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# Case analysis of financial fraud in Zhangzi Island based on the fraud triangle theory

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**Abstract.** This paper conducts an in-depth analysis of the financial fraud case of Zhangzi Island based on the Fraud Triangle Theory. The study identifies three key factors that drove Zhangzi Island's financial fraud: pressure, opportunity, and self-justification. Pressure stemmed from the risk of delisting due to consecutive losses for two years; the opportunity was due to internal control deficiencies and the difficulty of verifying biological assets; and self-justification was the management's rationalization of unconventional methods to ensure the company's survival and development. The study suggests that enterprises should strengthen internal controls and cultivate a culture of integrity. Regulatory agencies should leverage modern information technology to enhance supervisory efficiency in order to effectively prevent and combat financial fraud.

**Keywords:** fraud triangle theory, Zhangzi Island, financial fraud, case analysis, preventive measures

## 1. Introduction

### 1.1. Research background

In today's era, as the process of global economic integration accelerates and market competition intensifies, businesses face increasing operational and financial pressures. This trend has led to a rise in financial fraud incidents. Such events not only seriously harm the interests of investors but also pose a significant threat to the stability and healthy development of capital markets. Zhangzi Island Group Co., Ltd., a seafood farming company listed on the Shenzhen Stock Exchange, was once hailed as "the first stock in aquatic farming." However, in recent years, it has become the focus of public criticism due to its involvement in financial fraud scandals. In 2014 and 2015, Zhangzi Island reported consecutive losses and faced significant financial pressures and the risk of delisting. To achieve profitability, the company began implementing a series of fraudulent financial activities from 2016 onward, including artificially reducing operating costs and non-operating expenses, actions that seriously violated accounting standards and securities regulations.

### 1.2. Research questions and methods

This study aims to analyze the driving forces behind the financial fraud at Zhangzi Island using the Fraud Triangle Theory, uncovering its underlying logic and operational mechanisms. The research method involves case analysis, providing a detailed examination of the events of the fraud and its outcome. The analysis is also integrated with the Fraud Triangle Theory to investigate the causes of the fraud. Furthermore, the study innovatively incorporates advanced technology to identify fraudulent activities. By utilizing modern information technology such as the Beidou satellite navigation system, the study successfully reconstructed the actual navigation tracks of the fishing vessels, providing strong evidence to expose the financial fraud.

### 1.3. Research findings

The study finds that pressure, opportunity, and self-justification were the three critical factors behind Zhangzi Island's financial fraud. Regarding pressure, the company faced significant financial stress and the risk of delisting due to two consecutive years of losses, which drove management to adopt unconventional methods to turn the company's fortunes around. From the perspective of opportunity, internal control weaknesses and the difficulty in verifying biological assets provided an opening for fraudulent

 

financial activities. In terms of self-justification, management rationalized their actions by claiming they were necessary for the company's survival, protecting the interests of shareholders and employees. Over time, a corporate culture developed that tacitly, or even actively, encouraged financial fraud.

### 1.4. Research significance

This study not only enriches the application of the Fraud Triangle Theory in real-world cases but also provides valuable insights for businesses and regulatory agencies. For enterprises, it is crucial to strengthen internal controls, improve the ethical standards and legal awareness of management, and foster an integrity-driven corporate culture to prevent and reduce financial fraud from the source. For regulatory agencies, it is essential to fully leverage modern information technology to enhance supervision efficiency and accuracy, increasing efforts to combat financial fraud and thereby maintaining fairness, justice, and transparency in the capital market.

## 2. Literature review

Financial fraud has always been a significant issue in the global financial sector, severely undermining market stability and investor confidence. In recent years, with the deepening of research, scholars have explored the causes, detection methods, and influencing factors of financial fraud from multiple perspectives.

The Fraud Triangle Theory is a classic model used to explain financial fraud, which posits that pressure, opportunity, and rationalization are the three key factors leading to fraud. Huang et al. [1], through expert questionnaires and the Analytic Hierarchy Process (AHP), determined the weights of financial fraud risk factors, finding that "poor performance" under pressure and "weak internal controls" under opportunity were the most significant fraud risk factors. Rahman & Jie [2] used data from Chinese listed companies to validate the relationship between five variables in the Fraud Triangle Theory (including the three elements of pressure, opportunity, and rationalization) and the occurrence of financial fraud. The results showed that leverage ratio and liquidity ratio had a positive impact on fraud detection, while return on net assets, audit size, and the proportion of independent directors had a negative impact on fraud detection.

In specific case studies, Li Zifan [3] used the Zhangzi Island financial fraud case as an example, analyzing its financial fraud motivations based on the Fraud Triangle Theory. He pointed out that Zhangzi Island had significant internal control deficiencies, and there were conflicts of interest between management and governance, with a lack of effective supervision. Zhou Yunrui [4] also used Zhangzi Island as a case study, analyzing the methods, causes, and countermeasures of its financial fraud, emphasizing the importance of improving corporate governance and strengthening internal controls.

With the development of information technology, the application of machine learning and artificial intelligence in financial fraud detection has gained increasing attention. Zhu et al. [5] reviewed the intelligent practices in financial fraud detection in the post-pandemic era, emphasizing the advantages of graph neural network methods in handling heterogeneous data and providing a forecast for future research directions. Traditional machine learning algorithms, such as Naive Bayes, logistic regression, and support vector machines, have also been widely used in financial fraud detection. These methods train classifiers by extracting statistical features to identify potential fraudulent behaviors.

In conclusion, existing research has made significant achievements in the theoretical explanation of financial fraud, case analysis, and technological applications. However, with the increasing complexity and concealment of fraudulent methods, future research needs to further explore how to integrate multi-source data and improve the flexibility, robustness, and interpretability of models to address the evolving challenges of fraud.

## 3. Research methodology

Case study methodology is a research approach that involves an in-depth investigation of a specific case to understand complex phenomena or issues. By examining the background, process, and outcomes of a case in detail, it reveals the underlying logic and influencing factors of the problem, making it particularly suitable for analyzing specific events or behavioral patterns. In financial fraud research, case study methodology can clearly demonstrate the implementation process, methods, and consequences of fraudulent behavior, providing enterprises and regulatory bodies with direct and specific references.

The Fraud Triangle Theory is a theoretical framework used to explain the causes of fraudulent behavior. It consists of three elements: pressure, opportunity, and rationalization. Pressure motivates individuals to engage in fraudulent behavior, opportunity provides the conditions for the fraud to occur, and rationalization helps the fraudster psychologically justify their actions, thereby reducing feelings of guilt. When analyzing corporate financial fraud cases, this theory can comprehensively reveal the various factors that drive management or employees to commit fraud, helping businesses identify potential risk points and formulate corresponding preventive measures.

## 4. Case summary

### 4.1. Company introduction

Zhangzi Island Group Co., Ltd. is a company listed on the Shenzhen Stock Exchange, with the stock code 002069. The company is primarily engaged in the aquaculture, processing, and trading of seafood products, including species such as bottom-cultivated Ezo scallops, abalones, and sea cucumbers. The company was founded in 1958 and was listed on the SME board of the Shenzhen Stock Exchange in September 2006. Zhangzi Island was once hailed as the "first stock in aquatic farming," holding a certain level of influence within the industry.

### 4.2. The fraud incident

In 2014 and 2015, Zhangzi Island suffered consecutive losses for two years, facing significant financial pressure. In order to avoid being delisted, the company began to engage in a series of fraudulent financial practices starting in 2016.

The "Administrative Penalty Decision of the China Securities Regulatory Commission (CSRC)" pointed out that in 2016, the company artificially reduced operating costs and non-operating expenses to inflate profits. Specifically, when transferring the cost of bottom-cultivated Ezo scallops, the company used the fishing areas (fishing coordinates) of that month's catch as the basis for cost allocation. However, the fishing areas were manually filled out and lacked supporting evidence from the vessel's nautical logs. A comparison of the Beidou satellite navigation positioning data of the fishing vessels revealed a significant discrepancy between the recorded fishing areas and the actual areas where the vessels operated. This discrepancy resulted in an artificial reduction of operating costs by 60.03 million yuan, a reduction in non-operating expenses by 71.12 million yuan, and an inflated profit of 131.15 million yuan in 2016, accounting for 158.11% of the disclosed profit for the period.

In 2017, the company continued to artificially inflate operating costs and non-operating expenses to reduce profits. By comparing the Beidou satellite navigation data of the bottom-cultivated Ezo scallop fishing vessels, it was found that the recorded fishing area in 2017 was 57,900 mu larger than the actual fishing area, leading to an artificial increase in operating costs by 61.59 million yuan. Additionally, the company artificially reduced non-operating expenses by 41.87 million yuan, leading to an inflated non-operating expense of 205.96 million yuan and a reduction in profits by 278.65 million yuan, which represented 38.57% of the disclosed profit for the period.

Furthermore, the company was also involved in other illegal activities, including inaccurate disclosures in the "Year-End Inventory Report" and "Write-Off Announcement," false and untimely disclosures of performance changes, and other violations of the law.

### 4.3. Case outcome

On June 15, 2020, the CSRC imposed an administrative penalty and market entry ban on Zhangzi Island and the related individuals for violating securities laws and regulations. On December 28, 2023, the Supreme People's Procuratorate disclosed that Zhangzi Island's former chairman, Wu Hougang, was sentenced to 15 years in prison and fined 920,000 yuan for multiple crimes, including the illegal disclosure of important information, fraud, bid-rigging, and bribing non-government employees.

## 5. Analysis of fraud drivers based on the fraud triangle theory

### 5.1. Theoretical foundation

The Fraud Triangle Theory, proposed by Cressey (1953), posits that the occurrence of fraudulent behavior requires three simultaneous conditions: pressure, opportunity, and rationalization. This theory provides an important analytical framework for detecting and preventing financial fraud in enterprises.

### 5.2. Pressure

Pressure refers to the factors that motivate executives or employees to engage in fraudulent behavior. In the case of Zhangzi Island, the company faced significant financial pressure due to two consecutive years of losses and the risk of delisting, which became an important motivation for the management to engage in financial fraud. According to Sabatian & Hutabarat [6], pressure factors include financial stability, external pressure, personal financial needs, and financial goals. These factors can lead management to resort to fraudulent behavior to achieve the expected financial performance.

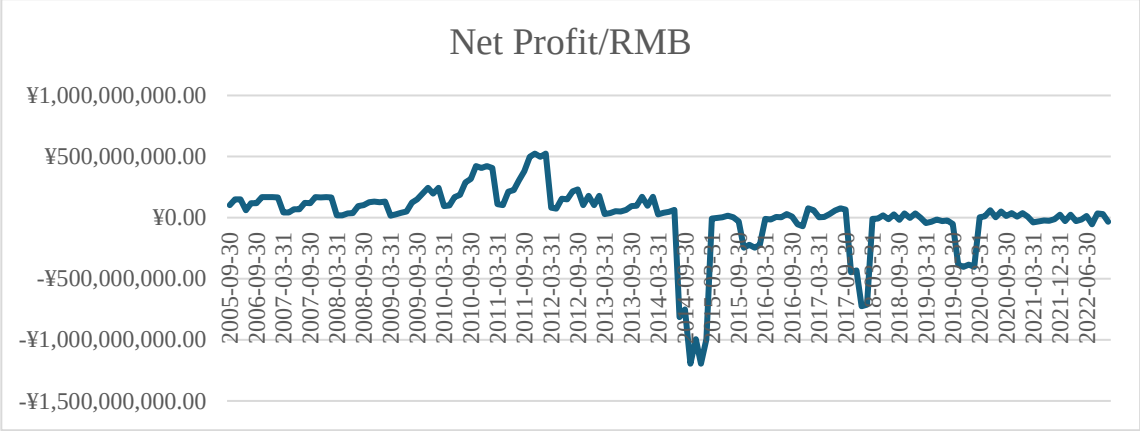


**Figure 1.** Zhangzidao net profit data from 2005 to 2024

*5.2.1. Pressure of delisting risk*

A listed company that suffers consecutive losses for two years will be classified as a "delisting risk warning" entity. If the company continues to lose money in the third year, its trading will be suspended, followed by the risk of forced delisting. As shown in Table 5-1, Zhangzi Island faced losses in 2014 and 2015, and if the company continued to lose money in 2016, it would likely face forced delisting. Therefore, achieving profitability in 2016 was crucial for the company's survival and development. Li Zifan & Song Xiayun (2020) [3] pointed out that, in fact, to create the illusion of profitability in 2016, Zhangzi Island artificially reduced operating costs and non-operating expenses to show positive net profits, resulting in an inflated net profit of 75.71 million yuan.

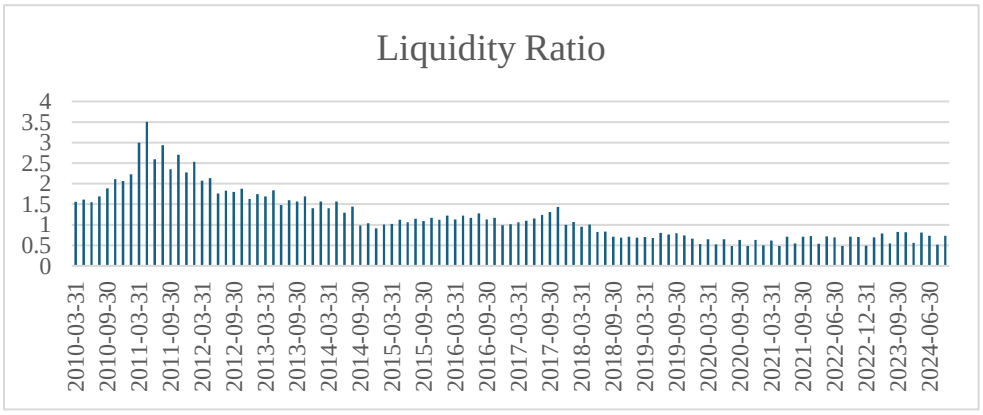


**Figure 2.** Zhangzidao 2010-2024 current ratio data

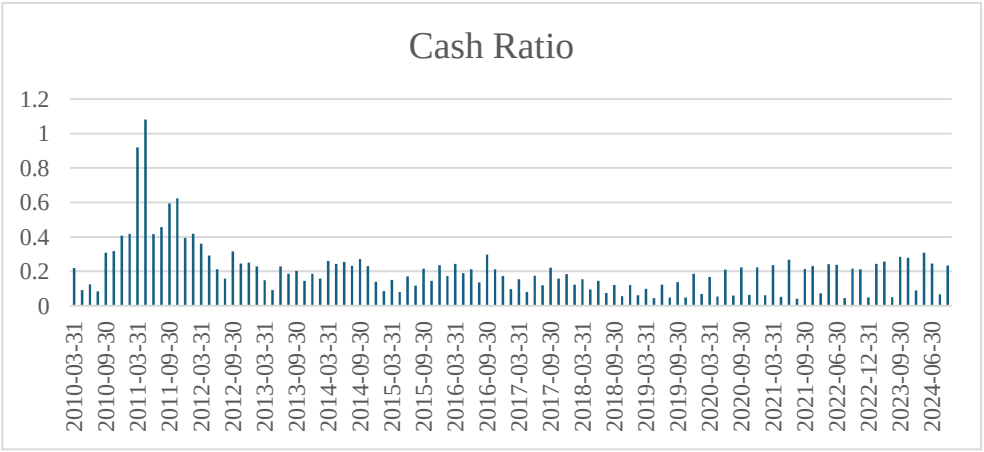


**Figure 3.** Zhangzidao cash ratio data from 2010 to 2024

*5.2.2. Pressure from poor business performance*

Since 2014, Zhangzi Island's business performance had been poor. As shown in Table 5-1, the company incurred losses in three out of four years from 2014 to 2017, with significant net losses. According to Table 5-2, Zhangzi Island's liquidity ratio declined year by year, indicating a decrease in cash flow and a lower ability to meet debt obligations. Table 5-3 shows a gradual decline in the company's cash ratio after 2011, highlighting the weakening ability to repay current liabilities. In 2018, Zhangzi Island returned to profitability, but a significant portion of the net profit came from government subsidies. Tan Liyan [7] noted that the company's actual profitability was weak, and in addition to the delisting risk, the company faced shareholder pressure. To alleviate business pressure, the executives manipulated financial data, artificially increasing and decreasing operating costs and non-operating costs to create the false impression of healthy business performance.

## 5.3. Opportunity

Opportunity refers to the conditions within the internal or external environment of a company that make it possible to commit fraudulent acts. The internal control deficiencies and the difficulty in verifying biological assets at Zhangzi Island provided the opportunity for financial fraud. Sabatian & Hutabarat [4] stated that weak internal controls and industry characteristics could increase the likelihood of fraudulent behavior. In the case of Zhangzi Island, the chaos in internal controls and the specific nature of biological assets allowed management to manipulate financial data without easy detection.

*5.3.1. Deficiencies in internal control*

Zhangzi Island had chaotic and ineffective internal controls. The company's chairman and general manager were the same person, Wu Hougang, which resulted in a lack of separation of duties. Additionally, Wu Hougang concurrently served as the Party Secretary of Zhangzi Island Town in Dalian, contributing to disorganization within the company. Moreover, many of Zhangzi Island's employees were island residents with familial ties, which facilitated the possibility of fraudulent behavior. Furthermore, the company's procurement of seedlings, which accounted for a significant portion of the annual expenses, was handled by the general manager's brother. This individual, who had only completed middle school and lacked professional expertise, was involved in accepting bribes during procurement. He avoided legal consequences by claiming "internal handling" when investigated by the local police. Li Zifan & Song Xiayun [3] pointed out that these phenomena reflected internal control weaknesses that provided loopholes for financial fraud at Zhangzi Island.

*5.3.2. Difficulty in verifying biological assets*

A large portion of Zhangzi Island's inventory consisted of biological assets, which have production cycles. The production cycle of Ezo scallops is approximately three years, and the production process involves many variables. Moreover, Zhou Yunrui [4] noted that biological assets like Ezo scallops cover a broad range and are difficult to inventory. In some cases, technological means are needed, and even with auditors present, the process remains challenging. This unique situation provided Zhangzi Island with an opportunity to commit financial fraud.

## 5.4. Rationalization

Rationalization refers to the process in which fraudsters find justifications for their actions to alleviate their inner guilt. In the case of Zhangzi Island, the management may have believed that unconventional measures were necessary for the company's survival and development. This process of rationalization allowed them to feel comfortable committing fraudulent acts. According to Sabatian & Hutabarat [6], rationalization is a critical component of the Fraud Triangle Theory, as it enables fraudsters to psychologically justify their actions, making it easier for them to engage in fraud.

*5.4.1. Management's rationalization*

In the Fraud Triangle Theory, rationalization is when fraudsters find a reasonable excuse for their actions to ease feelings of guilt. In the case of Zhangzi Island, Li Zifan & Song Xiayun [3] suggested that the company's management may have thought that unconventional financial practices were necessary for the company's survival and development, as well as to protect the interests of shareholders and employees. They may have believed that these actions were temporary and designed to address special circumstances, rather than long-term fraudulent activities.

*5.4.2. Implicit tolerance in corporate culture*

If a company culture tacitly accepts improper behavior, employees may more easily find excuses to rationalize their fraudulent actions. In the case of Zhangzi Island, due to the lack of internal controls and improper actions by management, Tan Liyan [7]

suggested that a culture may have developed that implicitly, or even actively, encouraged financial fraud. This allowed employees to find psychological support when committing fraudulent acts.

## 6. Use of advanced technology to detect fraud

### 6.1. Technical principles of beidou satellite navigation

The Beidou Satellite Navigation System is a domestically developed and independently operated satellite navigation system in China, capable of functions such as positioning, velocity measurement, and time synchronization. The accuracy of civil positioning data is within 10 meters, and it can record information such as the position, speed, and heading of fishing vessels.

### 6.2. Discovery process

#### *6.2.1. Data collection and analysis*

In the investigation of Zhangzi Island's financial fraud, the China Securities Regulatory Commission (CSRC) utilized the Beidou Satellite Navigation System to collect and analyze hundreds of millions of maritime navigation positioning data points from 27 of Zhangzi Island's fishing vessels. This data included detailed information on the vessels' positions, speeds, and headings, providing the foundation for reconstructing the actual navigation trajectories of the fishing vessels.

#### *6.2.2. Commissioning professional institutions*

The CSRC commissioned two third-party professional institutions, Zhongke Yutu Technology Co., Ltd. and the East China Sea Fisheries Research Institute of the Chinese Academy of Fishery Sciences, to perform in-depth analysis and processing of the satellite positioning data using computer technology. By employing professional technical methods, the satellite positioning data was transformed into intuitive navigation trajectory maps, clearly illustrating the actual operating conditions of the fishing vessels at sea.

#### *6.2.3. Restoring the true trajectories*

The professional institutions used the satellite positioning data to successfully restore the actual navigation trajectories of the fishing vessels and determine the real fishing areas the company operated in over the past two years. By comparing the satellite positioning data with the company's recorded fishing areas, significant discrepancies were identified, proving that the company had artificially reduced operating costs and non-operating expenses, thus inflating profits.

#### *6.2.4. Discovery of other illegal activities*

In addition, through the analysis of positioning data, the CSRC discovered that Zhangzi Island had made false records during the autumn survey in 2017. The investigation revealed that the company had not conducted surveys at 60 of the planned points, yet it falsely claimed in its public announcement that it had completed sampling at all 120 planned survey points.

According to a report by The Paper (澎湃新闻), through the innovative application of the Beidou Satellite Navigation System, the CSRC successfully exposed Zhangzi Island's financial fraud, unveiling the fraud methods the company thought were hidden. This process demonstrates the crucial role of modern information technology in securities market regulation and serves as a warning to companies that they must strictly adhere to laws and regulations regarding financial management and information disclosure.

## 7. Conclusion

Through an in-depth analysis of the financial fraud case of Zhangzi Island, it is clear that companies should strengthen internal controls, establish robust supervision mechanisms, and ensure that management decisions are transparent and compliant. At the same time, companies should focus on cultivating a culture of integrity, improving the ethical standards and legal awareness of both employees and management, to prevent financial fraud from the root. Additionally, regulatory agencies should fully leverage modern information technologies such as big data analysis, artificial intelligence, and blockchain to enhance regulatory efficiency and accuracy, thereby improving their ability to identify and combat financial fraud.

Future improvements in regulatory methods should focus on technological innovation and inter-departmental collaboration. On the one hand, continuous exploration of new technologies for financial regulation, such as utilizing big data to analyze corporate financial data and market behavior to detect abnormal signs in a timely manner, should be prioritized. On the other hand, strengthening collaboration between regulatory bodies and internal audits, industry associations, and other entities is essential to create a comprehensive supervisory network, improving the efficiency of information sharing and law enforcement cooperation.

However, this study also has certain limitations. First, while the case study method allows for an in-depth analysis of a specific case, the generalizability of its conclusions may be limited, as the specific circumstances and motivations behind fraud can vary from one company to another. Second, although the Fraud Triangle Theory provides a framework for analyzing financial fraud, the complexity of fraudulent behavior may exceed the scope of this theory. Future research could integrate additional theories and models to more comprehensively understand and prevent financial fraud.

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