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Fraud Hexagon and Fraudulent Financial Reporting in ASEAN Islamic Banks: Evidence from Indonesia, Malaysia, Brunei Darussalam, and the Philippines

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ABSTRACT

Fraudulent financial reporting in Islamic banks remains an important concern because Sharia compliance does not automatically eliminate governance weaknesses and managerial opportunism. However, empirical evidence on the determinants of fraudulent financial reporting in ASEAN Islamic banks using the Fraud Hexagon framework remains limited. This study aimed to examine the effect of the Fraud Hexagon factors on fraudulent financial reporting in Islamic banks across Indonesia, Malaysia, Brunei Darussalam, and the Philippines during 2020–2024. Using a quantitative explanatory design, this study analyzes 152 bank-year observations based on audited annual reports. Fraudulent financial reporting is proxied by the F-Score, while the independent variables consist of growth pressure, effective monitoring, related-party sales, CEO education background, CEO tenure, and corporate involvement in government projects. The data were analyzed using partial least squares–structural equation modeling (PLS-SEM). The results show that CEO tenure has a significant positive effect on fraudulent financial reporting ($\beta = 0.330$, $p < 0.001$), while effective monitoring also has a significant effect ($\beta = 0.178$, $p = 0.021$). The model explains 16.5% of the variation in the F-Score. These findings imply that Islamic banks should strengthen governance mechanisms, evaluate long executive tenure, and improve monitoring effectiveness to reduce fraudulent financial reporting risk.

ABSTRAK

Kecurangan laporan keuangan bank syariah menjadi perhatian penting karena kepatuhan syariah tidak secara otomatis menghilangkan kelemahan tata kelola dan perilaku oportunistik manajemen. Bukti empiris mengenai determinan kecurangan laporan keuangan pada bank syariah ASEAN dengan menggunakan kerangka Fraud Hexagon masih terbatas. Penelitian ini bertujuan untuk menguji pengaruh faktor-faktor Fraud Hexagon terhadap kecurangan laporan keuangan pada bank syariah di Indonesia, Malaysia, Brunei Darussalam, dan Filipina selama periode 2020–2024. Dengan menggunakan desain kuantitatif eksplanatori, penelitian ini menganalisis 152 observasi bank-tahun berdasarkan laporan tahunan yang diaudit. Kecurangan laporan keuangan diproksikan dengan F-Score, sedangkan variabel independen terdiri atas growth pressure, effective monitoring, related-party sales, CEO education background, CEO tenure, dan corporate involvement in government projects. Data dianalisis menggunakan PLS-SEM. Hasil penelitian menunjukkan bahwa CEO tenure berpengaruh positif signifikan terhadap kecurangan laporan keuangan ($\beta = 0{,}330$; $p < 0{,}001$), sedangkan effective monitoring juga berpengaruh signifikan ($\beta = 0{,}178$; $p = 0{,}021$). Penelitian menjelaskan 16.5% variasi F-Score. Temuan ini mengimplikasikan bahwa bank syariah perlu memperkuat mekanisme tata kelola, mengevaluasi masa jabatan eksekutif yang panjang, dan meningkatkan efektivitas pengawasan untuk mengurangi risiko kecurangan laporan keuangan.

INTRODUCTION

Islamic banking has become an important component of the financial systems of ASEAN countries, particularly Indonesia, Malaysia, Brunei Darussalam, and the Philippines. Its development reflects the increasing demand for financial services that comply with Sharia principles and promote justice, transparency, accountability, and ethical responsibility in the financial sector. Islamic banks operate under values that prohibit riba, maysir, and gharar while emphasizing trust and fairness in financial transactions (Valley, 2023; Karimullah, 2023; Hakimah Yaacob, Razali Mat Zin, 2024). However, Sharia compliance does not automatically eliminate governance weaknesses or managerial opportunism. Therefore, fraudulent financial reporting in Islamic banks remains an important issue because the manipulation of financial statements may damage not only financial credibility but also the ethical legitimacy of Islamic financial institutions.

Recent cases in ASEAN show that Islamic banks are not immune to fraud risk. In Indonesia, several cases have revealed weaknesses in internal controls and supervision, including the alleged manipulation of deposit records through duplicate passbooks involving a former employee of Bank Syariah Indonesia in Bengkulu and similar irregularities reported in Banda Aceh. In Malaysia, despite a more mature Islamic banking industry, governance gaps and control weaknesses remain relevant concerns (Suharto, 2022; Bader et al., 2024). These cases indicate that the Sharia label alone cannot guarantee effective governance or reporting integrity. Therefore, early detection of fraudulent financial reporting is necessary to protect stakeholders and maintain public trust in Islamic banking.

One model commonly used to identify the potential risk of fraudulent financial reporting is the Fraud Score Model or F-Score developed by Dechow et al. (2011). The F-Score evaluates fraud risk through accrual quality and financial performance indicators. Although it does not provide direct evidence of fraud, it functions as an early warning mechanism for detecting unusual reporting patterns that require further scrutiny. In Islamic banking, the use of the F-Score is relevant because it allows researchers to assess reporting quality using measurable financial indicators rather than relying only on normative assumptions about Sharia compliance.

The Fraud Hexagon framework provides a useful theoretical lens for explaining fraudulent financial reporting because it views fraud as a multidimensional phenomenon involving pressure, opportunity, rationalization, capability, arrogance, and collusion. Previous studies have applied the Fraud Hexagon in various contexts, such as state-owned enterprises, public companies, regional governments, and other organizational settings. However, these findings remain inconsistent. Some studies have shown that pressure and collusion are dominant factors, while others emphasize monitoring, capability, or arrogance (Lastanti et al., 2022; Indriaty & Thomas, 2023; Achmad et al., 2024; Bader et al., 2024). These mixed findings suggest that fraud determinants are context-specific and may depend on institutional settings, governance quality, regulatory environments, and industry characteristics.

Despite the growing fraud literature, empirical evidence on fraudulent financial reporting in Islamic banks remains limited, especially in a cross-country ASEAN context. Many prior studies have focused on conventional companies, non-financial firms, public-sector institutions, or single-country samples. This creates a research gap because Islamic banks combine commercial objectives with religious legitimacy and operate under different governance and regulatory environments. Therefore, it remains important to examine whether the Fraud Hexagon variables can explain fraudulent financial reporting risk in Islamic banks across ASEAN countries.

Based on this gap, this study examines the effect of growth pressure, effective monitoring, related-party transaction sales, CEO education background, CEO tenure, and corporate involvement in government projects on fraudulent financial reporting risk in ASEAN Islamic banks during 2020 to 2024. Fraudulent financial reporting is proxied by the F-Score. This study contributes to the literature in three ways. First, it extends the application of the Fraud Hexagon framework to Islamic banking, a sector that remains underexplored in fraud research. Second, it provides cross-country evidence from Islamic banks in Indonesia, Malaysia, Brunei Darussalam, and the Philippines. Third, it integrates the F-Score-based fraud risk measurement with governance and managerial variables derived from the Fraud Hexagon framework. Practically, the findings are expected to help Islamic bank management, internal auditors, audit committees, Sharia supervisory boards, and regulators strengthen early warning systems and improve governance mechanisms for reducing fraudulent financial reporting risk.

THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Islamic banking is founded on ethical and religious principles that emphasize justice, transparency, accountability, and trust. Unlike conventional banking, Islamic banks are expected not only to pursue financial performance but also to uphold Sharia values in their operational and reporting practices. From the Tawhid String Relation perspective, economic activities should be connected to divine values, knowledge, institutional policy, and social welfare. Therefore, Islamic financial institutions are expected to transform Sharia principles into governance practices that promote maslahah and prevent harmful behavior (Nugroho et al., 2020, 2021). In this context, financial reporting is not merely a technical accounting process but also a form of accountability and amanah to stakeholders.

However, ethical foundations do not automatically eliminate the possibility of opportunistic behavior. Agency theory explains that conflicts of interest may arise when principals delegate authority to agents. Jensen and Meckling (1976) argue that managers may have personal interests that differ from those of shareholders and other stakeholders. Eisenhardt (1989) further explains that information asymmetry allows agents to act opportunistically when monitoring is weak. In Islamic banking, agency problems may still occur because managers face pressure to maintain institutional performance, reputation, and stakeholder confidence. Thus, fraudulent financial reporting can emerge when managerial discretion, weak governance, and information asymmetry are not effectively controlled.

Fraud theory provides a more specific explanation of the factors that may lead to fraudulent behavior. Skousen (2008) introduced the Fraud Triangle, which consists of pressure, opportunity, and rationalization. Wolfe and Hermanson (2004) expanded it into the Fraud Diamond by adding capability. Later, the model was further developed by including arrogance and collusion, forming the Fraud Hexagon framework. In this study, the Fraud Hexagon framework is used as the main theoretical lens because it explains fraud as a multidimensional phenomenon involving pressure, opportunity, rationalization, capability, arrogance, and collusion. The use of the Fraud Hexagon in recent studies has also been supported by Jannah et al. (2021), Lastanti et al. (2022), Khamainy et al. (2022), Handoko & Salim (2022), Indriaty & Thomas (2023), Achmad et al. (2024), and Bader et al. (2024).

In this study, fraudulent financial reporting is proxied by the F-Score developed by Dechow et al. (2011). The F-Score is used as an early warning indicator to identify the potential risk of financial statement misstatement through accrual quality and financial performance indicators. The six Fraud Hexagon dimensions are represented by CEO education background, CEO tenure, corporate involvement in government projects, effective monitoring, growth pressure, and related-party transaction sales. These variables are expected to explain variations in fraudulent financial reporting risk in Islamic banks across ASEAN.

CEO Education Background and Fraudulent Financial Reporting

Capability refers to the ability of an individual to commit and conceal fraud. In this study, CEO education background is used as a proxy for capability because higher education may reflect stronger analytical ability, broader knowledge of financial reporting, and greater understanding of complex organizational systems. A CEO with a master's degree or higher may have better competence in managing banking operations and financial reporting. However, from the fraud hexagon perspective, higher capability may also increase the ability to exploit accounting discretion when there is pressure or weak monitoring. From the agency theory perspective, capable managers may use their knowledge either to improve accountability or to conceal opportunistic reporting behavior. Previous studies have shown that executive capability may influence fraudulent reporting, although the results remain mixed (Achmad et al., 2024; Mutmainah & Mahmudah, 2024; Setiawan & Soewarno, 2025). Therefore, this study proposes the following hypothesis:

H1: The CEO's educational background positively affects fraudulent financial reporting in ASEAN Islamic banks.

CEO Tenure and Fraudulent Financial Reporting

Arrogance refers to executive dominance, overconfidence, and belief that internal controls can be overridden. CEO tenure is used as a proxy for arrogance because long-serving CEOs may accumulate power, build loyal internal networks and become less constrained by governance mechanisms. Although long tenures may provide experience and stability, they may also increase managerial entrenchment and reduce independent oversight. From an agency theory perspective, long CEO tenure may increase information asymmetry because long-serving executives may have greater control over internal information and reporting processes. In Islamic banks, this condition may weaken the principle of amanah if leadership power is not balanced with strong governance. Prior studies suggest that executive dominance and long tenure may increase fraud risk (Adhitama et al., 2023; Bechihi & Nafti, 2025; Mardini, 2025). Therefore, this study proposes the following hypothesis:

H2: CEO tenure positively affects fraudulent financial reporting in ASEAN Islamic banks.

Corporate Involvement in Government Projects and Fraudulent Financial Reporting

Collusion refers to cooperation between two or more parties to conceal misconduct or manipulate transactions. In this study, corporate involvement in government projects is used as a proxy for collusion. Government-related projects may involve complex contracts, political relationships, and significant financial values. These conditions may create opportunities for opaque transactions, discretionary reporting, and coordinated manipulation. From the agency theory perspective, collusive relationships may increase information asymmetry and reduce transparency because certain transactions may be influenced by interests outside ordinary business considerations. In Islamic banking, such practices may also conflict with the values of fairness, accountability, and transparency. Previous studies emphasize that collusion is an important element in detecting financial statement fraud (Handoko & Salim, 2022; Kulmie & Ibrahim, 2024; Mutmainah & Mahmudah, 2024). Therefore, this study proposes the following hypothesis:

H3: Corporate involvement in government projects positively affects fraudulent financial reporting in ASEAN Islamic banks.

Effective Monitoring and Fraudulent Financial Reporting

Opportunities arise when weak governance and ineffective internal controls allow fraud to occur. Effective monitoring is expected to reduce opportunities because independent and active oversight can limit managerial discretion and detect irregular reporting practices. In this study, effective monitoring is measured by the proportion of independent commissioners. From the agency theory perspective, monitoring mechanisms reduce information asymmetry between managers and stakeholders and help ensure that managers act in the interests of principals. In Islamic banks, monitoring also has an ethical role because governance mechanisms should ensure that financial reporting reflects honesty, transparency, and Sharia-based accountability. Prior studies show that weak monitoring may increase the risk of fraudulent financial reporting, while stronger oversight may reduce it (Lastanti et al., 2022; Indriaty & Thomas, 2023; Achmad et al., 2022; Aji, 2025; Awaluddin et al., 2025). Therefore, this study proposes the following hypothesis:

H4: Effective monitoring negatively affects fraudulent financial reporting in ASEAN Islamic banks.

Growth Pressure and Fraudulent Financial Reporting

Pressure is a core element of fraud theory. In Islamic banking, growth pressure may arise when management is expected to maintain asset growth, profitability, and institutional credibility. When banks face strong pressure to show expansion, managers may be encouraged to present financial statements in a more favorable manner. From the agency theory perspective, managers may manipulate reporting outcomes to protect their reputation, compensation, or position when performance expectations are difficult to achieve. In Islamic banks, this pressure may be stronger because the institution must maintain both financial competitiveness and public trust as a Sharia-compliant entity. Previous studies indicate that growth-related pressure may encourage aggressive reporting behavior and increase fraud risk (Adejumo & Ogburie, 2025; Ataribanam et al., 2025; Bader et al., 2024). Therefore, this study proposes the following hypothesis:

H5: Growth pressure positively affects fraudulent financial reporting in ASEAN Islamic banks.

Related-Party Transaction Sales and Fraudulent Financial Reporting

Rationalization refers to the justification used by individuals to legitimize questionable actions. Related-party transaction sales may create room for rationalization because transactions between related parties can be presented as ordinary business activities, even when they contain reporting risks. Such transactions may blur the distinction between legitimate business decisions and manipulative reporting practices, especially when disclosure and monitoring are weak. From the agency theory perspective, related-party transactions may increase information asymmetry because stakeholders may not fully understand the economic substance of transactions between connected parties. In Islamic banking, related-party transactions require careful supervision because they may conflict with the principles of fairness, transparency, and accountability. Previous studies associate related-party transactions with potential reporting irregularities and fraud risk (Campa et al., 2023; Achmad et al., 2024; Amachukwu & Adabenege, 2024; Mutmainah & Mahmudah, 2024). Therefore, this study proposes the following hypothesis:

H6: Related-party transaction sales positively affect fraudulent financial reporting in ASEAN Islamic banks.

Conceptual Framework

This conceptual framework integrates the Tawhid String Relation perspective, agency theory, and the Fraud Hexagon framework. The Tawhid String Relation perspective explains the ethical foundation of Islamic banking. Agency theory explains why managers may behave opportunistically under information asymmetry and conflicting interests. The Fraud Hexagon framework identifies the specific fraud drivers that may influence fraudulent financial reporting. Therefore, fraudulent financial reporting in Islamic banks is understood as the result of the interaction between ethical expectations, agency conflicts, and multidimensional fraud risk factors.

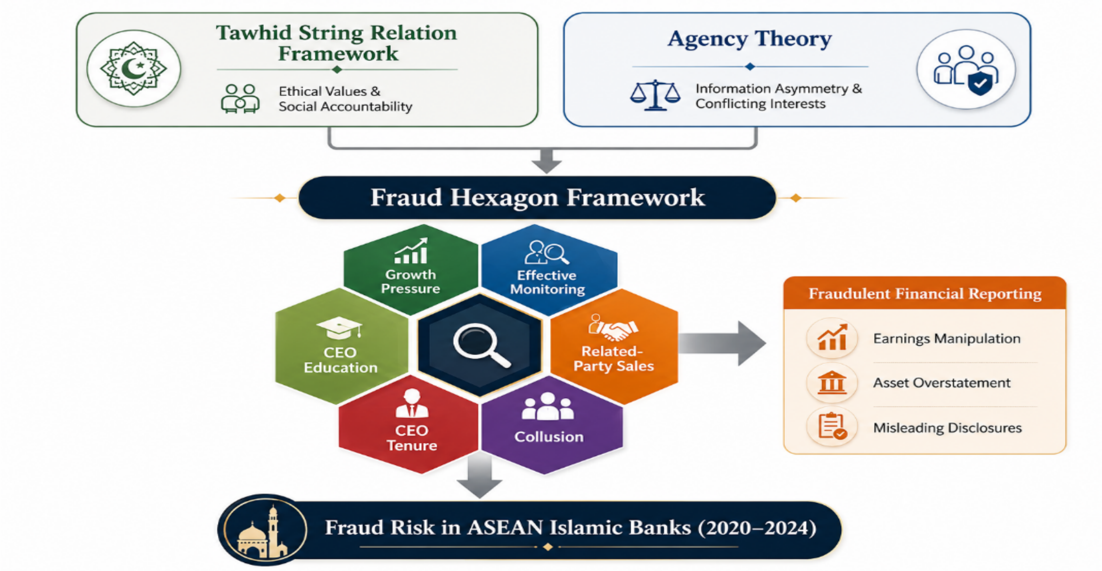

Figure 1. Theoretical Framework of Fraudulent Financial Reporting in Islamic Banks
Source: Developed by the author

RESEARCH METHOD

This study employs a quantitative explanatory design to examine the effect of Fraud Hexagon factors on fraudulent financial reporting in Islamic banks across ASEAN during 2020 to 2024. The explanatory approach was selected because the study aims to test the relationships between six independent variables—CEO Education Background, CEO Tenure, Corporate Involvement in Government Projects, Effective Monitoring, Growth Pressure, and Related-Party Transaction Sales—and the dependent variable, namely fraudulent financial reporting. The unit of analysis was the bank-year observation.

The population consists of Islamic banks operating in Indonesia, Malaysia, Brunei Darussalam, and the Philippines that consistently published audited annual reports during 2020 to 2024. A saturation sampling technique was applied because the accessible population was relatively limited and fully observable. The final sample included 30 Islamic banks, generating 150 bank-year observations. Two additional observations were included to reflect the Indonesian pre-merger structure in 2020, resulting in a total of 152 bank-year observations. Although the number of observations is relatively modest, it remains acceptable for PLS-SEM because the model contains six main predictors and exceeds the commonly used minimum rule of ten times the largest number of structural paths directed at the endogenous construct. Nevertheless, the limited sample size is acknowledged as a methodological limitation of this study.

Table 1. Islamic Banks in ASEAN and Eligible Sample Count (2020 to 2024)

Country	Eligible Banks (n)	Panel Window	Bank-Years (n)
Indonesia	12	2020 to 2024	60
Malaysia	16	2020 to 2024	80
Brunei Darussalam	1	2020 to 2024	5
Philippines	1	2020 to 2024	5
Total	30		150

Note: +2 bank-years from pre-merger Indonesia, resulting in 152 observations.
Source: Author's calculation based on the audited annual reports of Islamic banks in ASEAN from 2020 to 2024.

This study relies on secondary data obtained from audited financial statements, annual reports, notes to financial statements, and corporate governance disclosures. These documents were selected because they provide verifiable and comparable information on financial performance, board structure, related party transactions, executive characteristics, and institutional involvement in government-related projects. The use of documentary data also helps reduce perceptual bias and improve the consistency of cross-country comparisons.

Fraudulent financial reporting is proxied by the F-Score developed by Dechow et al. (2011). In this study, the F-Score is measured using two main components: accrual quality and financial performance. The formula is presented as follows:

F-Score = Accrual Quality + Financial Performance ……………………………….(1)

Accrual Quality = RSST Accrual..(2)

RSST Accrual = (ΔWC + ΔNCO + ΔFIN) / Average Total Assets ……………………......(3)
where ΔWC represents the change in working capital, ΔNCO represents the change in non-current operating accruals, and ΔFIN represents the change in the financial accruals. The financial performance component consists of changes in receivables, changes in inventory or equivalent asset accounts when applicable, changes in cash sales or operating revenue, and changes in the return on assets. Therefore, the financial performance component is formulated as:
Financial Performance = ΔREC + ΔINV + ΔCS + ΔROA ………………………………(4)
where ΔREC is the change in receivables scaled by the average total assets, ΔINV is the change in inventory or equivalent operating asset accounts scaled by the average total assets, ΔCS is the change in cash sales or operating revenue, and ΔROA is the change in return on assets. A higher F-score indicates a higher risk of fraudulent financial reporting or material misstatements.

After establishing the sample and dependent variable measurements, the independent variables were operationalized according to the six dimensions of the Fraud Hexagon. CEO Education Background represents capability and is measured as a dummy variable equal to one if the Chief Executive Officer has a master's degree or higher, and zero otherwise. This cutoff is used because postgraduate education may indicate higher managerial competence, analytical ability, and understanding of complex financial reporting. CEO Tenure represents arrogance and is measured as a dummy variable equal to one if the CEO has served for more than five years and zero otherwise. The five-year threshold is used because tenure beyond one strategic management cycle may indicate stronger executive influence, accumulated internal networks and potential managerial entrenchment. However, this binary measurement is also acknowledged as a limitation, and future studies may consider using a continuous tenure measurement.

Corporate Involvement in Government Projects represents collusion and is measured as a dummy variable equal to one if the bank is involved in government projects or contracts during the observation period and zero otherwise. Effective Monitoring represents an opportunity and is measured by the proportion of independent commissioners to total commissioners. Growth Pressure represents pressure and is measured by the percentage change in the total assets. Related-Party Transaction sales represent rationalization and are measured by related-party sales divided by total sales or operating revenue.

To address cross-country heterogeneity, this study considers the different regulatory and institutional environments across Indonesia, Malaysia, Brunei Darussalam, and the Philippines. Country differences are controlled using country dummy variables in the empirical model, with one country treated as the reference category. This approach helps reduce potential bias caused by pooling Islamic banks from countries with different governance systems, regulatory practices, and Islamic banking market maturity. As a robustness alternative, future research may conduct a multi-group analysis when a larger and more balanced country-level sample is available.

Table 2. Variables, Operational Definitions, Measures, and Data Sources

Construct	Code / Proxy	Operational Definition and Measurement	Data Source	Expected Direction
Fraudulent Financial Reporting	F-Score	F-Score = Accrual Quality + Financial Performance. Accrual Quality is measured by RSST Accrual: (ΔWC + ΔNCO + ΔFIN) / Average Total Assets. Financial Performance consists of ΔREC + ΔINV + ΔCS + ΔROA. A higher F-Score indicates a higher fraudulent financial reporting risk.	Audited financial statements and annual reports	Not applicable
CEO Education Background / Capability	CEO EDU	Dummy variable equal to 1 if the CEO has a master's degree or higher, and 0 otherwise. The postgraduate education threshold is used to represent higher managerial capability and financial reporting knowledge.	Management biographies and corporate profiles	Positive
CEO Tenure / Arrogance	CEO TEN	Dummy variable equal to 1 if CEO tenure is more than five years, and 0 if CEO tenure is five years or less. The five-year threshold is used to capture potential executive entrenchment after one strategic management cycle.	Management biographies and annual reports	Positive
Corporate Involvement in Government Projects / Collusion	CWGP	Dummy variable equal to 1 if the bank is involved in government projects or contracts during 2020 to 2024, and 0 otherwise.	Project disclosures, MD&A, and sustainability reports	Positive
Effective Monitoring / Opportunity	BDOUT	Proportion of independent commissioners to the total number of commissioners. A higher proportion indicates stronger formal board independence.	Corporate governance section	Negative
Growth Pressure / Pressure	ACHANGE	Percentage change in total assets, calculated as total assets in year t minus total assets in year t-1, divided by total assets in year t-1.	Audited financial statements	Positive
Related-Party Transaction Sales / Rationalization	RPT Sales	Related-party sales are divided by total sales or operating revenue.	Notes to financial statements	Positive
Country Control	COUNTRY	Country dummy variables for Indonesia, Malaysia, Brunei Darussalam, and the Philippines, with one country used as a reference category.	Bank domicile and annual reports	Control variable

Source: Developed by the author based on Dechow et al. (2011), Situngkir and Triyanto (2020), Prasetyaningrum and Hendarsjah (2022), and Matthew and Siregar (2024).

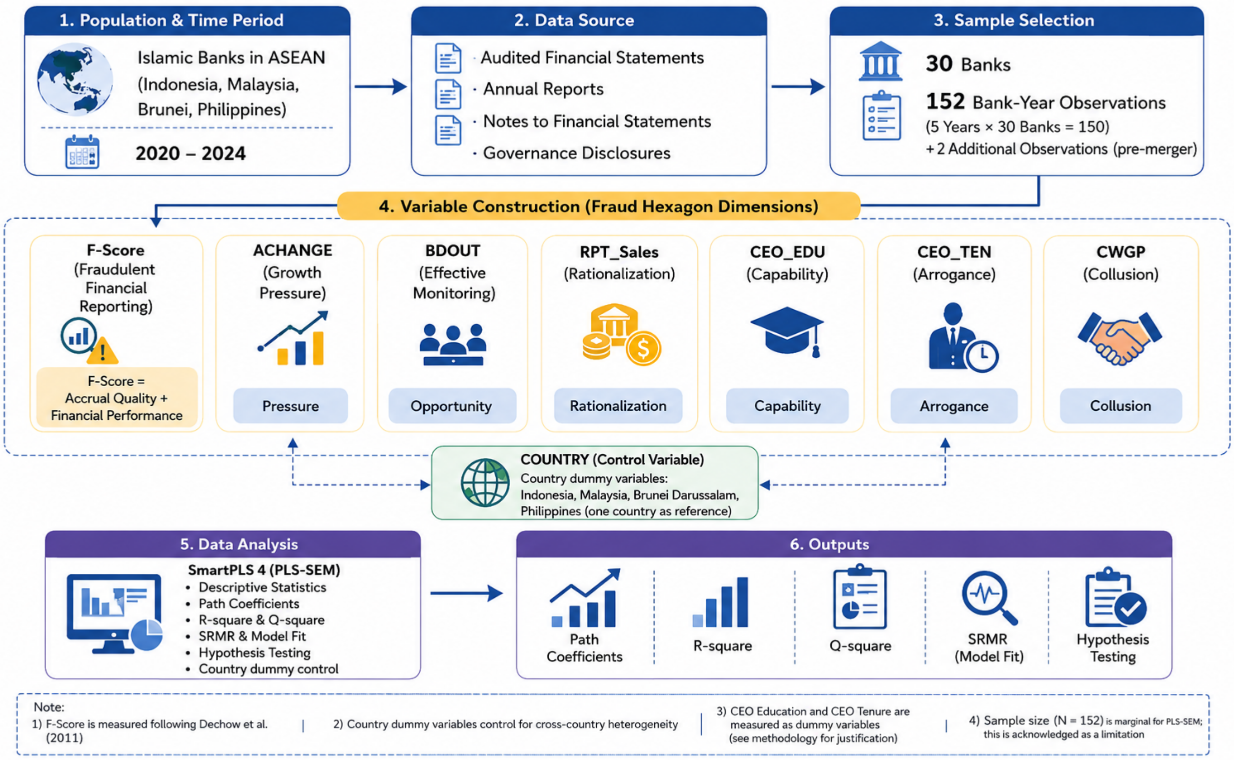

Figure 2. Research Design and Empirical Strategy
Source: Developed by the author.

The data were analyzed using SmartPLS 4 with the partial least squares–structural equation modeling (PLS-SEM) approach. Descriptive statistics were first used to summarize the distribution of each variable. The structural model was then evaluated using path coefficients, t-statistics, p-values, R-square, Q-square, and predictive indicators. A hypothesis was considered supported when the p-value was below 0.050, indicating a statistically significant relationship between the corresponding fraud hexagon variable and fraudulent financial reporting. Although the sample size of 152 observations is acceptable for a model with six main predictors, it is acknowledged as relatively modest; therefore, this issue is noted as a methodological limitation of the study.

Overall, this method enables the study to examine whether the six Fraud Hexagon dimensions can explain variations in fraudulent financial reporting among Islamic banks in ASEAN from 2020 to 2024 using a systematic, comparable, and statistically testable design.

DATA ANALYSIS AND RESULTS

The descriptive statistics indicate variations across the variables included in the model. As shown in Table 3, the mean value of Growth Pressure is 0.114, suggesting that the sampled Islamic banks experienced moderate asset growth from 2020 to 2024. Effective Monitoring has a mean of 0.634, indicating that independent commissioners account for a relatively large proportion of the board members. RPT Sales has a low mean of 0.020, implying that related-party sales generally represent a small share of total revenue. The dependent variable, F-score, has a mean of 0.712, with values ranging from 0.300 to 0.930. These values indicate that the fraudulent financial reporting risk varies across bank-year observations, although the average F-score remains below the conventional high-risk threshold. For dummy variables, CEO Education, CEO Tenure, CWGP, and Country Control are interpreted based on frequency and percentage rather than only mean values.

Table 3. Descriptive Statistics and Dummy Variable Distribution

Variable	Mean	Median	Observed Min	Observed Max	Std. Dev.
Growth Pressure	0.114	0.091	-0.277	1.260	0.174
Effective Monitoring	0.634	0.670	0.000	1.000	0.228
RPT Sales	0.020	0.005	-0.435	0.344	0.065
CEO Edu	0.434	0.000	0.000	1.000	0.496
CEO Tenure	0.724	1.000	0.000	1.000	0.447
CWGP	0.901	1.000	0.000	1.000	0.298
F-Score	0.712	0.720	0.300	0.930	0.082

Source: Author's calculation based on the audited annual reports of Islamic banks in ASEAN from 2020 to 2024.

Multicollinearity assessment was conducted using the variance inflation factor (VIF) values. As shown in Table 4, all predictor variables have VIF values ranging from 1.006 to 1.097, which are far below the commonly accepted threshold of 5.00. These results indicate that multicollinearity is not a serious concern in the structural models. Therefore, the estimated path coefficients were not substantially affected by the high correlations among the independent variables.

Table 4. Multicollinearity Assessment

Predictor Variable	VIF	Interpretation
CEO Education Background	1.087	No serious multicollinearity
CEO Tenure	1.088	No serious multicollinearity
Effective Monitoring	1.086	No serious multicollinearity
Growth Pressure	1.097	No serious multicollinearity
Related-Party Transaction Sales	1.006	No serious multicollinearity

Source: Author's calculations based on SmartPLS output.

The explanatory power of the model is presented in Table 5. The R-square value of 0.165 indicates that the six Fraud Hexagon variables explain 16.5% of the variation in fraudulent financial reporting. This value shows that the model has modest explanatory power. In substantive terms, 83.5% of the variation in F-Score remains explained by other factors outside the current model. This result is reasonable because fraudulent financial reporting is a complex phenomenon that may also be influenced by bank size, profitability, leverage, audit quality, ownership structure, Sharia supervisory board effectiveness, risk management quality, and macroeconomic conditions. Therefore, the relatively low R-square should not be interpreted as a model failure, but as an indication that the Fraud Hexagon variables explain only part of fraudulent financial reporting risk in ASEAN Islamic banks.

Table 5. Explanatory Power (R-Squared)

Endogenous Variable	R-square	R-square Adjusted
F-Score	0.165	0.130

Source: Author's calculation based on SmartPLS output from the audited annual reports of Islamic banks in ASEAN from 2020 to 2024.

The predictive relevance of the model is presented in Table 6. The Q^2predict value was greater than zero, indicating that the model had predictive relevance, although at a relatively weak level. This finding is consistent with the modest R-squared value and suggests that the model provides limited but acceptable predictive ability for fraudulent financial reporting risk. However, because the predictive power is not strong, the results should be interpreted carefully and complemented with robustness checks in future studies.

Table 6. Predictive Relevance (Q-Squared)

Variable	Q^2predict	PLS-SEM RMSE	PLS-SEM MAE	LM RMSE	LM MAE	IA RMSE	IA MAE
F-Score	0.079	0.079	0.054	0.079	0.054	0.083	0.049

Source: Author's calculation based on SmartPLS output from the audited annual reports of Islamic banks in ASEAN from 2020 to 2024.

The initial SmartPLS output produced model fit values of SRMR = 0.000, Chi-square = 0.000, and NFI = 1.000. These values were not interpreted as evidence of perfect model fit because such values may occur when the model consists mainly of single-item constructs or when the model specification does not require conventional measurement model assessment. Since all the constructs in this study were measured using observed indicators rather than latent multi-item scales, the global model fit indices in PLS-SEM should be interpreted cautiously. Therefore, the analysis focuses mainly on path coefficients, p-values, R-square, Q-square, and robustness checks rather than relying on perfect fit statistics.

Table 7. Model Fit Diagnostic and Interpretation

Criteria	**Initial SmartPLS Output**	**Interpretation**
SRMR	0.000	Not interpreted as perfect fit because the model uses single-item observed indicators
d_ULS	0.000	Interpreted cautiously
d_G	0.000	Interpreted cautiously
Chi-square	0.000	Not emphasized due to model specification
NFI	1.000	Not interpreted as perfect comparative fit
Main evaluation criteria	Path coefficients, p-values, R-square, Q-square, and robustness checks	Used as the primary basis for model assessment

Source: Author's calculations based on SmartPLS output.

The direct hypothesis testing results are presented in Table 8. CEO tenure has a positive and statistically significant effect on the F-Score, with a path coefficient of 0.330, a t-statistic of 4.113, and a p-value of 0.000. This result supports H2 and indicates that longer CEO tenure is associated with higher fraudulent financial reporting risk. Effective monitoring also has a statistically significant effect on the F-Score, with a path coefficient of 0.178, a t-statistic of 2.035, and a p-value of 0.021. However, the positive direction contradicts the expected negative relationship. This result suggests that the proportion of independent commissioners may not necessarily reflect the substantive effectiveness of monitoring. It may also indicate possible reverse causality, where banks with higher fraud risk increase formal board independence as a response to governance concerns.

By contrast, CEO Education Background, Corporate Involvement in Government Projects, growth pressure, and related-party transaction sales do not show statistically significant direct effects on the F-Score. These findings indicate that capability, collusion, pressure, and rationalization proxies do not directly explain fraudulent financial reporting risk in the sampled ASEAN Islamic banks. Overall, the results suggest that fraudulent financial reporting is more closely associated with governance dynamics and executive entrenchment than with the other fraud hexagon proxies used in this study.

Table 8. Structural Paths

Hypothesis	Path	Path Coefficient (O)	T Statistics	P Values	Significance
H1	CEO Edu → F-Score	0.056	0.811	0.209	Not significant
H2	CEO Tenure → F-Score	0.330	4.113	0.000	Significant
H3	CWGP → F-Score	0.063	1.329	0.092	Not significant
H4	Effective Monitoring → F-Score	0.178	2.035	0.021	Significant
H5	Growth Pressure → F-Score	-0.069	0.818	0.207	Not significant
H6	RPT Sales → F-Score	-0.107	1.154	0.124	Not significant

Source: Author's calculation based on SmartPLS output from the audited annual reports of Islamic banks in ASEAN from 2020 to 2024.

To address concerns regarding model stability, low explanatory power, unexpected coefficient direction, and the absence of robustness checks, this study conducted additional robustness tests. The robustness checks included an alternative F-Score threshold, winsorized variables, and the exclusion of extreme F-Score observations. These tests were conducted to examine whether the main findings remained stable under different model specifications and data treatments. The results are presented in Table 9.

Table 9. Robustness Check Results

Robustness Specification	CEO Edu	CEO Tenure	CWGP	Effective Monitoring	Growth Pressure	RPT Sales
Main Model	0.056	0.330***	0.063	0.178**	-0.069	-0.107
Alternative F-Score Threshold	0.047	0.165	0.121	-0.089	-0.035	-0.041
Winsorized Variables	0.045	0.346***	0.070*	0.165**	-0.073	-0.141
Excluding Extreme F-Score Observations	0.026	0.336***	0.067	0.067	-0.119*	-0.150*

Notes: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Values shown are path coefficients based on the Original Sample (O) from SmartPLS bootstrapping results.
Source: Author's calculations based on SmartPLS output.

The robustness results show that CEO tenure remains positive and significant in the main model, winsorized model, and the model excluding extreme F-Score observations. This indicates that the effect of CEO tenure on fraudulent financial reporting is relatively stable and not driven by outliers or extreme F-Score values. Therefore, the finding that longer CEO tenure is associated with higher fraudulent financial reporting risk is considered robust across several model specifications.

Effective Monitoring is significant in the main model and the winsorized model, but it becomes insignificant when the alternative F-Score threshold and the exclusion of extreme F-Score observations are applied. This result indicates that the effect of Effective Monitoring is less stable than the effect of CEO Tenure. The finding should therefore be interpreted cautiously, especially because the positive coefficient contradicts the expected negative direction. This result supports the possibility that formal board independence may not fully capture substantive monitoring effectiveness and may also reflect potential reverse causality.

The robustness checks also show that CWGP becomes weakly significant in the winsorized model, while Growth Pressure and RPT Sales become weakly significant when extreme F-Score observations are excluded. However, these effects are only significant at the 10% level and are not consistently observed across all robustness specifications. Therefore, the results should be interpreted as weak and specification-sensitive evidence rather than strong support for the corresponding fraud hexagon dimensions.

Overall, the robustness checks strengthen the conclusion that CEO tenure is the most stable predictor of fraudulent financial reporting risk in ASEAN Islamic banks. The results also show that the explanatory power of the Fraud Hexagon framework is partial and varies depending on the model specification. These findings suggest that fraudulent financial reporting is influenced not only by the six Fraud Hexagon proxies used in this study but also by broader governance, institutional, financial, and regulatory factors.

DISCUSSION

The findings indicate that the Fraud Hexagon framework has partial explanatory power in detecting fraudulent financial reporting risks in ASEAN Islamic banks. Among the six tested dimensions, CEO Tenure and Effective Monitoring significantly affect the F-score, while the CEO's educational background, corporate involvement in government projects, growth pressure, and related-party transaction sales do not show significant direct effects. This suggests that the fraudulent financial reporting risk in Islamic banks is more closely related to executive dominance and governance structure than to pressure, capability, rationalization, or collusion proxies.

CEO tenure has a positive and significant effect on the F-Score. This supports the arrogance dimension of the Fraud Hexagon, which argues that long-serving executives may accumulate authority, develop strong internal influence, and become more capable of overriding control mechanisms. From the agency theory perspective, longer tenure may also increase information asymmetry because executives gain greater control over internal reporting processes. This result is consistent with Adhitama et al.

(2023), Indriaty & Thomas (2023), and Setiawan & Soewarno (2025), who suggest that executive dominance and entrenchment may increase fraud risk. However, it differs from studies arguing that longer CEO tenure may improve organizational knowledge, strategic consistency, and managerial experience. In the context of ASEAN Islamic banks, the result suggests that the risk of executive entrenchment may outweigh the benefits of leadership continuity when monitoring mechanisms are not substantively effective.

Effective monitoring also has a significant effect on the F-score, but the positive direction contradicts the expected negative relationship. Theoretically, stronger monitoring should reduce fraud risk by limiting opportunities. This result may indicate that the proportion of independent commissioners reflects formal governance compliance rather than actual monitoring effectiveness. It may also suggest reverse causality, where banks with higher fraud risk strengthen formal board independence as a corrective response. This finding contrasts with Lastanti et al. (2022), Indriaty & Thomas (2023), and Aji (2025), who found that weak monitoring increases fraud risk. Therefore, the result should not be interpreted as evidence that monitoring increases fraud, but rather as an indication that board independence alone is insufficient to capture substantive governance quality.

The insignificant effects of Growth Pressure, Related-Party Transaction Sales, CEO Education Background, and Corporate Involvement in Government Projects show that several Fraud Hexagon dimensions may be context-dependent. Growth Pressure does not significantly affect the F-Score, contradicting Bader et al. (2024), Adejumo & Ogburie (2025), and Ataribanam et al. (2025), who argue that financial pressure may encourage earnings manipulation. In Islamic banks, asset growth may reflect genuine business expansion rather than pressure to manipulate financial statements. Related-Party Transaction Sales also does not significantly affect the F-Score, although prior studies such as Campa et al. (2023), Achmad et al. (2024), and Mutmainah & Mahmudah (2024) associate related-party transactions with reporting irregularities. This may occur because related-party sales in the sample are relatively low and may be subject to stronger disclosure requirements.

CEO Education Background is also insignificant, suggesting that higher education does not automatically increase or reduce fraudulent financial reporting risk. This finding supports the view that capability can be used either to strengthen accountability or to exploit accounting discretion, depending on governance conditions. Corporate Involvement in Government Projects is likewise insignificant, which contrasts with studies emphasizing the role of collusion in financial statement fraud, such as Handoko & Salim (2022) and Kulmie & Ibrahim (2024). This may be because government project involvement in Islamic banking does not necessarily indicate collusion but may reflect legitimate public financing activities or institutional cooperation.

Overall, the results show that the Fraud Hexagon framework remains relevant, but its dimensions do not operate uniformly in ASEAN Islamic banks. CEO tenure emerges as the most stable predictor, especially because the robustness tests show that its positive effect remains significant in the winsorized model and after excluding extreme F-Score observations. Effective Monitoring is significant in the main model but less stable across robustness specifications, indicating that its interpretation requires caution. These findings suggest that future research should refine the measurement of Fraud Hexagon variables and include additional governance and financial controls, such as bank size, profitability, leverage, audit quality, ownership structure, risk management quality, and Sharia supervisory board effectiveness.

CONCLUSION, IMPLICATIONS, LIMITATIONS, AND FUTURE RESEARCH

This study examines the effect of Fraud Hexagon factors on fraudulent financial reporting in Islamic banks across Indonesia, Malaysia, Brunei Darussalam, and the Philippines during 2020 to 2024. Using 152 bank-year observations and the F-Score as a proxy for fraudulent financial reporting risk, this study finds that CEO tenure and effective monitoring significantly affect fraudulent financial reporting. CEO tenure has a positive effect on the F-Score, indicating that longer executive tenure may increase the risk of managerial entrenchment and weaken the effectiveness of internal controls. Effective monitoring also shows a significant positive effect, although the direction contradicts the theoretical expectation that stronger monitoring should reduce fraud risk. Meanwhile, CEO education background, corporate involvement in government projects, growth pressure, and related-party transaction sales do not show significant direct effects on fraudulent financial reporting. These findings indicate that fraudulent financial reporting risk in ASEAN Islamic banks is more strongly associated with executive dominance and formal governance structure than with the other Fraud Hexagon proxies used in this study.

Theoretically, this study contributes to the literature on fraud, Islamic banking, and financial reporting by extending the application of the Fraud Hexagon framework to ASEAN Islamic banks. The findings show that the Fraud Hexagon remains relevant in explaining fraudulent financial reporting risk, although its dimensions do not operate uniformly across the Islamic banking context. The significant effect of CEO tenure supports the arrogance dimension of the Fraud Hexagon and strengthens the agency theory argument that long-serving executives may accumulate power and information advantages. The significant but positive effect of effective monitoring indicates that formal board independence may not always represent substantive monitoring quality. This finding highlights the importance of distinguishing between formal governance compliance and actual governance effectiveness in Islamic financial institutions.

Practically, the results imply that Islamic banks should pay greater attention to executive tenure, leadership concentration, and the substantive effectiveness of their monitoring mechanisms. Regulators, audit committees, internal auditors, and Shariah supervisory boards should not rely only on formal governance indicators, such as the proportion of independent commissioners, but should also evaluate the quality, expertise, independence, attendance, and actual involvement of monitoring bodies. Islamic banks should strengthen early warning systems by combining financial indicators, such as the F-score, with governance indicators, internal control assessment, risk management quality, audit quality, and Sharia governance evaluation. These steps are important to ensure that Sharia compliance is supported by transparent, accountable and effective governance practices.

This study has several limitations. First, fraudulent financial reporting is measured using the F-Score, which functions as an early warning indicator rather than direct evidence of actual fraud. Therefore, the results should be interpreted as indicators of fraud risk, not as proof that fraud has occurred. Future research may use alternative fraud detection models, such as the Beneish M-Score, discretionary accrual models, or other misstatement prediction models, to compare the consistency of the findings. Second, several fraud hexagon dimensions are measured using binary proxies, such as CEO education background, CEO tenure, and corporate involvement in government projects. These measurements may not fully capture the complexity of capability, arrogance, and collusion. Future studies may use continuous measures, index-based measures, or qualitative indicators to provide a more detailed explanation of these fraud dimensions.

Third, this study relies on secondary data from annual reports, audited financial statements, and corporate governance disclosures. These documents provide standardized and verifiable information; however, they may not capture informal governance practices, managerial motives, rationalization processes, or hidden collusive arrangements. Future research may use interviews, case studies, regulatory enforcement data, or mixed-method approaches to obtain deeper insights into the behavioral and institutional mechanisms behind fraudulent financial reporting. Fourth, this study may face potential endogeneity, particularly in the relationship between effective monitoring and fraudulent financial reporting. The positive coefficient of effective monitoring may indicate reverse causality, where banks with higher fraud risk increase formal board independence as a response to governance concerns. Future research should apply lagged independent variables, instrumental variable approaches, dynamic panel models, or generalized method of moments estimation to reduce potential simultaneity bias.

Fifth, because this study uses pooled observations from several ASEAN countries, cross-country heterogeneity and cross-sectional dependence may exist. Islamic banks in Indonesia, Malaysia, Brunei Darussalam, and the Philippines operate under different regulatory systems, market maturity levels, governance environments, and macroeconomic conditions. Although this study includes country control variables, future research may apply country fixed effects, year fixed effects, multi-group analysis, or panel data models that account for common shocks across banks and countries. Sixth, survivorship bias may occur because the sample includes only Islamic banks with available and consistently published annual reports during the study period. Banks with incomplete disclosures, discontinued reporting, merger-related data gaps, or unavailable annual reports were not fully captured in the analysis. Future studies should expand the data sources by including regulatory databases, bank-level supervisory reports, and delisted or discontinued institutions, where available.

Seventh, although the VIF results indicate that multicollinearity is not a serious concern in the structural model, the relatively modest sample size and the use of several governance-related proxies may still limit the generalizability of the findings to some extent. Future research should continue to report multicollinearity diagnostics and consider broader governance indicators to improve the model’s stability. In addition, future studies should include more control variables such as bank size, profitability, leverage, audit quality, ownership structure, board expertise, risk management quality, and Shariah supervisory board effectiveness. By addressing these methodological limitations, future research can provide stronger and more comprehensive evidence of the determinants of fraudulent financial reporting in Islamic banking.

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