

# DETERMINANTS INFLUENCING THE EFFECTIVENESS OF INTERNAL AUDITING AND THE RESPONSIBILITY OF AUDITORS IN FRAUD DETECTION IN AN EMERGING COUNTRY

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## Abstract

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Internal audit has become an essential part of firms in the age of Industry 4.0 due to its ability to identify errors or violations leading to fraud in firms (Alzeban & Gwilliam, 2014; Cohen & Sayag, 2010). This study is conducted to investigate the relationship between variables such as the quality of internal audit, the capability of the internal audit team, the independence of internal audit, and the support of leadership on the effectiveness of internal audit (EIA). Specifically, the study also examines the relationship between the EIA and the responsibility of auditors in detecting fraud. Data were gathered through a survey of 325 questionnaires from joint stock firms in the context of Vietnam, using SPSS 22 software and SmartPLS 3.0 software to analyze the regression of influencing determinants. The results reveal that: 1) the quality of the internal audit, the capability of the internal audit team, the independence of the internal audit, and the support of leadership have an impact on the internal audit effectiveness; 2) the EIA, the responsibility of auditors, and auditor training have a positive and significant impact on fraud detection. Therefore, the importance of internal audit in identifying accounting fraud and the need for firms to design internal audit processes and training to improve the effectiveness of their operations are highlighted.

**Keywords:** Internal Audit, Audit Effectiveness, Firms, Fraud Detection, Vietnam

**Authors' individual contribution:** Conceptualization — T.Q.N.; Methodology — T.Q.N., T.H.T., and V.H.P.; Validation — M.D.T. and T.L.N.; Writing — Review & Editing — T.Q.N., M.D.T., and V.H.P.; Visualization — T.H.T. and B.M.T.; Supervision — T.Q.N., T.H.T., M.D.T., V.H.P., and B.M.T.

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## 1. INTRODUCTION

An internal audit plays an important role in protecting the value of a business. An internal audit is an independent observer to ensure that a firm's operations comply with legal regulations, business ethics, and operating rules. Internal audit is responsible for detecting errors in the business operations of the firm, acting as an advisor, and guiding the board of directors and the audit committee in risk management. On the other hand, internal audit helps firm owners improve weaknesses in the management and administration systems. By analyzing, checking, and monitoring the operation processes of departments in the business system, internal audit provides advice to help the firm operate more effectively and efficiently. In fact, firms with an effective internal audit department have a lower likelihood of fraud and higher performance (Westhausen, 2017; Nguyen et al., 2022).

Westhausen (2017) concludes that around the world, the demand for fraud auditing services has increased in recent years. The demand for fraud auditing services also has gone up worldwide due to financial crises and the COVID-19 pandemic, which have created instability and led to an increase in fraudulent scandals in an auditee.

Ebaid (2016) believes that internal audit is an essential part of firm operations since it helps achieve the firm's goals with a systematic and disciplined approach to evaluating and enhancing risk management, control, and effective management processes. The study by George et al. (2015) shows that the effectiveness of internal audit (EIA) can be improved by the quality of the internal audit, the capacity of the internal audit team, the independence of the internal audit, and the support of the leadership. Bedard et al. (2001) state that internal auditors are responsible for identifying financial misstatements by employing audit standards specifically. According to Petraşcu and Tieanu (2014), the role of an internal auditor depends much on their competence and training in finding misstatements.

Different from previous studies, this research aims to investigate the relationship between variables of the quality of internal audit, the capability of the internal audit team, the independence of internal audit, and the support of leadership, and the internal audit effectiveness. In detail, the study also tests the relationship between the EIA and the responsibility of auditors in discovering fraud in firms.

The outline of this study is as follows. Section 1 includes the introduction to the research topic, Section 2 reviews the literature related to the effectiveness of internal audit and the auditor's responsibility in identifying fraud. Section 3 analyzes the methods used to conduct empirical research on the determinants of internal audit effectiveness and auditors' responsibilities in fraud detection in a country emerging. Section 4 presents the research results and Section 5 discusses the importance of internal audit in detecting accounting fraud and the need for firms to design internal audit processes and training for enhancing its performance is emphasized. Finally, Section 6 concludes the paper.

## 2. LITERATURE REVIEW

Internal audit is understood as an independent, objective assurance and help detect and prevent material misstatements in a firm. It helps the firm meet its objectives by bringing a systematic, disciplined method to assess and improve the effectiveness of risk management, monitor, and governance processes. It is argued in the literature that internal audit contributes to compliance with laws and regulations, and facilitates the work of external auditors (George et al., 2015), identifies shortcomings in business procedures, and provides independent assessments of procedures and business activities (Kinney, 2000). In addition to these benefits, internal audit enhances corporate governance structures (The Institute of Internal Auditors, 2018; Hay et al., 2008), supports strategic management planning (Melville, 2003), evaluates business risks (Spira & Page, 2003; Sarens & De Beelde, 2006; Karagiorgos et al., 2009; Mohamud & Salad, 2013), and adds value to the firm.

Therefore, the EIA is of great importance to the success of a business. There is no doubt that the International Standards for the Professional Practice of Internal Auditing (ISPPA) are necessary to ensure the EIA. In this context, Al-Twaijry et al. (2003) adopted ISPPA as a guide to assess the EIA. Similarly, the International Professional Practices Framework (IPPF) is an authoritative organizational guidance framework issued by the Institute of Internal Auditors. Kasim and Hanafi (2012) employ IPPF to allocate variables to attribute standards and performance standards in their study. They conclude a new model for assessing the quality of internal auditing based on the framework of IPPF.

George et al. (2015) look into the specific factors associated with EIA in the Greek context. Empirical evidence was collected by means of a mailed survey. Factor and regression analysis are employed in order to process the gathered data. The findings reveal that the main factors impacting EIA are: 1) quality of internal audit, 2) competence of the internal audit team, 3) independence of internal audit, and 4) support from management. The results also demonstrate that the independence of internal audit is the foundation of EIA as it is the most crucial factor in our model. Finally, they conclude that internal audit is of major importance in the context of Greece.

Research by Yee et al. (2008) suggests that without independence, internal audit simply becomes part of the management team, losing the ability to provide new perspectives. The independence of internal audit is viewed by Zhang et al. (2007) as a crucial element in the EIA. Cohen and Sayag (2010) also discuss that the organizational independence of internal audit affects the EIA. By testing the EIA in Saudi Arabia, Alzeban et al. (2014) contend that the independence of internal audit (along with "the competency of the internal audit unit", "the size of the internal audit unit", "the relationship between the internal auditor and external auditor", "the supportive management") is positively related to the EIA. However, it should be noted that in the study, the independence of internal audit has a lower significant positive relationship with the EIA in comparison with the other four components.

Mihret and Yismaw (2007) consider the quality of internal audit as one of the variables related to the effective internal audit. Based on the public sector of Ethiopia, the findings indicate that the EIA is influenced by the quality of internal audit, along with the support of management, organizational environment, and firm characteristics. Barac and van Staden (2010) examine the relationship between the perceived quality of internal audit and the safety of corporate governance in South Africa. In contrast, the results indicate that there is no correlation between the above two variables. On the other hand, auditors have to conduct their roles objectively and adhere to the ethical standards, so that internal audit activities can evaluate and contribute to improving risk management, monitor, and governance using a systematic and scientific method.

Bou-Raad (2000) argues that audit quality is not only important for complying with legal requirements but also because the scope of auditors' tasks may involve in evaluating areas with high levels of judgment, and audit reports may directly impact decisions or actions approved by management. Therefore, it can be argued that high audit quality means adherence to formal standards, as well as high effectiveness in the internal audit process, will enhance the EIA.

The capacity of the internal audit team is regarded to be an important element in the EIA. According to ISPPA, Mousa (2005) considers professional proficiency and due care as crucial factors of internal audit. Turley and Zaman (2007) argue that communication among members of the audit team has a positive impact on the audit outcome. The internal audit team is also investigated by Arena and Azzone (2009) as an aspect influencing the EIA. Moreover, Mihret et al. (2010) point out that both technical competence and continuous training of the internal audit team are essential requirements for effective internal audit. Furthermore, Cohen and Sayag (2010) argue that the professional qualifications of the internal auditor have significant importance for the EIA. Alzeban and Gwilliam (2014) conclude that the higher the EIA, the higher the competence of the internal audit staff.

Mihret et al. (2010) and Mihret and Yismaw (2007) argue that there is a positive association between the support of top management and the EIA. Management support is also considered as a key determinant of the EIA by Cohen and Sayag (2010). Similarly, Alzeban and Gwilliam (2014) indicate that management support has a significant and positive relationship with the EIA, as well as a positive relationship with all other variables influencing it.

Much evidence on management provide ample evidence of the key role played by the support of top leadership in the success of processes within an organization. Schwartz et al. (2005) conclude that top leadership support for internal audit is a critical element in its effectiveness. Of course, funding is an important measure of that support. Internal audit departments should have the proper resources to recruit the right number of high-quality staff, update training and development information, and collect

and maintain physical infrastructure such as computers. In a survey of internal auditors in the context of Australia, Leung et al. (2003) confess that chief audit executives generally had a positive view of the EIA. They saw the support of top management as the key determinant in ensuring the effectiveness of their role. Sarens and De Beelde (2006) report on the development of similar attitudes in Belgium, where recent changes in corporate governance regulations have affected the internal audit function.

Nardo (2011) investigates the characteristics and mechanisms of the informal economy. It is important to regularly monitor and investigate all activities in a firm and take action when misconduct is discovered. According to Rezaee (2005), financial accounting fraud is an intentional act to deceive stakeholders, particularly investors and creditors, by presenting incorrect accounting data, leading to untrue financial statements.

The American Institute of Certified Public Accountants (AICPA), under SAS 99 standards, considers financial reporting errors as fraud through intentional negligence or misrepresentation of financial accounts. Internal audit includes efforts, methods, and measures applied within a firm to ensure and protect its assets, control the accuracy and reliability of accounting data, assure the effectiveness of the organization's operations, and encourage the maintenance of its standardized firm policies.

Furthermore, Spathis (2002) reveals that in the United States (US), the most common accounting errors have been recorded, with the most-used term being "fraud" and understood as an intentional distortion of financial reporting. The study by Button et al. (2015) investigates the most sensitive issue for firms, which is the cost of fraud, in firms in the United Kingdom. Through the study, the costs that firms have to bear after discovering fraudulent behaviour by employees of the firms are evaluated. Fraud costs are related to investigation costs, any other costs incurred to deal with such behaviour, external punitive measures, and seeking new employees.

Balaciu et al. (2014) explore the feasibility of how managers can develop their relationship with auditors so that they can change accounting policies that may benefit the company. In addition, Balaciu et al. (2014) investigate the behaviour of auditors related to creative accounting that affects financial assets. They found auditors are not only to detect material fraud and errors but also to evaluate the EIA and give suggestions for detecting, preventing and monitoring material misstatements.

The study by Carcello et al. (2005) shows that firms with large debt and budgets have high internal audit budgets. In addition, service or financial utility firms, as well as firms with high cash flow, use internal audit procedures to monitor budgets and financial transactions conducted within the firm. Omoteso and Obalola (2014) employ Porter's method to control related to the "Audit triad", whereby internal audit, external audit, and coordinated audit committees investigate and manage firm fraud. They conclude that there should be relationships between these three types of controls so that they can

support a healthy internal control as a tool to prevent and detect fraud.

Krambia Kapardis and Papastergiou (2016) concludes that all firms are victims of fraud and discovers that as the Greek crisis occurs, firms need to take preventative measures against fraud by maintaining effective internal audits.

The positive relationship between the EIA and fraud detection has been affirmed through studies such as a research of Monisola (2013). The existence of an internal audit unit in a firm raises the ability to control errors, anomalies, and fraud.

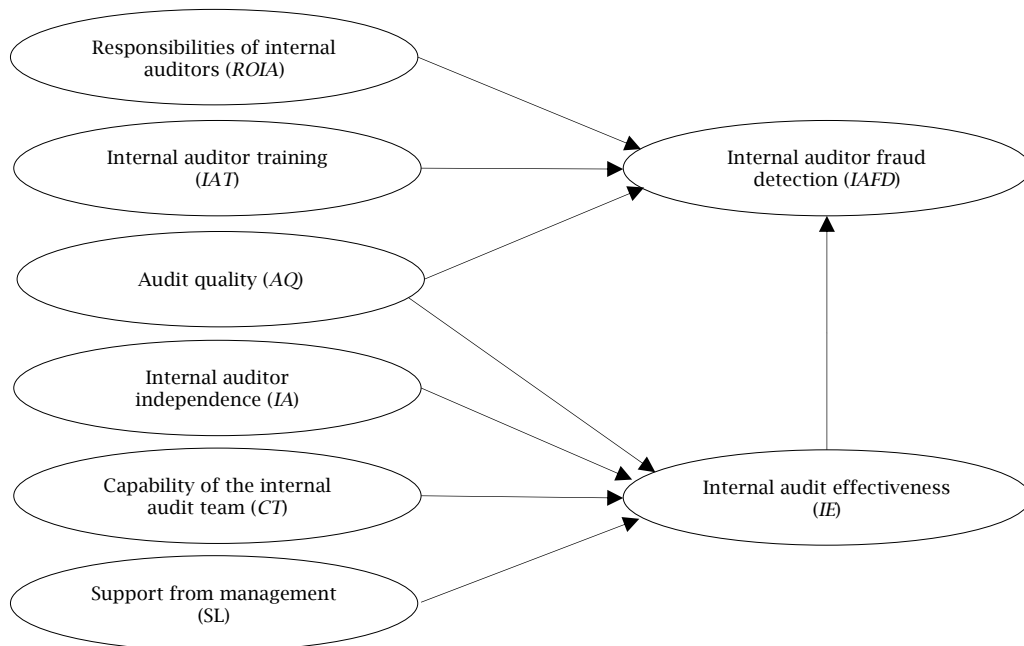
McKee (2006) states that to run EIA, the internal audit team requires continuous training. Internal auditors are individuals who possess secrets, knowledge, skills, and high capacity while adhering to international auditing standards, ensuring more effective control. Hammersley et al. (2011) point out that fraud detection is challenging due to the lack of experience on the side of internal auditors in discovering manipulated financial data. Bierstaker et al. (2014) explain that training on fraud involving simulating fraud cases can significantly enhance internal auditors' experience, improve performance, and improve the ability to detect fraud.

Handoyo and Bayunitri (2021) determine whether there is an impact of internal audit and internal control on fraud prevention in Indonesia and conclude that internal audit and internal control influence the prevention of fraud in Indonesia.

Shahini-Gollopeni et al. (2022) explore the role and importance of internal audit in increasing performance in microfinance firms in Kosovo. The results illustrate that an internal audit is necessary for the organization, internal audit positively affects good governance and performance of the organization. According to Nguyen et al. (2022), the internal audit has been an indispensable part of firms in the era of 4.0 technology. Because the internal audit is able to find out the misstatements lead to fraud in the firms.

This research aims to review the relationship between EIA and the auditor's responsibility in the fraud detection of the firms. The sample includes 176 internal auditors working in the listed firms in the context of an emerging country and Vietnam as the case study. It can be seen from that, the importance of the internal audit in fraud detection and the demands from firms to invest the internal audit procedures and trainings in order to reach the high working effectiveness of the firm. From that, we propose the research model as below:

Figure 1. Research model proposed



The following hypotheses are designed and presented in Table 1 below.

**Table 1.** Proposed research hypotheses

<b>Coding</b>	<b>Hypotheses</b>	<b>Sources</b>
<i>H<sub>0</sub></i>	<i>Observed variables are not correlated with each other in the population.</i>	
<i>H<sub>1</sub></i>	<i>Audit quality has a positive influence on audit efficiency.</i>	Mihret and Yismaw (2007), Barac and van Staden (2010), George et al. (2015)
<i>H<sub>2</sub></i>	<i>The independence of internal audit has a positive effect on EIA.</i>	Yee et al. (2008), Zhang et al. (2007), Cohen and Sayag (2010), Alzeban and Gwilliam (2014)
<i>H<sub>3</sub></i>	<i>The capability of the internal audit team will affect the EIA.</i>	Mousa (2005), Turley and Zaman (2007), Arena and Azzone (2009), Mihret et al. (2010), Cohen and Sayag (2010), Alzeban and Gwilliam (2014), George et al. (2015)
<i>H<sub>4</sub></i>	<i>More support from top management will be associated with higher audit effectiveness.</i>	Mihret et al. (2010), Mihret and Yismaw (2007), Cohen and Sayag (2010), Alzeban and Gwilliam (2014), Schwartz et al. (2005), Leung et al. (2003), Sarens and De Beelde (2006), George et al. (2015)
<i>H<sub>5</sub></i>	<i>There is a positive relationship between EIA and fraud detection.</i>	Nardo (2011), Rezaee (2005), Spathis (2002), Button et al. (2015), Balaciu et al. (2014), Carcello et al. (2005), Omoteso and Obalola (2014), Hasnan et al. (2022), Handoyo and Bayunitri (2021), Shahini-Gollopeni et al. (2022), Nguyen et al. (2022)
<i>H<sub>6</sub></i>	<i>There is a positive relationship between internal auditor responsibility and fraud detection.</i>	Hasnan et al. (2022), Handoyo and Bayunitri (2021), Shahini-Gollopeni et al. (2022), Nguyen et al. (2022)
<i>H<sub>7</sub></i>	<i>There is a positive relationship between internal auditor training and fraud detection.</i>	McKee (2006), Hammersley et al. (2011), Bierstaker et al. (2014), Hasnan et al. (2022), Handoyo and Bayunitri (2021), Shahini-Gollopeni et al. (2022), Nguyen et al. (2022)
<i>H<sub>8</sub></i>	<i>There is a positive relationship between audit quality and fraud detection.</i>	From the interview

### 3. RESEARCH METHODOLOGY

#### 3.1. Data collection

By in-depth interviews with business managers including chairman of the board of directors, general director, heads/deputies of departments, chief accountants, and accountants/auditors of non-financial joint stock companies main. Mainly in Vietnam. Experts, experienced auditors and university audit lecturers are also interviewed. Interview method to collect information about the characteristics of each factor affecting the EIA and the auditor's responsibility in discovering fraud in an emerging country.

Based on the identification of the determining factors discovered above, questionnaires are sent to participants through the following forms: 1) direct interview, 2) sending mail, 3) email, 4) Google Docs and 5) other means. The survey results obtained 345 responses out of a total of 364 questionnaires distributed to internal auditors, department heads, and directors working at non-financial joint stock companies with regulations. Charter capital is over ten billion Vietnamese dong (VND), and has a total of  $\geq 100$  employees in Vietnam. After eliminating invalid responses due to missing or incomplete information, we selected 325 valid responses, achieving a response rate of 89.29%.

#### 3.2. Data processing

The determinants and coded attributes are presented in the Appendix.

SPSS 22 software was employed to analyze data. Descriptive statistical analysis was conducted to show the basic information of the population and sample size. To test the quality of the scale, we employ Cronbach's alpha. Then, exploratory factor

analysis (EFA) was employed to extract determinants for further analysis. Finally, we use partial least squares structural equation modelling (PLS-SEM) to estimate the complex causal relationships among the latent variables. Then we analyze, explore and test conceptual and theoretical models.

### 4. RESEARCH RESULTS

#### 4.1. Descriptive statistics

The participants were mainly female, accounting for 60.92% of the sample, while males accounted for 39.08%. The opinions of the survey respondents were concentrated in the group with an auditing specialization, with a total of 137 people, accounting for the highest proportion at 42.15%, followed by the group with an accounting specialization at 36.62%, and finally the group with a finance specialization at 21.23%.

On the other hand, internal auditors with a certification in auditing had the highest proportion of participation at 41.54%, followed by internal auditors without an auditing certification at 39.38%, and lastly, directors/department heads at 19.08%.

#### 4.2. Checking the reliability of scales

Cronbach's alpha reliability coefficient and EFA analysis were done. Table 2 illustrates that most of the factors have a Cronbach's alpha coefficient greater than 0.6, and the total correlation coefficient of the measurement scales is greater than 0.3, after excluding the attributes including *AQ6*, *CT6*, *IE6*, *ROIA6*, and *IAT1*.

After removing unsatisfactory attributes, we rerun SPSS for the remaining scales. The findings are evidenced in Table 2 below.

**Table 2.** Cronbach's alpha reliability coefficient results of the measurement scales

<i>Determinants</i>	<i>Observed variables</i>		<i>Cronbach's alpha</i>	<i>Coefficients</i>
	<i>Before</i>	<i>After</i>		
Audit quality (AQ)	6	5	0.732	0.742
Internal audit independence (IA)	3	3	0.615	0.412
Capability of the internal audit team (CT)	6	5	0.820	0.523
Support from management (SL)	3	3	0.678	0.530
Internal audit effectiveness (IE)	6	5	0.683	0.595
Responsibilities of internal auditors (ROIA)	6	5	0.769	0.685
Internal auditor training (IAT)	4	3	0.837	0.734
Internal audit fraud detection (IAFD)	4	4	0.621	0.486

Source: Compilations by the Authors.

### 4.3. Exploratory factor analysis and correlation between variables

#### 4.3.1. Exploratory factor analysis (EFA)

The factor analysis results in Table 3 show that the Kaiser-Meyer-Olkin (KMO) index was 0.901 (higher than 0.5), which proved that the data used for factor analysis was completely appropriate.

The result of Bartlett's test was 20,475.951, with the significance level value of Sig. = 0.000 < 0.05 (rejecting the hypothesis  $H_0$ ). Therefore, the hypothesis about the correlation matrix between the variables was a rejected identity matrix. The variables were correlated with each other and satisfied the factor analysis conditions (Table 3).

The results reveal that the remaining observed variables after removing the scales did not satisfy the reliability. The total variance value extracted was 66.718%, which is all satisfactory > 50%. Thus, it could be said that these determinants explain 66.718% of the data. The eigenvalue coefficients of all factors are high (> 1), and elements with eigenvalues (lowest) of 1.151 all satisfy > 1.0.

**Table 3.** KMO and Bartlett's coefficients

<i>Criteria</i>	<i>Model</i>
KMO index	0.901
Bartlett's test	20,475.951
Bartlett's test with sig. value	0.000
Total value of variance extracted	66.718
Minimum eigenvalues	1.151

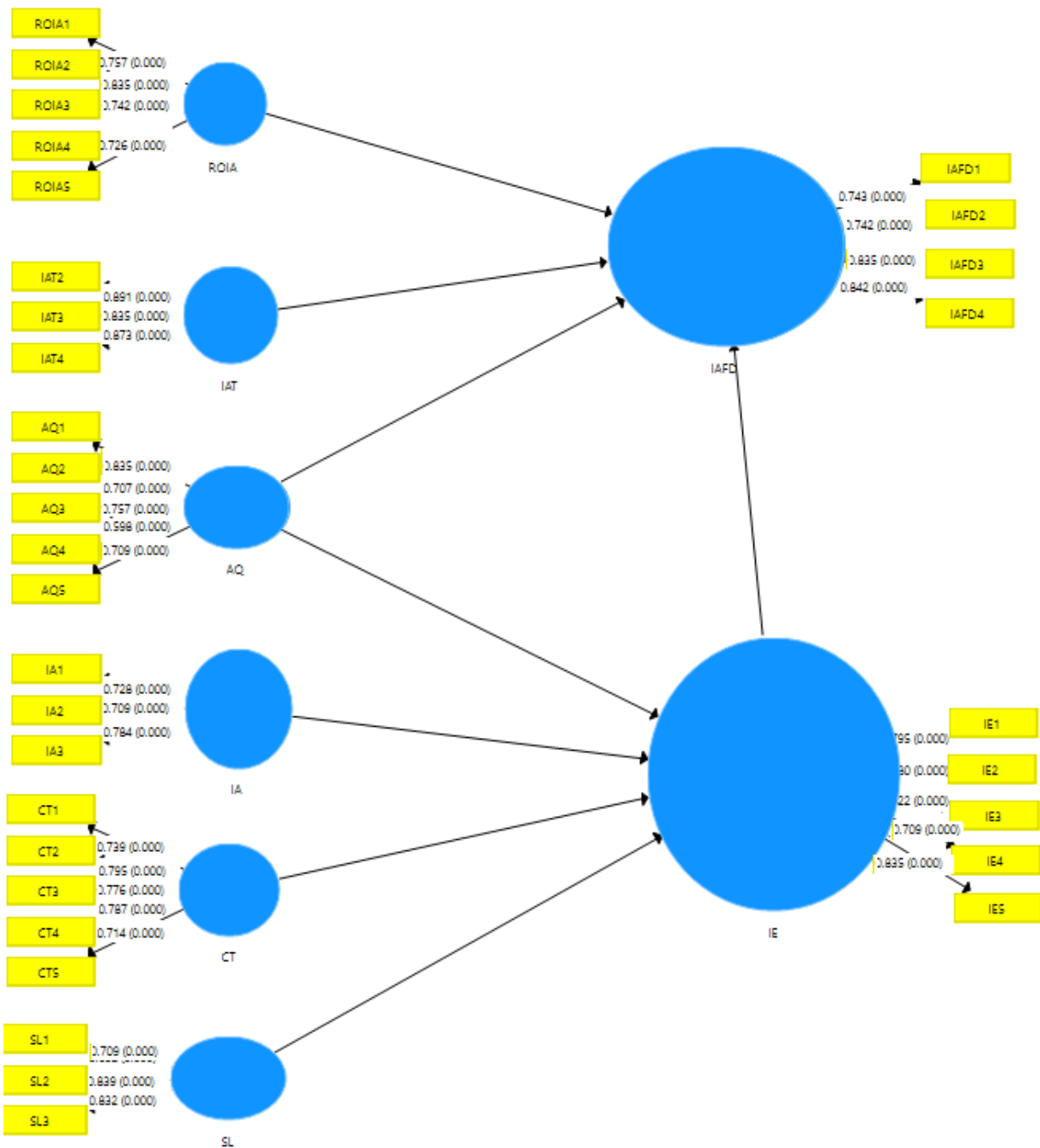
Source: Compilations by the Authors.

#### 4.3.2. Multivariate regression analysis

First, the fit of the model, the reliability of the model measuring the results, and the accuracy of the convergence are tested.

The model fit, the reliability of the measurement model, and the accuracy of convergence can be evaluated. The model fit is indicated by standardized value of the root mean square residual (SRMR) = 0.055 < 0.08 great model.

Figure 2. Reliability and convergence of the model

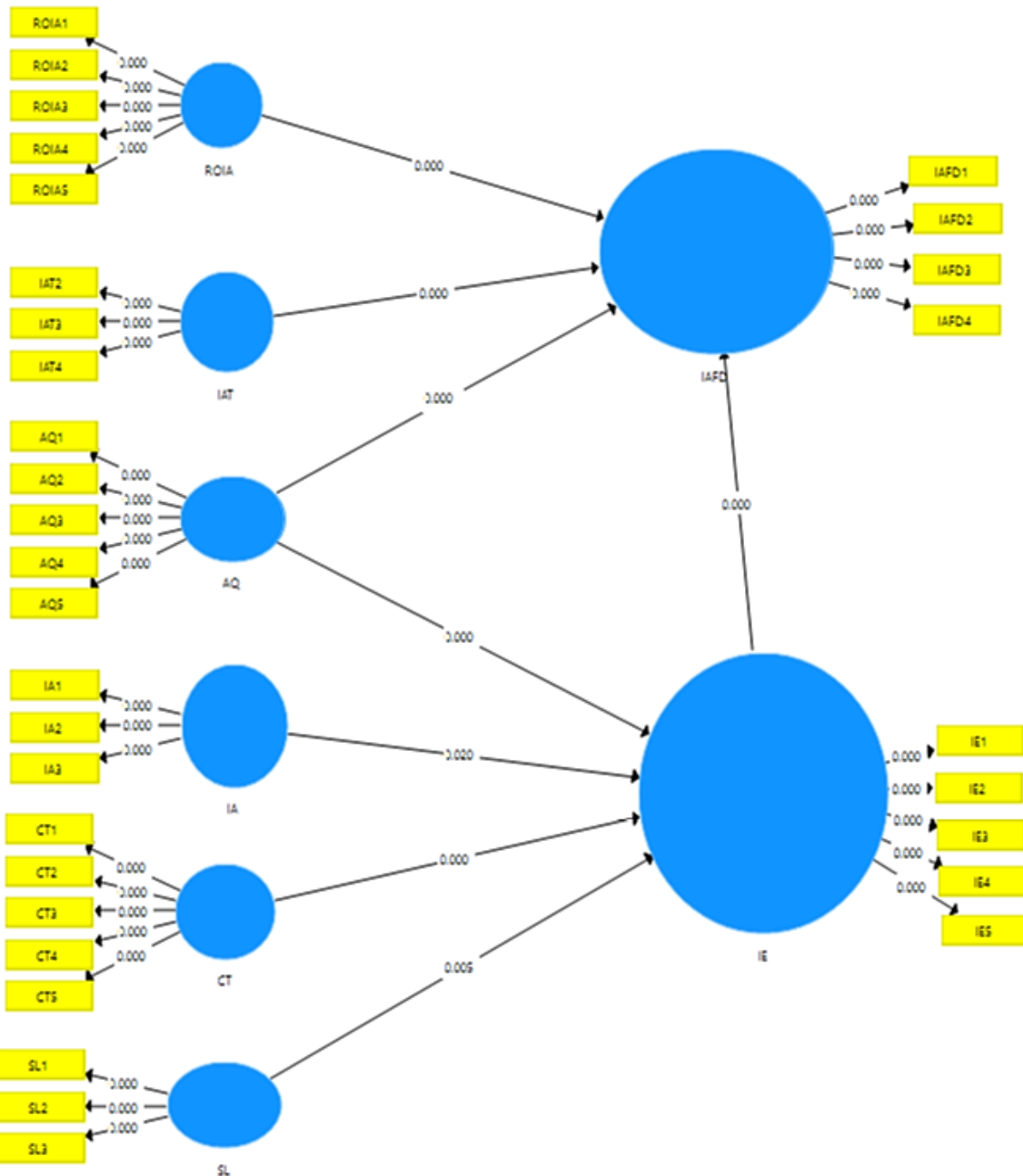


Source: Compilations by the Authors.

According to Figure 2, we learn that the reliability of Cronbach's alpha and composite reliability  $\geq 0.7$  is suitable for the model. *The level of convergence:* the magnitude of the average variance coefficient  $\geq 0.5$  achieves the accuracy level of convergence.

*Multicollinearity among indicators:* the coefficient:  $VIF \leq 5$ , the model does not show the phenomenon of multicollinearity.

Figure 3. Impact of determinants on the EIA, the responsibility of auditors in detecting fraud



Source: Compilations by the Authors.

Figure 2 and Table 4 illustrate that all variables of audit quality (AQ), internal audit independence (IA), capability of internal audit team (CT), support from management (SL) have an effect on dependent

variable of internal audit effectiveness (IE). Therefore, hypotheses H1, H2, H3, and H4 are supported.

Table 4. Model testing results

Impacts	Sample	Mean	Standard deviation	t-statistics	p-values
AQ → IAFD	0.035	0.035	0.037	0.945	0.000
AQ → IE	0.326	0.332	0.064	5.116	0.000
CT → IE	0.226	0.225	0.057	3.947	0.000
IA → IE	0.121	0.122	0.052	2.336	0.020
IAT → IAFD	0.824	0.822	0.066	12.451	0.000
IE → IAFD	0.366	0.368	0.067	5.485	0.000
ROIA → IAFD	0.455	0.461	0.039	11.792	0.000
SL → IE	0.163	0.163	0.058	2.838	0.005

Source: Compilations by the Authors.



## 5. DISCUSSION

From the findings in Section 4, we find that the variables of responsibility of internal auditors (ROIA), internal auditor training (IAT) and internal audit effectiveness (IE) have an impact on internal auditor fraud detection (IAFD). In details:

- Audit work quality has a positive influence on audit efficiency ( $\beta = 0.326$ ;  $p = 0.000 < 0.05$ ). Hypothesis H1 is supported.

- The independence of internal audit has a positive effect on audit effectiveness ( $\beta = 0.121$ ;  $p = 0.000 < 0.05$ ). Hypothesis H2 is accepted.

- The capability of the internal audit team will affect the effectiveness of the audit ( $\beta = 0.226$ ;  $p = 0.000 < 0.05$ ). This result supports hypothesis H3.

- More support from top management will be associated with higher audit effectiveness audit ( $\beta = 0.163$ ;  $p = 0.000 < 0.05$ ). This result supports hypothesis H4.

- There is a positive relationship between internal audit effectiveness and fraud detection ( $\beta = 0.366$ ;  $p = 0.000 < 0.05$ ). Hypothesis H5 is supported.

- There is a positive relationship between internal auditor responsibility and fraud detection ( $\beta = 0.455$ ;  $p = 0.000 < 0.05$ ). Hypothesis H6 is matched.

- There is a positive relationship between internal auditor training and fraud detection ( $\beta = 0.824$ ;  $p = 0.000 < 0.05$ ). This result supports hypothesis H7. This factor has the strongest impact in internal audit fraud detection.

- There is a positive relationship between audit quality and fraud detection ( $\beta = 0.035$ ;  $p = 0.000 < 0.05$ ). Hypothesis H8 is accepted.

This is consistent with previous research conducted by Mihret and Yismaw (2007), Barac and van Staden (2010), Yee et al. (2008), Zhang et al. (2007), Cohen and Sayag (2010), Alzeban and Gwilliam (2014), Mousa (2005), Turley and Zaman (2007), Arena and Azzone (2009), Mihret et al. (2010), Schwartz et al. (2005), Leung et al. (2003), Sarens and De Beelde (2006), Hasnan et al. (2022), Handoyo and Bayunitri (2021), Shahini-Gollopeni et al. (2022), Nguyen et al. (2022).

## 6. CONCLUSION

During the era of the 4.0 Industrial Revolution, fraudulent activities within and outside of firms are existed. Perpetrators of fraudulent measures are typically individuals who are members of the board of directors, employees, or even competitors. Typically, fraud arises from the benefits that can be obtained, such as earning rewards by skewing financial reports and reducing the firm's asset value, which often leads to higher bonuses or one of the two types of economic incentives. On the other

hand, there are cases of fraud or confusion related to auditors' inability to detect and report material misstatements during the course of the audit. This is why the role of internal auditors in discovering fraud is crucial.

To prevent such material misstatements, every firm should create a positive internal audit environment, maintain an effective internal audit system, hire experienced and trustworthy employees as internal auditors, and continuously train their employees to identify and detect potential fraud through the development of various preventive strategies. For a firm, detecting fraud and auditing the firm's operations through the internal audit unit is an important part of business operations and maintaining the firm's continuous operation. Many firms have been victims of fraud, leading to have bad situations in financial positions and operational results, and even go bankruptcy. To secure a firm's financial data, the firm designs and operates an effective control system to identify, detect and prevent material misstatements including fraud. A well-trained and experienced auditor can identify misconduct and violations occurring within the firm by using various techniques that can facilitate this control.

From the findings, we learn that the EIA, the responsibility of the internal auditors, and the evaluation of internal staff training have an impact on the internal auditors' fraud detection. We understand that the 4.0 Industrial Revolution demands that Vietnamese firms pay greater attention to internal audits, particularly the EIA within the firm. Attention should be given to the responsibility of internal auditors, training, cross-referencing, and regular cross-checks between departments.

However, this study only focuses on non-financial firms listed on the Vietnam Stock Exchange (VSE). Future research could incorporate some other financial indicators or study non-financial determinants outside the firms as dependent variables or control variables that affect the relationship between the effectiveness and efficiency of internal auditing and auditors' responsibilities in detecting fraud in an emerging country. On the other hand, the study only proposes some recommendations of EIA and the auditor's responsibility in detecting fraud at Vietnamese non-financial stock firms, but not pay much attention to it. In this study, we briefly mentioned some of the reasons that limit the EIA and the auditor's responsibility in detecting fraud in Vietnam. Future research could incorporate qualitative methods to further analyze the limitations of internal audit effectiveness and auditors' responsibilities in detecting fraud in an emerging country to complete improve and minimize the risks of errors that can occur in firms.

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## APPENDIX

Table A.1. Determinants and codings

<b>Codings</b>	<b>Description</b>	<b>Sources</b>
<b>Internal audit effectiveness (IE)</b>		
IE1	Internal audit adds value to the business.	Nardo (2011), Rezaee (2005), Spathis (2002), Button et al. (2015), Balaciu et al. (2014), Carcello et al. (2005), Omoteso and Obalola (2014), Hasnan et al. (2022), Handoyo and Bayunitri (2021), Shahini-Gollopeni et al. (2022), Nguyen et al. (2022)
IE2	Internal audit enhances the efficiency of the firm's departments.	
IE3	Internal audit improves the effectiveness of the organization's operations.	
IE4	The structure of the control system prevents fraud.	
IE5	The internal control is effective in detecting fraud.	
IE6	Protective measures in the control system can prevent illegal activities.	
<b>Internal audit quality (AQ)</b>		
AQ1	Internal audit objectives have been achieved.	Mihret and Yismaw (2007), Barac and van Staden (2010), George et al. (2015)
AQ2	Communication exists between internal audit and external parties.	
AQ3	Internal audit work is performed effectively.	
AQ4	Internal audit findings are timely and objective.	
AQ5	Internal audit recommendations can be easily implemented.	
AQ6	Internal audit reports are timely and comply with regulations.	
<b>Capability of the internal audit team (CT)</b>		
CT1	Internal auditors have high levels of professional expertise.	Mousa (2005), Turley and Zaman (2007), Arena and Azzone (2009), Mihret et al. (2010), Cohen and Sayag (2010), Alzeban and Gwilliam (2014), George et al. (2015)
CT2	Internal auditors are considered professionals.	
CT3	Internal auditors are proactive in the firm's work.	
CT4	There is an information exchange between the internal auditor and the audited party.	
CT5	Internal auditors attend training courses to enhance their capabilities and update their knowledge.	
CT6	Internal auditors have sufficient academic qualifications.	
<b>Internal audit independence (IA)</b>		
IA1	Internal audit reports to the highest level of the firm.	Yee et al. (2008), Zhang et al. (2007), Cohen and Sayag (2010), Alzeban and Gwilliam (2014)
IA2	Internal auditors have unrestricted access to all departments and employees within the organization.	
IA3	Internal auditors participate, build into the development of firm processes.	
<b>Support from management (SL)</b>		
SL1	Senior management supports internal audit personnel.	Mihret et al. (2010), Mihret and Yismaw (2007), Cohen and Sayag (2010), Alzeban and Gwilliam (2014), Schwartz et al. (2005), Leung et al. (2003), Sarens and De Beelde (2006), George et al. (2015)
SL2	The internal audit department is large enough to effectively carry out its duties.	
SL3	Senior management recognizes the need for internal audit.	
<b>Internal audit fraud detection (IAFD)</b>		
IAFD1	Internal audits can discover fraudulent transactions.	Hasnan et al. (2022), Handoyo and Bayunitri (2021), Shahini-Gollopeni et al. (2022), Nguyen et al. (2022)
IAFD2	Internal audits can detect fraudulent behavior by employees.	
IAFD3	Internal audits can detect misstatements in financial reports.	
IAFD4	Internal audits can detect inaccurate valuation of firm assets.	
<b>Responsibilities of internal auditors (ROIA)</b>		
ROIA1	Internal auditors have full access to business records.	Hasnan et al. (2022), Handoyo and Bayunitri (2021), Shahini-Gollopeni et al. (2022), Nguyen et al. (2022)
ROIA2	Internal auditors are independent.	
ROIA3	Internal auditors cooperate with the members of the board of management.	
ROIA4	Internal audits report directly to the board of management when identifying errors.	
ROIA5	Internal auditors are staff members of the internal audit department.	
ROIA6	The firm hires an independent external auditor to perform the internal audit.	
<b>Internal auditor training (IAT)</b>		
IAT1	Internal audit staff are continuously trained.	McKee (2006), Hammersley et al. (2011), Bierstaker et al. (2014), Hasnan et al. (2022), Handoyo and Bayunitri (2021), Shahini-Gollopeni et al. (2022), Nguyen et al. (2022)
IAT2	A team of experienced internal audit staff.	
IAT3	Internal auditors are regularly updated with relevant knowledge.	
IAT4	Internal auditors comply with Vietnamese and international standards on auditing.	

Note: We use the Likert 1-5 scale with the following convention: strongly disagree: 1; disagree: 2; no opinion/neutral: 3; agree: 4; completely agree: 5).