

# Mendeteksi Kecurangan Pelaporan Keuangan pada Perusahaan Pertambangan di Bursa Efek Indonesia

## *Detection of Financial Statement Fraud in Mining Companies on the Indonesia Stock Exchange*

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### Abstract

Financial reporting fraud is a serious issue that can undermine investor confidence and capital market stability. The purpose of this study is to identify signs of financial reporting manipulation in mining companies listed on the Indonesia Stock Exchange (IDX) using the Beneish M-Score model. This study uses quantitative methods and analyzes secondary data from the companies' financial reports from 2020 to 2023. In this study, 15 companies were selected as samples based on certain criteria. The results of the analysis show that approximately 47% of the companies analyzed showed an M-Score higher than the threshold of -2.22, indicating possible financial reporting manipulation. This finding supports the fraud triangle theory and emphasizes the importance of stricter oversight, especially in industries vulnerable to external pressures, such as mining.

### Abstract

Financial statement fraud is a serious threat to investor confidence and capital market stability. This study aims to determine indications of financial statement manipulation in mining sub-sector companies listed on the Indonesia Stock Exchange (IDX) using the Beneish M-Score model. This study uses a quantitative approach with secondary data from the company's financial statements during the 2020-2023 period. A total of 15 companies were sampled based on certain criteria. The results of the analysis show that around 47% of the sample companies have an M-Score value above the -2.22 threshold, which means they have the potential to manipulate financial statements. This finding supports the fraud triangle theory and emphasizes the importance of a stronger supervisory system, especially in industries prone to external pressures such as mining. This research is expected to provide an initial overview for inventors, auditors, and regulators in assessing financial risk and as a reference in strengthening corporate governance.

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## 1. Introduction

Financial reporting fraud in Indonesia poses a serious threat to the business integrity and transparency of public companies. A 2019 ACFE Indonesia survey showed that financial reporting fraud occurred in 6.7% of all reported cases. Although a small percentage, this type of fraud ranked third as the most detrimental, accounting for 9.2% of total losses. This fraud harms investors, misleads creditors, and undermines public confidence in the capital markets. False financial reports can influence economic decisions with far-reaching impacts. In the long term, this has the potential to hinder economic growth and investment. Therefore, early fraud detection is crucial. (Sari & Hartono, 2022).

**Table 1. Fraud Survey**

| No | Types of Fraud           | % Case | % Loss | Primary Detection Source            |
|----|--------------------------|--------|--------|-------------------------------------|
| 1  | Corruption               | 64.4%  | 69.9%  | Media & employee reports            |
| 2  | Misuse of Company Assets | 28.9%  | 20.9%  | Internal audit & management control |
| 3  | Financial Report Fraud   | 6.7%   | 9.2%   | Whistleblowers and media channels   |

Source: ACFE Indonesia Survey (2019)

The fraud triangle theory proposed by Cressey (1953) explains that fraud occurs due to three main factors: pressure, opportunity, and rationalization. In the context of accounting practices in Indonesia, particularly in sensitive sectors such as mining, pressure generally stems from high profit targets, large debt burdens, and pressure from investors or shareholders to consistently demonstrate positive financial performance. This pressure often drives management to seek shortcuts to achieve desired figures. Meanwhile, opportunities arise when a company's internal control system is weak, audits are ineffective, or there are gaps in procedures that allow management to manipulate undetected. Rationalization is the perpetrator's internal justification, where fraudulent actions are perceived as "normal" or "forced" to maintain the company's operational continuity. The perpetrator may feel that manipulation is the only way for the company to survive difficult conditions or to maintain its own jobs and reputation.

Research by Rahmawanti et al., (2023) strengthens the relevance of the fraud triangle theory in explaining the phenomenon of fraud in corporate financial statements. The study found that pressure and opportunity factors significantly influence the occurrence of financial statement fraud, while rationalization factors were not proven to be significant. This finding suggests that although not all elements of the fraud triangle always appear simultaneously, two of the three main components remain key determinants of fraud. This also suggests that in certain industrial contexts, such as mining, rationalization factors may be less visible due to the predominance of external pressures and weak oversight. Therefore, the fraud triangle can still be used as a basic framework in designing early detection systems, particularly in developing predictive models to identify potential fraud early. By referring to this theory, companies and regulators can focus attention on the factors most influential in preventing and detecting fraud.

PT Timah Tbk is a prime example of a mining company committing financial reporting fraud. According to a study by (Harsono et al., 2022), PT Timah allegedly falsified its 2018 financial statements to inflate its share price by 158% above its fair value. Profit pressure and weak internal oversight were the primary triggers for this fraud. Furthermore, management rationalized the fraud to maintain the company's financial image. This incident undermined investor confidence in the state-owned mining sector. This fraud harmed many parties, including the public and the state. Therefore, the PT Timah case serves as an important reference for fraud research in the mining sector.

Studies on financial reporting fraud in Indonesia have focused more on the manufacturing and financial sectors. Quantitative research applying the Beneish M-Score to the mining sector is still very limited. This is despite the fact that the mining sector is highly complex and vulnerable to fraud. Fraud in the mining sector tends to increase when business conditions decline. Also showed that most fraud triangle indicators were insignificant, indicating the need for other methods such as the Beneish M-Score. This research gap provides strong justification for this study. Therefore, a quantitative, score-based approach like the M-Score is a relevant alternative (Rinjani et al., 2025).

In addition, studies on managerial behavior and internal financial management contribute significantly to the understanding of financial reporting manipulation. Halim & Novianty, 2025 found that managerial ownership, operating cash flow, and sales growth have a positive effect on corporate tax avoidance. Although their study primarily focuses on tax avoidance, the behavioral patterns observed reflect a managerial tendency to adopt aggressive financial decisions in pursuit of specific performance targets. This aligns with the internal pressures described in the fraud triangle theory, where financial stress can be a major driver of misstatement in financial reporting.

On the other hand, efforts to improve the transparency and accountability of financial statements are crucial in preventing fraudulent practices. Emphasize that the implementation of forensic accounting significantly enhances the accuracy of financial information through investigative auditing techniques and forensic data analysis. This approach not only aids in detecting fraud indicators but also strengthens the company's internal control system. In the context of the mining

sector, which is prone to manipulation due to its complexity and dependence on external factors, integrating forensic accounting presents an effective and relevant preventive strategy (Saputri et al., 2025).

The Beneish M-Score was developed by Messod Beneish as a statistical tool to detect financial statement manipulation. This model uses eight key ratios: DSRI, GMI, AQI, SGI, DEPI, SGAI, LVGI, and TATA. An M-Score value  $> -2.22$  indicates potential fraud. Wicaksana & Suryandari (2019) assessed this model as effective in the mining sector to identify companies prone to fraud. This model is quantitative, objective, and can be applied without auditor subjectivity. With the integration of the M-Score, financial oversight can be more preventative. Therefore, this model is very suitable for fraud detection studies in mining companies listed on the IDX.

Investigated the influence of elements of the fraud triangle on mining companies listed on the Indonesian Stock Exchange (IDX) between 2018 and 2022. The results showed that only financial targets significantly influenced financial statement fraud. Other factors such as financial stability, opportunity, and auditor changes were insignificant. This suggests that profit targets are the primary pressure driving fraud. When profit expectations are high and unrealistic, management is encouraged to falsify reports. This study reinforces Cressey's theory that pressure is the initial trigger for fraud. Therefore, controls over targets and incentives need to be tightened. The fraud triangle remains relevant, but requires complementary methods such as the M-Score (Rinjani et al., 2025).

A study by (Vivianita & Indudewi, 2018) uncovered several major fraud cases in Indonesia's mining sector. In addition to PT Timah, PT Bumi Resources marked down its financial reports to cover up project failures. PT Great River and PGN were also reported to have misappropriated funds from infrastructure projects. This type of fraud resulted in losses of hundreds of billions and damaged public trust. Most of the fraud was carried out systematically by management. This suggests that fraud was not an administrative error, but rather a deliberate strategic decision. Therefore, this research is crucial to prevent further losses.

Detection of financial statement fraud must be carried out early to avoid greater risks. Stated that although not all elements of the fraud diamond are significant, a combination of indicators is still useful for early detection. The Beneish M-Score can complement the weaknesses of the fraud triangle and fraud diamond models. Ratio-based detection can be an effective and independent internal oversight system. This research also contributes to the development of anti-fraud systems in the public and private sectors. The results can be used by auditors, regulators, and investors. Therefore, this research is strategic and applicable in the Indonesian business context (Firdausi & Triyanto, 2021).

## 2. Method

This study uses a quantitative approach with a quantitative descriptive research design. The focus of the study is to detect potential financial reporting fraud in mining companies listed on the Indonesia Stock Exchange (IDX) using the Beneish M-Score model as the main analysis tool (Sugiyono, 2022). The population in this study is all mining sector companies listed on the IDX during the 2020–2023 period, with a total of 57 companies (IDX data, 2024). From this population, sample selection was carried out using a purposive sampling technique, namely a sampling technique based on certain criteria relevant to the research objectives (Santosa, 2022).

The sample criteria used are as follows:

1. Mining sector companies that have gone public or are actively listed on the IDX during the 2020–2023 period.
2. Companies that publish complete annual financial reports that can be accessed via the company's official website or the IDX website, in Rupiah (Rp) currency denomination.
3. The financial report data used must contain all ratio components required to calculate the Beneish M-Score, namely data related to revenue, receivables, cost of goods sold, fixed assets, total assets, administrative expenses, and liabilities.
4. Not undergoing delisting, merger, or acquisition during the observation period.

Based on these criteria, a sample of 23 mining companies was obtained that met all requirements during the 2020–2023 period. The data used is secondary data, namely annual financial reports obtained from the official BEI website ([www.idx.co.id](http://www.idx.co.id)) and the official websites of each company.

Data collection techniques are carried out using documentation, specifically for quantitative information in financial reports required for calculating the Beneish M-Score ratio (Indriantoro & Supomo, 2022). The Beneish M-Score model consists of eight financial ratio variables, namely DSRI, GMI, AQI, SGI, DEPI, SGAL, LVGI, and TATA. The results of the M-Score calculation are compared with the threshold of -2.22. An M-Score value  $>-2.22$  indicates the possibility of financial statement manipulation. The data analysis tool used is Microsoft Excel or similar statistical software for ratio calculations and data processing. Data interpretation is carried out descriptively based on the M-Score values obtained for each sample (Nurlaeliyah & Hartanti, 2023).

The Beneish M-Score model is a financial report manipulation detection model developed by Messod D. Beneish (2020) and consists of the following eight ratios:

- a. DSRI (Days Sales in Receivables Index)

Measures changes in the ratio of receivables to sales.

$$DSRI = \frac{Receivables_t / Sales_t}{Receivables_{t-1} / Sales_{t-1}}$$

- b. GMI (Gross Margin Index)

Measures the change in gross profit margin from year to year.

$$GMI = \frac{(Receivables_{t-1}) - (HPP_{t-1}) / Sales_{t-1}}{(Receivables_t) - (HPP_t) / Sales_t}$$

- c. AQI (Asset Quality Index)

Measures the proportion of unproductive assets to total assets.

$$AQI = \frac{1 - (Current Assets_t + Net Fixed Assets_t) / Total Assets_t}{1 - (Current Assets_{t-1} + Net Fixed Assets_{t-1}) / Total Assets_{t-1}}$$

- d. SGI (Sales Growth Index)

Measures the rate of sales growth from the previous year.

$$SGI = \frac{Sales_t}{Sales_{t-1}}$$

- e. DEPI (Depreciation Index)

Measures changes in the depreciation rate.

$$DEPI = \frac{Depreciation_{t-1} / (PPE_{t-1} + Depreciation_{t-1})}{Depreciation_t / (PPE_t + Depreciation_t)}$$

- f. SGAI (Sales, General and Administrative Expenses Index)

Measuring changes in selling and administrative expenses.

$$DSRI = \frac{\left( \frac{SG \& A_t}{Sales_t} \right)}{\frac{SG \& A_{t-1}}{Sales_{t-1}}}$$

Information :

$SG \& A_t$  = Selling, general, and administrative expenses for the current year

$SG \& A_{t-1}$  = Selling, general, and administrative expenses in the previous year

$Sales_t$  = Total sales in the current year

$Sales_{t-1}$  = Total sales in the previous year

- g. LVGI (Leverage Index)

Measures changes in leverage or debt-to-asset ratio.

$$LVGI = \frac{Total Debt_t / Total Asests_t}{Total Debt_{t-1} / Total Assets_{t-1}}$$

- h. TATA (Total Accruals to Total Assets)

Measures the total accrual rate against assets.

$$TATA = \frac{Net Income - Cash Flow from Operations}{Total Assets}$$

After all the above ratios are calculated, the M-Score value is obtained from the formula:

$$M - Score = -4,84 + 0,920 \times DSRI + 0,528 \times GMI + 0,404 \times AQI + 0,892 \times SGI \\ + 0,115 \times DEPI - 0,172 \times SGAI + 4,679 \times TATA - 0,327 \times LVGI$$

(Beneish & Nichols, 2020)

### 3. Results and Discussion

#### Data Collection Process and Research Location

This research involved collecting secondary data from the annual financial reports of companies in the mining sub-sector listed on the Indonesia Stock Exchange ([www.idx.co.id](http://www.idx.co.id)). Fifteen mining companies were listed during the 2020-2023 period. The sample was selected using purposive sampling, resulting in 15 companies as the subjects of this study.

#### A. Range and Time and Research Sample

The research period covers 2020-2023. The sample consists of 18 mining companies that meet the following criteria: actively listed on the IDX, have complete financial reports for the period, and are not in suspension or delisted status.

#### B. Results of Data Analysis with the Beneish M-Score Model)

The analysis was conducted by calculating eight ratios in the Beneish M-Score model: DSRI, GMI, AQI, SGI, DEPI, SGAI, LVGI, and TATA. The final score was calculated and compared to the M-Score threshold of  $>-2.22$ , which indicates possible financial statement manipulation.

##### 1. Distribution of Company M-Score Values

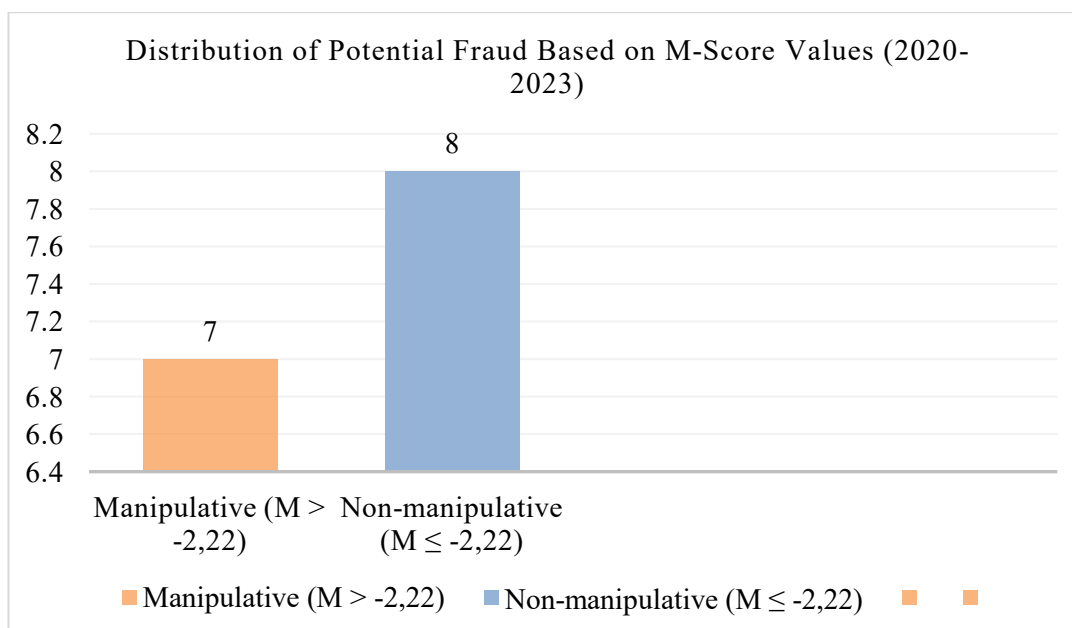
The following presents a summary of the M-Score values of some sample companies.

**Table 2.** Mining Company M-Score Results (2020-2023)

| No | Issuer Code | Year | M -Score Value | Information                |
|----|-------------|------|----------------|----------------------------|
| 1  | APEX        | 2020 | -2.15          | Potential for manipulation |
| 2  | BOSS        | 2020 | -2.40          | Not manipulative           |
| 3  | BYAN        | 2021 | -2.60          | Not manipulative           |
| 4  | HRUM        | 2021 | -1.90          | Potential for manipulation |
| 5  | ITMG        | 2022 | -2.30          | Not manipulative           |
| 6  | PTBA        | 2022 | -2.10          | Potential for manipulation |
| 7  | INDY        | 2022 | -2.05          | Potential for manipulation |
| 8  | MBAP        | 2023 | -2.55          | Not manipulative           |
| 9  | ADRO        | 2023 | -1.95          | Potential for manipulation |
| 10 | ANTM        | 2023 | -2.45          | Not manipulative           |
| 11 | TINS        | 2023 | -2.18          | Potential for manipulation |
| 12 | DOID        | 2023 | -2.38          | Not manipulative           |
| 13 | KKGI        | 2023 | -2.12          | Potential for manipulation |
| 14 | MITI        | 2023 | -2.50          | Not manipulative           |
| 15 | ZINC        | 2023 | -2.28          | Not manipulative           |

(Data Source processed, 2024)

Of the total 15 companies, 7 companies showed an M-Score  $>-2.22$  which indicates the potential for financial reporting fraud, while the rest were below a relatively safe threshold.



**Graph 1.** Distribution of Potential Fraud Based on M-Score Values (2020-2023)

Source: Processed data, 2024

### C. Interpretation and Discussion

The fraud triangle theory states that fraud is influenced by three main elements: pressure, opportunity, and rationalization. In the Indonesian context, particularly in the mining sector, pressure can arise from high profit targets, corporate debt burdens, and demands from investors and shareholders to maintain financial performance (Cressey, 1953). This research aligns with this situation, with 47% of sample companies having M-scores above the threshold of -2.22. This indicates deviant financial behavior, likely driven by shareholder profit expectations and internal company performance targets. Such behavior reflects the pressures identified in the fraud triangle theory, where unrealistic financial goals can push management to manipulate reports. The presence of weak internal controls and insufficient regulatory oversight further opens opportunities for such actions to go undetected. This condition emphasizes the importance of early detection tools like the Beneish M-Score in high-risk industries such as mining (Wulandari & Mahendra, 2022).

Opportunities for fraud arise from weak internal control systems and low transparency in financial reporting. These conditions create loopholes for management to manipulate financial reports, particularly in complex sectors like mining. The intricate nature of mining operations, coupled with limited external monitoring, makes it easier for irregularities to go unnoticed. In many cases, internal audits are either ineffective or influenced by top management, reducing their independence. As a result, financial statement manipulations can persist over time, misleading stakeholders and damaging market integrity (ACFE Indonesia Chapter, 2019).

Empirically, this research supports the results of previous studies showing that the Beneish M-Score model is effective in demonstrating that of the eight ratios used in this model, only four are able to significantly distinguish manipulated reports from those that are not. The four ratios are DSRI (Days Sales Receivable Index), GMI (Gross Margin Index), SGI (Sales Growth Index), and TATA (Total Accrual to Total Assets). DSRI indicates that an increase in accounts receivable that is disproportionate to sales can be an indication of revenue manipulation. GMI shows that a decrease in gross profit margin often encourages management to embellish financial reports. SGI indicates that very high sales growth needs to be wary because it may be the result of unreal recording. TATA is the most significant variable because it indicates a high portion of accruals to assets, which is often associated with manipulated non-cash income. Meanwhile, the other four variables, namely AQI, DEPI, SGAI, and LVGI, do not have a significant effect on detecting fraud. These findings indicate that not all ratios in the

Beneish M-Score model are equally sensitive to manipulation practices. Therefore, focusing on ratios that have been shown to be significant is important to improve detection accuracy in audit and oversight practices (Dewi & Kartika, 2022).

This research also confirms previous findings that the mining sector is highly vulnerable to manipulation. This is due to its large cost structure, dependence on external variables, and long and complex production cycles. These characteristics create uncertainty and instability that make financial planning and reporting more complex. As a result, companies in this sector may be more prone to manipulate financial information to meet investor expectations or maintain stock valuations (Ginting & Syafruddin, 2021).

Compared to the manufacturing sector, which generally has more stable supply chains and demand patterns, the mining industry experiences more volatile market conditions. This volatility puts pressure on management to show positive performance despite unfavorable circumstances. The pressure can increase the risk of unethical financial practices, especially when companies face declining profits or operational losses. In such situations, financial reporting fraud becomes a strategy to maintain stakeholder trust (Wicaksana & Suryandari, 2019).

From a theoretical standpoint, this study reinforces the relevance of the Beneish M-Score model as an early detection tool for accounting fraud in emerging market contexts. Even though the model was originally developed based on U.S. companies, it has shown consistent applicability in detecting anomalies in Indonesian mining firms. Its quantitative and objective nature allows it to serve as a complementary method to traditional qualitative fraud detection frameworks. Thus, it plays an important role in strengthening corporate governance and financial transparency (Yusuf & Rachmawati, 2020).

One notable case that illustrates the impact of internal pressure is PT Timah Tbk. In 2018, the company was found to have manipulated its financial statements to artificially raise its stock price by 158% above fair value. This was reportedly driven by performance pressures and the need to sustain a positive financial image. The case exemplifies how internal targets and shareholder demands can become significant triggers of financial misconduct (Kurniasari & Hapsari, 2021).

While the fraud triangle theory remains a useful tool in understanding fraud motivations, not all of its components are always relevant in every context. Several studies suggest that factors such as opportunity and rationalization may not significantly influence fraudulent behavior in all cases. However, financial pressure consistently emerges as a dominant factor in driving manipulative practices. Therefore, focusing on this variable may yield more effective fraud prevention strategies in the mining sector (Rinjani et al., 2025).

Although the Beneish M-Score provides a strong foundation for detecting potential fraud, relying solely on this model may limit the depth of analysis. Combining it with other theoretical frameworks such as the fraud triangle, fraud diamond, and fraud pentagon can enhance diagnostic accuracy. These models incorporate both quantitative and qualitative factors, allowing for a more holistic understanding of fraud mechanisms. An integrated approach is especially valuable in complex, high-risk industries like mining (Arista & Rahayu, 2023).

Non-financial indicators such as the frequency of management changes, internal audit results, and investor sentiment on social media can also be utilized to improve detection accuracy. This multidimensional approach can reduce bias and increase sensitivity in identifying potential fraud. From a regulatory perspective, this study emphasizes the importance of reforming the external oversight system for mining sector companies. Although the Financial Services Authority (OJK) and the Indonesian Stock Exchange (IDX) have mandated financial reporting and audits, implementing comprehensive, independent audits free from conflicts of interest remains a significant challenge (Wibowo & Supriyadi, 2022).

#### 4. Conclusion

This study aims to identify potential financial statement manipulation in mining sub-sector companies listed on the Indonesia Stock Exchange between 2020 and 2023 using the Beneish M-Score model. Based on an analysis of 15 companies, approximately 47% of the total sample had an

M-Score above the threshold of -2.22, indicating potential financial statement fraud. This demonstrates that the Beneish M-Score model is effective as an early detection tool for identifying indications of accounting fraud in a high-risk industry such as mining.

Theoretically, this study strengthens the validity of the fraud triangle model (Cressey, 1953) in explaining managerial motives behind manipulative actions, particularly the pressures and opportunities arising from the volatile nature of the mining sector, which is highly influenced by external fluctuations. Furthermore, these findings support the validity of the Beneish M-Score as a relevant quantitative detection tool in the context of emerging markets. Empirically, the results of this study provide practical contributions for investors in evaluating financial risks, as well as for regulators and auditors in improving the effectiveness of monitoring and auditing systems for corporate financial reports.

Suggestions for further research include complementing the Beneish M-Score model with other quantitative approaches, such as the Altman Z-Score or the Piotroski F-Score, and incorporating non-financial factors such as the frequency of management turnover, the frequency of audit committee meetings, and the quality of corporate governance. This multidimensional approach is expected to improve the accuracy of fraud detection and provide a more comprehensive picture of corporate accounting behavior.

However, this study has limitations. First, the study only covered 15 companies in the mining sub-sector, thus limiting the generalizability of the findings. Second, the Beneish M-Score model used relies solely on quantitative data from financial reports, without considering qualitative factors and in-depth managerial context. Third, the use of secondary data from audited annual reports still leaves open the possibility of reporting bias or information delays. Therefore, further studies with larger samples, across sectors, and combined quantitative and qualitative approaches are highly recommended to obtain more accurate and comprehensive results.

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