

Factors Influencing Fraudulent Financial Reporting: Evidence from State-Owned Enterprises Listed on the Indonesia Stock Exchange

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Article Info	ABSTRACT
Article history: Received Jun, 2026 Revised Jun, 2026 Accepted Jun, 2026 Keywords: Financial target Ineffective monitoring Rationalization Capability Arrogance	This study investigates the determinants of fraudulent financial reporting in Indonesian state-owned enterprises listed on the Indonesia Stock Exchange during 2020–2024 using the fraud pentagon perspective. The study examines financial target, ineffective monitoring, rationalization, capability, and arrogance as independent variables, while fraudulent financial reporting risk is measured using the F-score model. From 24 listed firms, purposive sampling generated 21 companies with 89 final observations after outlier removal. Multiple linear regression results show that financial target has a positive and significant effect on fraudulent financial reporting. Ineffective monitoring and CEO arrogance also significantly influence fraudulent financial reporting, although both show negative coefficients in this sample. Meanwhile, auditor change and director change do not significantly affect fraudulent financial reporting. The model explains 39.1% of the variation in the F-score and is statistically significant. These findings suggest that fraud risk assessment in state-owned enterprises should emphasize profitability pressure, the quality of board oversight, and managerial communication signals rather than relying solely on governance structure, auditor rotation, or director turnover. <i>This is an open access article under the CC BY-SA license.</i> 

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1. INTRODUCTION Financial statement fraud remains one of the most consequential forms of corporate misconduct because it directly attacks the credibility of accounting numbers, weakens investor protection, and reduces the usefulness of audited financial statements for capital-market decisions. Reliable financial reporting is essential for maintaining market confidence and supporting stakeholder decision-making, while fraud reduces the	quality of financial information and may harm shareholders and capital-market participants [1,2]. Academic literature treats fraudulent financial reporting not merely as an isolated accounting error but as an intentional act shaped by pressure, opportunity, rationalization, capability, arrogance, and collusion within the reporting process [3]. In capital-market settings, this problem becomes more sensitive because published annual reports transmit signals to investors, creditors, government owners,
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employees, and the public. When managers manipulate the representation of performance, the market does not only receive biased numbers; it also receives a distorted narrative about the entity's accountability [4] [5].

The issue of fraudulent financial reporting is particularly relevant in the context of listed state-owned enterprises (SOEs). These entities operate at the intersection of commercial objectives and public accountability, as they are expected not only to compete in capital markets and achieve profitability targets but also to maintain public-service legitimacy, comply with state governance requirements, and respond to political and institutional expectations. This hybrid position may create competing pressures. On the one hand, listing status requires greater transparency, market discipline, and accountability to investors. On the other hand, state ownership may intensify performance expectations, reputational sensitivity, and public scrutiny. Recent studies on Indonesian SOEs show that performance pressure, governance mechanisms, internal audit effectiveness, and risk management are closely related to the prevention and detection of fraudulent financial reporting [6,7]. In addition, broader evidence from listed Indonesian firms indicates that effective corporate governance can reduce the likelihood of financial statement fraud, although this relationship may be influenced by financial distress [8]. Therefore, fraudulent financial reporting in state-owned enterprises should be examined using a framework that captures both financial pressure and governance-related constraints.

Prior studies have developed several mechanisms to identify and explain fraudulent financial reporting. Detection-oriented research often applies financial statement-based models, such as the Beneish M-Score and the F-Score model, to capture abnormal accruals, earnings manipulation, and reporting-quality signals [9]. Meanwhile, theory-oriented research commonly relies on the fraud pentagon and fraud hexagon frameworks to translate behavioral,

managerial, and governance-related conditions into measurable fraud risk factors, including pressure, opportunity, rationalization, capability, arrogance, and collusion [9]. These approaches have different emphases. Detection models focus primarily on symptoms embedded in accounting data, whereas fraud-factor models explain why such symptoms may emerge. Therefore, a more useful empirical design should link fraud-risk measurement with theoretically grounded predictors to provide a more comprehensive explanation of fraudulent financial reporting.

This article adopts the fraud pentagon perspective as a theoretical framework for explaining fraudulent financial reporting. The model extends the conventional logic of fraud by incorporating five interrelated dimensions: pressure, opportunity, rationalization, capability, and arrogance. Pressure refers to incentives that encourage management to achieve, maintain, or present desired financial performance, particularly when firms face financial stability concerns, external financing demands, or profitability expectations. Opportunity reflects weaknesses in monitoring, governance, or internal control systems that create room for misconduct. Rationalization captures the cognitive justification through which individuals reinterpret unethical reporting behavior as acceptable or necessary.

Capability represents the position, expertise, authority, and discretion required to execute and conceal fraud, while arrogance reflects managerial overconfidence, narcissism, or a sense of superiority over rules and control mechanisms. Recent international studies show that these fraud-risk dimensions are closely connected with financial statement fraud, management fraud, corporate governance, and financial misconduct [9–11]. Although these five elements are conceptually distinct, they may interact in practice. For instance, profitability pressure may become more dangerous when board monitoring is weak; changes in directors may matter only when incoming executives possess both discretion and incentives; and symbolic managerial dominance may become

problematic when annual reports are treated as image-building documents rather than accountability instruments. This interpretation is consistent with recent evidence showing that governance mechanisms, audit committees, board characteristics, and CEO traits can influence the likelihood of financial misconduct and opportunistic reporting behavior [12,13].

The present study examines the effect of fraud pentagon factors on fraudulent financial reporting in state-owned enterprises listed on the Indonesia Stock Exchange during 2020-2024. Five empirical proxies are used. Financial target is measured using return on assets (ROA). Opportunity is measured through the proportion of independent commissioners, commonly operationalized as board of directors oversight (BDOUT). Rationalization is measured by auditor change. Capability is measured by director change. Arrogance is measured by the frequency of CEO pictures in annual reports. Fraudulent financial reporting is measured through the F-score, a composite indicator that combines accrual quality and financial performance signals.

The study makes three contributions. First, it provides firm-year evidence on fraudulent financial reporting risk among listed Indonesian state-owned enterprises, a setting where financial reporting quality has both market and public-sector implications. Second, it evaluates the fraud pentagon through observable proxies that can be replicated by future researchers using annual reports and financial statements. Third, it offers a practical interpretation of mixed findings by distinguishing formal governance attributes from substantive oversight. This distinction matters because the mere presence of independent commissioners, auditor changes, or director changes does not necessarily indicate either effective fraud prevention or higher fraud propensity.

The remainder of this article is organized as follows. Section 2 discusses agency theory, fraudulent financial reporting, the fraud pentagon, and hypothesis development. Section 3 explains the research design, sample, variable measurement, and

statistical model. Section 4 presents descriptive statistics, diagnostic testing, regression results, and discussion. Section 5 concludes by summarizing the findings, implications, limitations, and future research directions.

2. LITERATURE REVIEW

2.1 *Agency theory and fraudulent financial reporting*

Agency theory explains that the separation between ownership and control creates potential conflicts of interest because managers may not always act in accordance with shareholders' objectives. In publicly listed firms, annual reports function as important contracting and monitoring mechanisms because investors, creditors, regulators, and other stakeholders rely on financial statements to assess managerial performance and firm accountability. However, managers often possess superior information about the firm's operations, which creates information asymmetry and allows them to exercise accounting discretion in reporting financial performance. Such discretion is not inherently problematic because accounting standards provide room for managerial judgment; however, it becomes a fraud risk when discretion is used intentionally to misstate accounts, conceal adverse information, or distort the firm's economic condition. Recent studies show that agency conflicts, financial leverage, weak governance, and ineffective monitoring can reduce financial reporting quality and increase the likelihood of earnings management or corporate financial misconduct [13–15].

These agency problems become more severe when managerial evaluation, compensation schemes, debt covenants, reputation, and political or institutional expectations depend heavily on accounting numbers. Therefore, financial statement fraud can be understood as an extreme manifestation of agency conflict, in which managerial discretion is transformed from a reporting judgment into an opportunistic mechanism for influencing stakeholders' perceptions of firm performance [16,17].

Misstatement risk does not arise solely from managerial incentives; it is also shaped by the effectiveness of governance mechanisms that limit managerial discretion in the financial reporting process. Boards, audit committees, independent commissioners, internal auditors, and external auditors are expected to reduce information asymmetry by monitoring management judgments, evaluating reporting choices, and strengthening the credibility of financial statements. However, recent empirical evidence suggests that the effectiveness of these mechanisms cannot be fully assessed through formal governance attributes alone. For example, audit committee independence, meeting frequency, or structural compliance may not adequately reflect the substantive quality of oversight, because actual monitoring effectiveness depends on members' expertise, objectivity, professional experience, and ability to challenge management. Bilal et al. (2023) show that audit

committee financial experts improve financial reporting quality when their educational background, professional certification, gender, and experience enhance their monitoring capacity, indicating that expertise quality matters beyond the mere presence of financial experts. Cohen et al. (2022) demonstrate that investors distinguish between formal independence and substantive independence, as personal ties between audit committee members and CEOs can weaken perceived independence, while industry expertise can strengthen perceived competence and audit committee effectiveness. Therefore, governance mechanisms should be evaluated not only based on formal structures, but also on the diligence, expertise, skepticism, and actual influence exercised in the reporting oversight process.

Fraudulent financial reporting differs from ordinary reporting error because it involves intent. The literature normally associates the phenomenon with deliberate misclassification, premature revenue recognition, inflated assets, omitted liabilities, manipulated disclosures, or accounting estimates that deviate from economic reality. Because intent is difficult to observe directly, empirical accounting studies typically use proxies. Some studies use enforcement actions or restatements; others use statistical models based on accruals and financial performance. This article follows the latter approach by using the F-score as a continuous measure

of fraudulent financial reporting risk.

2.2 *Fraud Pentagon as an Explanatory Framework*)

The fraud triangle explains misconduct through three fundamental conditions: pressure, opportunity, and rationalization. In the context of financial statement fraud, Skousen et al. (2009) operationalized this framework by translating SAS No. 99 fraud-risk factors into measurable firm-level indicators, showing that pressure-related factors such as rapid asset growth, cash needs, and external financing, as well as opportunity-related factors such as ownership structure and board control, are associated with financial statement fraud. However, subsequent research argues that the fraud triangle may not fully explain why certain individuals are able to execute complex fraud schemes while others are not. For this reason, the fraud diamond extends the original model by adding capability, while the fraud pentagon further incorporates arrogance or ego-related attributes as additional drivers of fraudulent behavior [10,21]. In financial reporting settings, capability is particularly important because accounting fraud typically requires access to accounting systems, technical knowledge of reporting rules, authority over estimates and disclosures, and the ability to influence subordinates, internal auditors, or external auditors. Arrogance is equally relevant because powerful executives may perceive themselves as being above ordinary governance constraints, thereby increasing the likelihood that

discretion will be used opportunistically rather than responsibly. This interpretation is consistent with recent studies showing that fraud diamond and fraud pentagon perspectives provide broader explanatory power for financial reporting misconduct, especially when fraud involves managerial authority, professional judgment, and executive dominance [22].

The development of fraud theory has generated both support and criticism in the accounting and auditing literature. Free (2015) argues that fraud-triangle thinking remains useful because it offers a practical vocabulary for organizing fraud risk factors, particularly pressure, opportunity, and rationalization. However, the model should not be interpreted as a mechanical framework in which the presence of these elements automatically leads to fraud. In a similar vein, Morales et al. (2014) caution that the fraud triangle may construct an overly narrow image of the “risky individual” while giving insufficient attention to broader organizational, institutional, and governance conditions. This criticism is particularly relevant in the context of state-owned enterprises (SOEs). Fraud risk in SOEs may not only arise from individual motives but also from state ownership, public accountability, complex stakeholder expectations, political and institutional pressures, and the extent to which governance bodies exercise substantive rather than merely formal monitoring. Recent studies on Indonesian

SOEs support this broader view by showing that fraudulent financial reporting risk is associated with fraud-risk factors such as pressure, opportunity, capability, rationalization, ego, and governance-related conditions [7,9]. Therefore, the analysis of fraud in SOEs should move beyond an individual-centered explanation and consider the interaction between managerial motives, governance effectiveness, and institutional context.

The empirical interpretation must recognize that proxies are

imperfect. A high proportion of independent commissioners may indicate stronger monitoring rather than weaker control. Auditor change may occur for mandatory rotation or procurement reasons rather than concealment. Director change may reflect restructuring rather than fraud capability. CEO picture frequency can indicate symbolic dominance, but it can also reflect annual-report design conventions. These measurement limitations require careful interpretation of regression findings.

Table 1. Conceptual framework

Fraud pentagon element	Proxy	Expected relationship	Dependent variable
Pressure	Financial target (ROA)	Significant	Fraudulent financial reporting (F-score)
Opportunity	Ineffective monitoring (BDOUT)	Significant	Fraudulent financial reporting (F-score)
Rationalization	Auditor change	Significant	Fraudulent financial reporting (F-score)
Capability	Director change	Significant	Fraudulent financial reporting (F-score)
Arrogance	CEO-picture frequency	Significant	Fraudulent financial reporting (F-score)

3. METHODS

This study uses a quantitative explanatory design. The unit of analysis is the firm-year observation. The population consists of state-owned enterprises listed on the Indonesia Stock Exchange during 2020-2024. The research used purposive sampling because the analysis required complete annual reports and financial statement data for all variables. From 24 listed state-owned enterprises, three firms were excluded because their financial reports were incomplete for the observation period. The final firm sample contained 21 firms, generating 105 initial firm-year observations. After diagnostic testing, 16 outlier observations were removed to satisfy the normality requirement, leaving 89 observations for regression estimation.

The study relies on secondary data obtained from annual reports and financial statements. The dependent variable is fraudulent financial reporting risk measured by the F-score. The F-score combines accrual quality and financial performance information, making it suitable as a continuous indicator of misstatement likelihood. Although the F-score does not prove the existence of fraud, it identifies firm-year observations with reporting characteristics associated with higher misstatement risk. This distinction is important. The article uses the term fraudulent financial reporting to follow the study variable label, but the empirical measure should be interpreted as fraud risk or indication rather than legal proof of fraud.

The independent variables operationalize the five fraud-pentagon dimensions. Financial target is measured by return on assets (ROA). Ineffective monitoring is measured by the proportion of independent commissioners to total commissioners (BDOUT). Rationalization is measured as a dummy variable coded 1 if the firm changed its external auditor during the observation period and 0 otherwise. Capability is measured as a dummy variable coded 1 if the firm changed directors during the observation period and 0 otherwise. Arrogance is measured by the number of CEO pictures appearing in the annual report. These proxies are observable, replicable, and consistent with the fraud-factor logic used in prior empirical studies.

Multiple linear regression is used to test the hypotheses. The model is specified as follows:

$$\text{FFR} = \alpha + \beta_1 \text{ROA} + \beta_2 \text{BDOUT} + \beta_3 \text{CPA} + \beta_4 \text{DCHANGE} + \beta_5 \text{CEO's Pic} + \varepsilon.$$

FFR denotes fraudulent financial reporting measured by the F-score; ROA denotes financial target; BDOUT denotes ineffective monitoring; CPA denotes auditor change; DCHANGE denotes director change; and CEO's Pic denotes CEO-picture frequency. Before hypothesis testing, the analysis evaluates normality, multicollinearity, heteroscedasticity, autocorrelation, model fit, and coefficient significance.

Table 2. Sample selection

Criteria	Firms/observations
State-owned enterprises listed on the Indonesia Stock Exchange during 2020-2024	24 firms
Firms excluded because financial reports were incomplete during 2020-2024	(3 firms)
Final firms used as sample	21 firms
Observation period	5 years
Initial firm-year observations	105 observations
Outlier observations removed after diagnostic testing	(16 observations)
Final firm-year observations for regression	89 observations

Table 3. Operational definition of variables

Variable	Proxy and measurement	Scale
Fraudulent financial reporting	F-score = Accrual Quality + Financial Performance	Ratio
Financial target / pressure	ROA = Net income / Total assets x 100%	Ratio
Ineffective monitoring / opportunity	BDOUT = Independent commissioners / Total commissioners	Ratio
Rationalization	Auditor change: 1 if the firm changed auditor, 0 otherwise	Nominal
Capability	Director change: 1 if the firm changed directors, 0 otherwise	Nominal
Arrogance	CEOPIC = number of CEO pictures in the annual report	Ratio

4. RESULTS AND DISCUSSION

4.1 Descriptive statistics

The descriptive statistics show meaningful variation across variables. The F-score ranges from 0.01 to 0.98, with a mean of 0.2469 and a standard deviation of 0.20754. This indicates that the sample contains both low-risk and relatively high-risk reporting

observations. ROA ranges from -30.89% to 21.89%, with a mean of 3.3943 and a standard deviation of 6.55762. The wide dispersion reflects the heterogeneous financial performance of listed state-owned enterprises during the 2020-2024 period, including years affected by sector-specific shocks and post-pandemic recovery dynamics.

Table 4. Descriptive statistics

Variable	N	Minimum	Maximum	Mean	Std. deviation
Fraudulent financial reporting (F-score)	89	0.01	0.98	0.2469	0.20754
Financial target (ROA)	89	-30.89	21.89	3.3943	6.55762
Opportunity (BDOU)	89	0.25	0.75	0.4559	0.11971
Rationalization (auditor change)	89	0	1	0.35	0.479
Capability (director change)	89	0	1	0.33	0.471
Arrogance (CEO-picture frequency)	89	2	7	3.55	1.023

BDOU ranges from 0.25 to 0.75, with a mean of 0.4559. This suggests that independent commissioners are present in the governance structure, but the proportion varies across firms. Auditor change has a mean of 0.35, meaning that approximately 35% of observations experienced auditor change. Director change has a mean of 0.33, meaning that about one-third of observations involved director change. CEO-picture frequency ranges from 2 to 7 pictures, with a mean of 3.55. These values confirm that the sample provides sufficient variation to test the fraud-pentagon proxies.

The regression model is statistically significant. The F-test reports a value of 10.674 with a significance value below 0.001. The model summary reports $R = 0.625$, $R\text{-square} = 0.391$, and adjusted $R\text{-square} = 0.355$. Thus, the five fraud-pentagon proxies explain 39.1% of the variation in fraudulent financial reporting risk measured by the F-score. For accounting fraud research that uses archival proxies, this explanatory power is substantively meaningful because fraud risk is influenced by many unobserved factors, including internal control quality, managerial ethics, audit effort, accounting-estimate complexity, and enforcement risk.

4.2 Regression Results

Table 5. Diagnostic and model-fit summary

Test	Key statistic	Decision
Normality	Kolmogorov-Smirnov Asymp. Sig. = 0.200	Residuals normally distributed after outlier treatment
Multicollinearity	VIF range = 1.024-1.125	No multicollinearity
Heteroscedasticity	Park-test sig. values > 0.05	No heteroscedasticity
Autocorrelation	Runs-test Asymp. Sig. = 0.338	No autocorrelation
Model fit	F = 10.674; Sig. < 0.001	Regression model is significant
Coefficient of determination	R-square = 0.391; Adjusted R-square = 0.355	Model explains 39.1% of F-score variation

Table 6. Multiple linear regression coefficients

Variable	B	Std. error	Beta	t	Sig.	Result
Constant	0.409	0.084	-	4.853	0.000	-
Financial target (ROA)	0.014	0.002	0.452	5.385	0.000	H1 supported
Opportunity (BDOU)	-0.304	0.135	-0.175	-2.257	0.027	H2 supported
Rationalization (auditor change)	0.055	0.034	0.126	1.565	0.121	H3 not supported
Capability (director change)	0.059	0.035	0.134	1.687	0.095	H4 not supported
Arrogance (CEO-picture frequency)	-0.052	0.016	-0.254	-3.269	0.002	H5 supported

The coefficient estimates show that ROA has a positive and significant coefficient ($\beta = 0.014$, $t = 5.385$, $p < 0.001$). H1 is supported.

This result indicates that higher profitability pressure is associated with higher fraudulent financial reporting risk. The finding is

consistent with the argument that financial targets can create incentives to manage or manipulate reported performance when managers face expectations to present favorable outcomes. In state-owned enterprises, performance pressure may not only come from investors; it may also come from government ownership expectations, public scrutiny, and sectoral benchmarks.

BDOUT has a negative and significant coefficient ($\beta = -0.304$, $t = -2.257$, $p = 0.027$). H2 is supported in terms of statistical significance, although the direction is negative. This means that a higher proportion of independent commissioners is associated with lower F-score risk in this sample. The result suggests that independent commissioners may function as a monitoring mechanism that constrains financial reporting risk. It also shows why the label 'ineffective monitoring' should be interpreted carefully. If BDOUT is measured as the proportion of independent commissioners, a higher value can represent more effective monitoring rather than weaker monitoring. This finding aligns with governance literature that emphasizes independent oversight as a fraud-deterrence mechanism.

Auditor change has a positive but insignificant coefficient ($\beta = 0.055$, $t = 1.565$, $p = 0.121$). H3 is not supported. This result suggests that auditor change does not explain variation in F-score risk among listed state-owned enterprises during the observation period. The finding is plausible because auditor rotation can occur for regulatory, procurement, or administrative reasons. Without information about auditor-client disagreement, audit opinion changes, or resignation circumstances, a simple change dummy may be too broad to capture rationalization.

Director change has a positive but insignificant coefficient ($\beta = 0.059$, $t = 1.687$, $p = 0.095$). H4 is not supported at the 5% significance level. The result indicates that director change alone does not provide sufficient evidence of fraud capability. Changes in directors can result from governance renewal, restructuring, tenure rotation, performance recovery efforts, or

owner decisions. This reinforces the argument that capability is difficult to measure using a simple turnover dummy. Future research should use richer indicators, such as CEO tenure, executive accounting expertise, concentration of decision rights, prior misconduct exposure, or the presence of dominant founder-like leadership.

CEO-picture frequency has a negative and significant coefficient ($\beta = -0.052$, $t = -3.269$, $p = 0.002$). H5 is supported in terms of statistical significance, but the negative direction differs from the conventional expectation that greater CEO prominence increases fraud risk. A plausible interpretation is that, in Indonesian state-owned enterprises, more CEO pictures may reflect stronger transparency, more formalized communication, or more extensive annual-report disclosure rather than excessive arrogance. The result does not invalidate the arrogance concept; rather, it shows that the proxy may be context-sensitive. Visual prominence can represent image management in one setting but routine corporate communication in another.

4.3 Discussion

The results support the importance of financial target, monitoring structure, and CEO communication signals, while auditor change and director change do not show significant effects. The strongest result is the positive effect of ROA. This finding indicates that profitability conditions are not merely performance outcomes; they can also operate as pressure channels. In state-owned enterprises, managers may face multiple audiences. Shareholders expect financial returns, the government expects accountability, and the public expects service continuity. When performance becomes a key legitimacy marker, pressure can shape reporting incentives.

The significant negative effect of BDOUT deserves careful interpretation. If the variable is called ineffective monitoring but measured as the proportion of independent commissioners, the expected sign should be clarified before hypothesis testing. A larger proportion of independent commissioners

can logically indicate more effective monitoring. The negative coefficient therefore suggests that independent commissioner representation may reduce fraud risk. A skeptical reading is also necessary: structural independence does not automatically guarantee substantive oversight. However, in this dataset, the empirical association suggests that independent oversight has a disciplining function. The article therefore interprets the result as evidence of a governance effect rather than evidence that ineffective monitoring reduces fraud.

The insignificant effect of auditor change suggests that rationalization may not be captured well by external auditor turnover. Rationalization is a psychological mechanism; it refers to the actor's justification for misconduct. Auditor change is only an institutional event. The two may be related, but the relation is indirect. If a firm changes auditors because of mandatory rotation or tender rules, the event says little about managerial rationalization. More precise indicators may include audit opinion shopping, audit report lag, modified opinions, restatement history, or textual indicators of defensive management discussion.

The insignificant effect of director change raises a similar measurement issue. Capability refers to the ability to commit and conceal fraud, not merely the occurrence of a leadership transition. A newly appointed director may increase capability only when the director has sufficient power, information access, accounting knowledge, and opportunity to influence reporting. Conversely, a director change can strengthen governance if the new leadership improves control. The dummy variable cannot separate these mechanisms. For this reason, the finding should not be interpreted as proof that capability is irrelevant. It suggests that director change is an insufficient proxy for capability in this setting.

The negative coefficient for CEO-picture frequency is the most context-sensitive result. Prior fraud-pentagon studies often treat frequent CEO pictures as evidence of arrogance. This assumption may be too

strong when annual-report design is standardized or when management photographs function as part of transparency communication. In state-owned enterprises, annual reports may emphasize leaders to present accountability, program implementation, and organizational transformation. More pictures can therefore accompany richer disclosure rather than weaker integrity. A better arrogance measure may combine CEO-picture frequency with CEO-chair duality, compensation dominance, tone of CEO letters, personal pronoun use, or narcissistic language measures.

The overall evidence suggests that fraud-pentagon analysis should not be reduced to a mechanical checklist. Pressure, opportunity, rationalization, capability, and arrogance are theoretically meaningful categories, but their empirical proxies require contextual validation. The same observable indicator can carry different meanings across ownership forms, regulatory systems, and reporting cultures. This is particularly important in state-owned enterprises because their governance arrangements blend market, bureaucratic, and political accountability. The empirical task is therefore not only to test whether each proxy is significant, but also to determine whether the proxy represents the underlying fraud element with sufficient construct validity.

For practitioners, the findings imply that fraud-risk assessment should prioritize financial pressure and substantive monitoring quality. Internal auditors and audit committees should track periods of abnormal profitability pressure, sectoral downturn, loss recovery, and aggressive performance narratives. External auditors should treat high profitability expectations as a source of heightened professional skepticism. Regulators and state shareholders should not focus only on formal compliance with independent commissioner ratios, but also evaluate commissioner expertise, attendance, agenda control, and the quality of questions raised during financial reporting reviews.

For researchers, this study highlights the need for richer measurement in fraud-pentagon studies. Fraud theory is not weak

because some proxies are insignificant; rather, proxies can be weak because they simplify complex constructs. Rationalization and capability are particularly difficult to observe through archival data. Future studies can combine archival variables with qualitative evidence, text analysis, interview data, audit report narratives, enforcement actions, or machine learning features extracted from annual reports. Such designs would produce stronger construct validity while preserving empirical replicability.

Listed state-owned enterprises provide an analytically rich context for studying fraudulent financial reporting because they combine public ownership with market accountability. Unlike purely private firms, they often pursue strategic, developmental, or public-service objectives alongside profitability. Unlike unlisted public entities, they must also satisfy disclosure expectations in the capital market. This duality makes the reporting environment complex. Managers can face pressure to show commercial discipline while also maintaining legitimacy as public assets. Such pressure can affect accounting judgments, especially when performance deteriorates or when government stakeholders expect strong financial contribution.

The 2020-2024 period is also important because it contains both disruption and recovery. Several sectors experienced operational shocks, financing constraints, asset impairment issues, and changing market demand. In such periods, financial statement items become more judgment-intensive. Estimates of receivables, impairment, inventory, project costs, revenue recognition, and fair value can change substantially. Fraud-risk analysis must therefore consider the possibility that pressure increases when firms try to communicate resilience, turnaround, or stable profitability in a volatile economic environment.

State ownership also affects governance interpretation. Independent commissioners in state-owned enterprises may have formal independence, but their practical role depends on appointment processes, expertise, access to information,

board culture, and willingness to challenge management. The significant negative BDOUT coefficient should therefore be understood as evidence that formal independent representation may matter in this sample, but not as final proof that all independent commissioners exercise equally effective monitoring. The real governance question is not only how many independent commissioners sit on the board, but whether they have the resources and authority to interrogate financial reporting assumptions.

Because state-owned enterprises receive heightened public attention, managerial communication in annual reports may carry a stronger legitimacy function. Photographs of the CEO, board, projects, social responsibility programs, and operational achievements are often used to narrate transformation and accountability. This context helps explain why CEO-picture frequency can have a negative coefficient. The visual presence of top management may indicate an extensive annual report rather than narcissistic or arrogant leadership. Future studies should therefore treat visual indicators as culturally and institutionally embedded signals.

The setting also shows why fraud research should integrate accounting, governance, and public administration perspectives. Accounting models can detect abnormal reporting patterns, while governance theory explains monitoring arrangements and agency conflicts. Public administration perspectives help explain why state-owned enterprises may respond to political mandates, public legitimacy, and social expectations. A single theory cannot fully capture this setting. The fraud pentagon provides a useful organizing framework, but contextual interpretation remains necessary.

Measurement issues and construct validity

The F-score is useful because it transforms accounting data into a continuous fraud-risk indicator. It is more practical than enforcement-based measures when official fraud cases are limited or when researchers lack legal confirmation. However, the F-score should be interpreted carefully. It does not

label a firm as legally fraudulent. It identifies financial reporting patterns associated with misstatement risk. This distinction matters ethically and methodologically. In the present article, the dependent variable reflects the indication or risk of fraudulent financial reporting rather than a proven violation.

The pressure proxy, ROA, also requires careful interpretation. A high ROA can indicate genuine operational efficiency, not necessarily manipulation. The positive coefficient does not mean that profitable firms commit fraud. It indicates that changes in profitability are statistically associated with F-score risk in the sample. One possible explanation is that strong profitability targets induce management to sustain favorable performance. Another explanation is that accrual-based reporting components embedded in the F-score move with profitability. Researchers should therefore avoid overstatement and interpret the coefficient as a risk association, not a causal proof of unethical behavior.

The opportunity proxy is more complicated because the study labels the construct as ineffective monitoring but measures it through the proportion of independent commissioners. The theoretical construct and empirical indicator point in opposite directions when the indicator is interpreted as board independence. If higher BDOUT means stronger independent oversight, a negative coefficient is theoretically consistent with effective monitoring. This shows an important lesson for fraud-pentagon research: construct labels must match the direction of measurement. Otherwise, empirical findings can be misinterpreted.

Rationalization is the most difficult fraud-pentagon element to measure using annual-report data. It is essentially cognitive and moral: the actor convinces himself or herself that the behavior is acceptable, necessary, temporary, or deserved. Auditor change does not directly capture that psychological process. It may only indicate a change in external assurance provider. This explains why the auditor-change variable often has inconsistent results across studies. A

more direct rationalization indicator would require textual, interview, or case-based evidence.

Capability is also difficult to measure with a director-change dummy. The ability to commit financial statement fraud depends on authority, technical knowledge, access to accounting systems, control over subordinates, understanding of audit procedures, and capacity to conceal evidence. Director turnover captures a change in personnel, but it does not capture whether the new director has these capabilities or whether control systems constrain them. This limitation is not a weakness of the study alone; it reflects a broader measurement challenge in archival fraud research.

Arrogance, proxied by CEO-picture frequency, is increasingly used in fraud-pentagon studies, but its validity depends on reporting culture. In firms with highly standardized annual-report templates, pictures may reflect design norms. In firms with strong CEO-centered communication, pictures may reflect executive dominance. In firms emphasizing stakeholder engagement, pictures may signal public accountability. Because the same visual indicator can mean different things, researchers should combine it with additional measures such as CEO letter tone, first-person pronoun use, CEO duality, executive compensation dominance, or board dependence.

4.4 Limitations and future research

The study has several limitations. First, the sample is limited to listed Indonesian state-owned enterprises. This strengthens contextual relevance but limits generalizability to private firms, unlisted state-owned enterprises, financial institutions, or firms in other countries. Future research can compare state-owned and private firms to determine whether fraud-pentagon proxies operate differently across ownership types.

Second, the study uses the F-score as a proxy for fraudulent financial reporting. The F-score detects risk patterns, not legally confirmed fraud. Future studies can

triangulate the F-score with restatements, enforcement announcements, audit opinions, regulatory sanctions, or media-investigated cases. Such triangulation would provide a stronger distinction between accounting risk and actual fraud occurrence.

Third, the study applies multiple linear regression to panel-like firm-year data. While this approach follows the study design, future research could employ panel-data regression, logistic regression for high-risk classification, robust standard errors, or machine learning classification to test the stability of findings. These methods could better address unobserved firm heterogeneity, sectoral effects, and non-linear relationships.

Fourth, several fraud-pentagon proxies are indirect. Auditor change may not reflect rationalization, director change may not reflect capability, and CEO-picture frequency may not reflect arrogance. Future research should strengthen construct validity by combining archival proxies with qualitative evidence. Interviews with auditors, audit committees, or internal control officers could reveal why certain changes occurred and whether they were related to fraud risk.

Fifth, the study does not include control variables such as firm size, leverage, liquidity, sector, audit quality, firm age, audit committee expertise, or ownership concentration. These controls may affect the F-score and could alter coefficient estimates. Future research should expand the model to include both fraud-pentagon variables and governance/financial controls.

Finally, the results show that context matters. The negative CEO-picture coefficient is a warning against importing proxy meanings from one setting to another without validation. Future studies can develop context-sensitive arrogance measures using annual-report visual analysis, CEO-letter sentiment, impression-management indicators, and governance dominance metrics. Such research would advance fraud-pentagon theory from checklist-based testing toward more valid and institutionally aware explanation.

5. CONCLUSION

This article examines the effect of fraud-pentagon factors on fraudulent financial reporting risk among state-owned enterprises listed on the Indonesia Stock Exchange during 2020-2024. Using 89 firm-year observations after outlier treatment and applying multiple linear regression, the study finds that financial target, independent commissioner proportion, and CEO-picture frequency have significant effects on fraudulent financial reporting risk measured by the F-score. Auditor change and director change do not have significant effects.

The findings produce several substantive conclusions. First, profitability pressure matters. ROA has a positive and significant association with F-score risk, indicating that financial targets can become a pressure channel in financial reporting. Second, monitoring structure matters, but the operational definition must be interpreted carefully. The negative coefficient of BDOUT suggests that a higher proportion of independent commissioners is associated with lower fraud risk, implying a monitoring role rather than ineffective monitoring. Third, symbolic CEO visibility has a significant but negative association with fraud risk, suggesting that CEO-picture frequency may not universally represent arrogance. In this state-owned enterprise context, it may also reflect formal communication and disclosure practices.

The study contributes to fraud-risk literature by showing that fraud-pentagon proxies do not operate uniformly across contexts. It also contributes to accounting practice by emphasizing that fraud-risk assessment should integrate financial pressure, governance effectiveness, and communication signals rather than relying on a single red flag. The main limitation lies in the use of archival proxies. F-score indicates potential risk but does not establish legal fraud. Auditor change, director change, and CEO-picture frequency are indirect measures of rationalization, capability, and arrogance. Future research should validate these constructs using mixed evidence, such as textual analysis, governance-quality scores,

audit committee data, enforcement cases, and interviews with auditors or governance officers.

In practical terms, state shareholders, audit committees, internal auditors, and external auditors should pay closer attention to years when firms face strong profitability expectations. They should also strengthen the substantive function of independent commissioners by improving financial

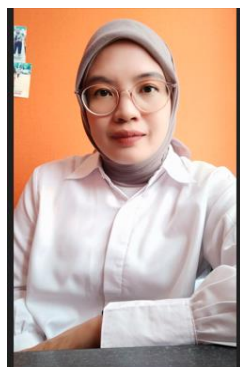
expertise, meeting quality, access to internal audit findings, and follow-up mechanisms. Finally, researchers should refine arrogance measurement by combining visual cues with narrative, linguistic, and governance indicators. Such refinement will make fraud-pentagon research more empirically precise and more useful for prevention-oriented accounting governance.

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