company executives and imposed a ban on market entry.

4.2. Fraud Triangle Theory Analysis of Fraud Motivation

Pressure. First of all, under the background of the continuous improvement of China's economic system, the economy has gradually turned from high-speed development to steady progress, and the market is facing downward pressure from the economy. The marine industry is greatly affected by this. In order to stabilize the development of the enterprise, the business has changed from traditional production and breeding to diversified development. The reform of industrial structure has made the industry highly competitive, and the fishing industry depends on the natural environment to survive. It is difficult for Zoneco Group to maintain a good operating condition and its position in the industry is gradually weakened.

In addition, the Shenzhen Stock Exchange stipulates that companies will be temporarily listed after losing money for three consecutive years. As a result, after the scallop scandal broke out in 2014 and 2015 and the companies in Zoneco lost money for two consecutive years, Zoneco faced a huge delisting risk in 2016, and was not allowed to increase its profits without any loss, thus retaining the listing qualification.

Opportunity. By studying the internal board structure of Zoneco, we can find that there are great problems in corporate governance. First, enterprises have a close relationship with government agencies. Zoneco Group is a collective-owned enterprise held by the local people's government, and the members of the board of directors are mostly government officials of Zoneco Town. The combination of rights and profit-seeking makes the risk of corporate fraud extremely high. Second, the board members have varying degrees of education and expertise. Most of the Board members have college or undergraduate education, and the current president, Tang Yan, once served as the director of the editorial department, lacking sufficient and effective corporate management expertise.

At the same time, it is difficult to audit the assets of Zoneco Company. In view of the marine aquaculture industry, assets such as Patinopecten yessoensis grow on the seabed, which makes it difficult for auditors to conduct on-the-spot investigations. It is easy and possible for the number of assets to be controlled by the enterprise.

In addition, China's securities market laws and regulations have certain deficiencies. After the "Enron fraud incident" broke out, the United States issued the "Sabens case" in 2002, imposing high fines and criminal jail sentences on companies and related personnel who committed financial fraud, which would be fatal to any company [13]. On the other hand, the top penalty imposed by the China Securities Regulatory Commission for corporate financial fraud is only 600,000 yuan and lifetime market ban, which is too weak for a listed company to form an industry deterrent.

Rationalization. When an enterprise makes financial fraud, it will conceive a "reasonable" reason for itself, which is called "self-rationalization". Zoneco Group is a collective ownership, and the members of the board of directors have local party secretaries. The profit of the enterprise is also related to the economic income of the residents in Zoneco Town. Therefore, Zoneco Group has reason to think that if it does not make fake products, it will affect the development of the town. It is too ashamed to excuse the local people for its illegal activities.

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4.3. Counterfeit Means

Corporate financial fraud can be found from the financial statement data clues and loopholes, by comparing the data changes in previous and following years to infer whether corporate fraud. Therefore, the analysis of the profit statement in the 2012-2017 financial annual report of Zoneco Group reveals that the enterprise mainly has inflated operating costs, inflated impairment losses on assets and inflated non-operating expenses.

Table 1: Financial data of Zoneco group from 2012 to 2017.

	2017	2016	2015	2014	2013	2012
Operation Cost	2,720,604,641.62	2,590,368,910.98	2,406,081,637.07	2,292,218,640.25	2,041,587,893.32	1,966,129,154.96
Growth Rate	5.03%	7.66%	4.97%	12.28%	3.84%	1.56%
Asset Impairment Loss	100,104,226.07	4,999,147.34	48,879,481.52	399,282,959.58	17,332,726.56	48,866,805.05
Growth Rate	1902.43%	-89.77%	-87.76%	2203.64%	-64.53%	838.02%
Non-business Expenditure	631,659,876.12	12,669,910.87	-25,211,341.94	777,454,613.81	15,671,067.92	61,054,470.33
Growth Rate	4885.51%	-150.25%	-103.24%	4861.08%	-74.33%	-51.58%

As can be seen from the above table data, there were significant fluctuations in the value of Zoneco Group in 2014 and 2017, and there was reasonable suspicion of financial fraud.

In 2014, the operating cost of Zoneco Group increased by nearly 10% compared with the previous year, and the asset impairment loss and non-operating expenses suddenly changed from negative growth to positive growth of nearly 20 times and 50 times. The rapid and sudden changes in data showed that the enterprises inflated various expenditures during the year, resulting in a significant drop in profit and a year-end net profit loss of RMB1,195 million. According to reports from former executives and local farmers, the per-mu yield in the Zoneco region has dropped significantly in recent years. The reason is that there was insufficient seeding in the early stage and a good harvest could not be obtained naturally in the later stage. The "theory of a sudden attack on a cold water regiment" is just an excuse for companies to "take a big bath" in their own assets and inventories and hide their mismanagement.

In 2017, Zoneco Group again significantly inflated its asset impairment losses and non-operating expenses by nearly 20 times and 50 times respectively as compared with 2016. After calculation by

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professional institutions, in 2017, Zoneco Group inflated its non-operating expenses by nearly RMB205,954 million and inflated its asset impairment loss by nearly RMB11,152 million.

5. Big Data Technology to Identify Financial Fraud

Big data technology has played an important role in the fraud scandal in Zoneco. The Beidou satellite navigation system can uncover the veil of the CSRC and investors and find out the exact evidence of fraud when the financial statements reveal that the enterprise has a great possibility of fraud, but the auditors are unable to count the scallops on the spot. The China Securities Regulatory Commission's decision on administrative punishment shows that the announcement of assets write-off issued by the enterprise is fraudulent. Through satellite navigation and big data survey, fishing vessels can be located in real time, and the actual fishing route and the bottom plan of Japanese scallop can be restored by comparing the front and back information. Finally, the actual fishing area of Zoneco can be calculated. The results show that a total of 442,200 mu of Patinopecten yessoensis sowed at the end of 2014, 2015 and 2016 have been harvested in previous years, and the impairment area coincides with the actual operation area of the harvesting vessel.

Big data technology still has some shortcomings. It is difficult to guarantee accuracy. Big data technology relies on electronic information for operation. In the process, the slightest difference in parts and the professional degree of personnel operation will affect the results of the investigation, which may cause huge deviations. The investigation period is relatively long. The verification of financial fraud cases of Zoneco Group started in 2018 and was not clarified until 2020. During this period, the human resources and time costs were more than those of the traditional investigation. The scope of application is limited. The Beidou navigation system can be used for positioning calculation in the case of Zoneco. However, there are still many enterprises whose businesses are established in special places and special natural environments, which make it difficult to detect with big data technology.

6. Summary

With the development of market economy and science and technology, the application of big data in the securities market is bound to be the general trend. By applying advanced big data technologies such as remote sensing, geographic information and satellite navigation, it can make up for the difficulty of on-the-spot inventory in the audit, expand new ideas and methods for detecting financial fraud, provide a powerful tool for maintaining a good environment in the securities market, increase the trust and support of investors, and inject continuous vitality into the market.

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