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Dekar Urumsah

Department of Accounting, Universitas Islam Indonesia, Yogyakarta, Indonesia
dekar.urumsah@uii.ac.id

Mislya Rahmida

Department of Accounting, Universitas Islam Indonesia, Yogyakarta, Indonesia
mislya2018@gmail.com

Rizki Hamdani

Department of Accounting, Universitas Islam Indonesia, Yogyakarta, Indonesia
rizki.hamdani@uii.ac.id

Seto Satriyo Bayu Aji

Business Economy & Management Doctoral Degree Program, Masaryk University, Brno, Czech Republic
491280@muni.cz

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Dekar Urumsah¹, Mislya Rahmida², Rizki Hamdani^{3*}, Seto Satriyo Bayu Aji⁴

^{1,2,3}Department of Accounting, Universitas Islam Indonesia, Yogyakarta, Indonesia

⁴Business Economy & Management Doctoral Degree Program, Masaryk University, Brno, Czech Republic

*Corresponding Author: rizki.hamdani.uui.ac.id

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*Corresponding Author:

rizki.hamdani@uui.ac.id

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Abstract

The study investigates the impact of whistle-blowing, forensic audit, and investigative audit on fraud detection, with gender and experience serving as potential moderators. Structured equation modeling (SEM) is used to study the relationships between determinants. This study also seeks to understand the role of gender and experience in determining fraud detection through multigroup analysis. The data used for the analysis includes 97 auditors from the Supreme Audit Agency (BPK RI) and the Financial and Development Supervisory Agency (BPKP) who work in the investigation unit. The findings reveal that whistle-blowing positively and significantly influences forensic audit, investigative audit, and, ultimately, fraud detection. Both forensic and investigative audits also exhibit positive and significant impacts on fraud detection. Moderation effects of gender and experience were not observed in the relationships between whistle-blowing and the aforementioned audits or fraud detection. These findings suggest that the implementation of whistle-blowing systems can facilitate fraud reporting, improve early warning for fraud detection, and function as an effective oversight tool to prevent internal violations in government institutions. This study contributes valuable empirical evidence regarding the interplay between whistle-blowing, forensic and investigative audits, fraud detection, and the moderating roles of gender and experience. It effectively addresses knowledge gaps and offers potential contributions to existing theories, particularly concerning the nuanced influence of gender and experience on fraud detection.

Introduction

The Association of Certified Fraud Examiners (ACFE) states that fraud is unlawful behavior or actions carried out intentionally for certain purposes such as manipulation or providing false reports to other parties (ACFE Indonesian Chapter, 2017). These actions are carried out by people from inside or outside the organization to gain personal or group benefits, either directly or indirectly, which will harm other parties (ACFE, 2018). If there is no prevention and detection efforts beforehand, fraud will always occur (Kennedy & Siregar, 2017).

There are three types of fraud that most often occur in Indonesia, including corruption, asset misappropriation, and fraudulent statements (ACFE, 2008). Referring to a survey conducted by the ACFE Indonesian Chapter (2020), fraud that occurred in Indonesia throughout 2019 revealed that the percentage of each type of fraud showed the highest number of fraud in the form of corruption at 69.9%, followed by fraud in the form of asset misappropriation at 20.9%, then the

type of fraudulent fraudulent statements was 9.2%. Meanwhile, the organization that suffered the most losses was the government with survey results of 48.5%. Apart from that, the companies that suffered losses were those with state-owned enterprises (SOE) status with a percentage of 31.8% (ACFE Indonesian Chapter, 2020).

Corruption is the most striking form of fraud and is difficult to prevent or detect because it is closely related to structured and planned collaboration with other parties, so efforts and methods are needed to detect fraud (Tuanakotta, 2016). In Indonesia, not only executive, legislative, and judicial officials can engage in corruption, but also private entities can also do so (Hamdani et al., 2017). Indonesian Corruption Watch (ICW) revealed that corruption reached IDR 26.83 trillion in semester 1 2021, this amount increased by 47.63% compared to the same period in 2017 of IDR 18.17 trillion (ICW, 2021). Corruption practices in Indonesia as perceived in the Corruption Perception Index (CPI) announced by Transparency International, that until the end of 2018, Indonesia was still a country with a high level of corruption, namely ranking 89th out of 180 countries in the world with a score of 38 on a scale of 0-100 (Transparency International Indonesia, 2019).

The causes of fraud that occur in Indonesia, especially in the government or public sector, are based on agency theory in which there are agency relationships and problems (Halim & Abdullah, 2006). Agency theory causes information asymmetry between the government as an agent who has direct access to information and the public who do not have access. Thus, it is very possible for abuse or corruption to occur by agents (Mardiasmo, 2009).

To overcome fraud that occurs in the public sector, one way is to implement a whistle-blowing system, carry out forensic audits, and investigative audits. Whistleblowing is the disclosure of information by current or former members regarding illegal, immoral or unauthorized practices under the control of their superiors or to people or organizations that may influence and commit fraudulent acts (Miceli et al., 2008). Whistle-blowing systems are applications for reporting violations, which can support the implementation of forensic audits and investigative audits. Meanwhile, someone who informs the public or powerful officials about alleged dishonesty, illegal activities or mistakes that occur in government, public or private organizations is called a whistle-blower (Susmanschi, 2012). The application of whistle-blowing has been proven to support investigative audits (Mamahit & Urumsah 2018) and the application of whistle-blowing has proven to be effective in supporting investigative audits (Rahmayani, et al., 2014).

A forensic audit involves testing evidence for a statement, emphasizing the process of searching for evidence and assessing its suitability or findings for the trial process (Wiratmaja, 2010). While Mulyadi and Nawawi (2020) assert that forensic audits have a positive effect on fraud prevention, Akenbor and Ironkwe (2014) argue that both proactive and reactive forensic audits have a significant negative relationship with fraud practices.

An investigative audit is an examination aimed at identifying and revealing fraud or crime using approaches, procedures, and techniques commonly applied in criminal investigations (Rahmayani et al., 2014). To effectively detect fraud, investigative audits utilize investigative skills, appropriate techniques, and tools to collect expected evidence thoroughly (Tuanakotta, 2016). Investigative audits have proven effective in detecting fraud (Briyan & Urumsah, 2019). So that, auditor with investigative skills will have a greater opportunity to uncover fraud (Sumartono et al., 2020).

This study addresses inconsistencies in previous research, drawing on the work of Syahputra and Urumsah (2019). However, this research differs by not including the whistle-blowing variable. Another study by Priyadi et al. (2022) used variables such as the whistle-blowing system, forensic audit, investigative audit, and fraud detection, but this research incorporates moderating variables—gender and experience. The research aims to empirically test and analyze the impact of whistle-blowing on forensic audits, investigative audits, and fraud detection. Additionally, it seeks to examine the influence of forensic audits and investigative audits on fraud detection, along with the moderating effects of gender and experience on the relationship between whistle-blowing and fraud detection.

Literature Review

Principal-Agency and Fraud Pentagon Theory

Principal-Agency theory explains the relationship between collaborating entities, where one party acts as a principal who hands over the authority to control and make decisions to another party, called an agent, who carries out services or tasks on behalf of the principal (Eisenhardt, 1989). In agency theory, conflicts of interest will arise between the principal and the agent, due to different interests (Hill & Jones, 1992). To fulfill the agent's personal interests, the agent sometimes takes actions that are not expected by the principal, namely actions that are detrimental to the principal. And usually agency problems arise because the agent carries out various actions that are contrary to the wishes of the principal, such as fraud (Jensen & Meckling, 1976).

The theory explaining the drivers of fraud was first put forward by Cressey (1953) and called the fraud triangle, then developed by Wolfe and Hermanson (2004) into the fraud diamond. Finally, Crowe (2012) refined the state-triggering model into the fraud pentagon, which identified several factors, such as pressure, opportunity, rationalization, capability, and arrogance.

Whistle-blowing and Forensic Audit

In principal-agency theory, agents should be tasked with representing the principal in managing the organization. However, there are several actions on the part of agents who carry out actions that are contrary to the wishes of the principal, such as acts of fraud which cause conflict between the principal and the agent which is called an agency problem (Jensen & Meckling, 1976). In general, whistle-blowing is a disclosure by organizational members of illegal, immoral, or unauthorized practices under the control of their superiors to people or organizations who might take action (Miceli et al., 2008). Whistle-blowing can play an important role in exposing unethical behavior in government and can make government more transparent and accountable to the public (Jeon, 2017). The presence of indications of fraud reported through whistle-blowing is an early warning that there are indications of fraud occurring, so that the more reports that come in from whistle-blowers, the greater the possibility of fraud occurring. An investigation into fraud must be preceded by an opinion or more often referred to as a predication, namely circumstances that, taken as a whole, would lead an expert wisely and reasonably to believe that fraud has occurred, is occurring or will occur (Singleton et al., 2006). If fraud actually occurs, of course it will have an impact on the organization which will bear the costs, so the existence of whistle-blowing will encourage the organization or company to carry out a forensic audit. Panjaitan (2018) stated that the implementation of a whistle-blowing system has been proven to show significant influence on forensic audits in disclosing acts of corruption by government auditors. This research formulates the following hypothesis:

H₁: Whistle-blowing has a positive effect on forensic audit

Whistle-blowing and Investigative Audit

In agency theory, conflicts of interest will arise between the principal and the agent, due to different interests (Hill & Jones, 1992). Things that can cause conflicts between principals and agents are usually called agency problems. The role of whistle-blowing is not only to report corruption problems, but also other scandals that violate the law and cause harm/threat to society. For organizations, incoming reports are an initial warning that there are indications that fraud has occurred, so the more reports that come in from whistle-blowers, the greater the possibility of fraud occurring and if fraud does occur, of course it will have an impact on the organization that will bear the responsibility. loss. This means that the existence of whistle-blowing will encourage organizations or companies to carry out investigative audits. This description indicates that there is a positive relationship between whistle-blowing and investigative audits. The research results that

the application of whistle-blowing has proven to be effective in supporting investigative audits are research by Ulimsyah et al. (2021). Based on this description, the following hypothesis can be formulated:

H₂: Whistle-blowing has a positive effect on investigative audit

Whistle-blowing and Fraud Detection

Whistle-blowing systems can be an opportunity for organizations to control the organization if fraud occurs due to weaknesses in internal control (Triantoro et al., 2020). If there are many reports coming in from whistle-blowers, the greater the possibility of fraud occurring and if fraud does occur, of course it will have an impact on the organization which will bear the losses. The existence of whistle-blowing will encourage organizations or companies to carry out forensic audits and investigative audits to detect fraud. Fraud detection relates to the general identification of signs or indications of fraud which involves monitoring transactions and analyzing data to find suspicious patterns or behavior. In contrast, forensic audits and investigations are more specific, emphasizing in-depth investigations following indications of fraud. Research that is in line with this description is Purnamawati (2018) who believes that the presence of a whistle-blowing system brings significant changes to companies because of the indirect benefits of employees being able to monitor each other. Effectiveness of the whistleblowing system influences an auditor's capability in fraud detection (Iskandar et al., 2022). Fraud cases reported by whistle-blowers through the whistle-blowing system which were followed up with investigations showed that the results were able to detect and reduce the level of fraud, and were quite effective because they could detect the level of fraud relatively quickly. Based on this description, the following hypothesis can be formulated:

H₃: Whistle-blowing has a positive effect on fraud detection

Forensic Audits and Fraud Detection

Forensic audits are carried out by utilizing special investigative skills in carrying out investigations in such a way that the results will have application to the court (Akenbor & Ironkwe, 2014). Carrying out a forensic audit requires a forensic auditor who has the skills to determine what should be examined, what constitutes relevant and valid evidence, where to look for it, and how to obtain or retrieve it, is adept at interviewing departmental and government officials, and can present findings and explanations. Because forensic audits are carried out by utilizing special investigative skills in carrying out investigations, the results of which can be used as evidence in court, this indicates that there is a positive relationship between forensic audits and fraud detection. Alao (2016); Enofe et al. (2015); Zachariah et al. (2014) also proves the effectiveness of forensic audits in detecting fraud. Based on this description, the following hypothesis can be formulated:

H₄: Forensic audits have a positive effect on fraud detection

Investigative Audit and Fraud Detection

Investigative audits can be used as an effective method for detecting fraud because investigative audits in the examination process are appropriate to the case being examined and the evidence collected must be sufficient and appropriate, especially when this audit is used for litigation, which will require the auditor to find evidence. which is valid in the eyes of the law (Dewi & Ramantha, 2016). To prove that fraud exists and actually occurred, an investigative audit is carried out and if the auditor who carries out the investigative audit has the expertise of a forensic accountant and carries out investigative audit procedures to obtain sufficient and appropriate evidence in accordance with the cases examined according to applicable procedures. So the investigative audit carried out to detect fraud will be effective. This description indicates that there is a positive relationship between investigative audits and fraud detection. A study that is in line with this description is a researcher who believes that investigative audits are influential in detecting fraud,

namely a study by Mamahit and Urumsah (2018) who argue that pre-planning investigative audits and implementing investigative audits are effective methods in detecting fraud. Based on this description, the following hypothesis can be formulated:

H₅: Investigative audits have a positive effect on fraud detection

Moderation of Gender in Fraud Detection

Gender of auditors is an indicator that can influence the success or failure of carrying out special audits in detecting fraud, such as in forensic audits and high-risk investigative audits (Cezair, 2009). Men and women behave and act in ways that show differences, this will make gender a factor that can determine whether or not fraud detection is going well. Women tend to be more careful in processing information by using more complete information and re-evaluating that information (Meyers-Levy, 1986). Idawati (2019) states that the gender variable has a partially significant effect on fraud detection. This means that the roles of men and women are equally important in detecting fraud. Meanwhile, Syahputra and Urumsah (2019) shows that gender is proven to be a variable that moderates the relationship between forensic audits and investigative audits on fraud detection. This description indicates that there is a positive relationship between gender and fraud detection. Based on this description, the following hypothesis can be formulated:

H₆: Gender as a moderating variable has a positive effect on fraud detection

Moderation of Experience in Fraud Detection

An auditor who has a lot of flying hours in conducting audits and is used to finding fraud will find it easier to detect fraud than an auditor who has low flying hours. Experienced auditors are auditors who are able to detect, understand and look for the causes of fraud (Anggriawan, 2014). Experience, which is one of the factors that comes from within oneself or the internal auditor, will greatly determine an in-depth understanding of how to detect fraud that might arise. An auditor's success or failure in detecting fraud depends on the auditor's internal factors. When the auditor has experience in assessing fraud, the auditor will be more skilled and faster at detecting fraud. Experience has been proven to be a variable that can moderate fraud detection (Syahputra & Urumsah, 2019; Kiswanto & Maulana, 2019). Based on this description, the following hypothesis can be formulated:

H₇: Experience as a moderating variable has a positive effect on fraud detection

The research model used in this study is presented in Figure 1.

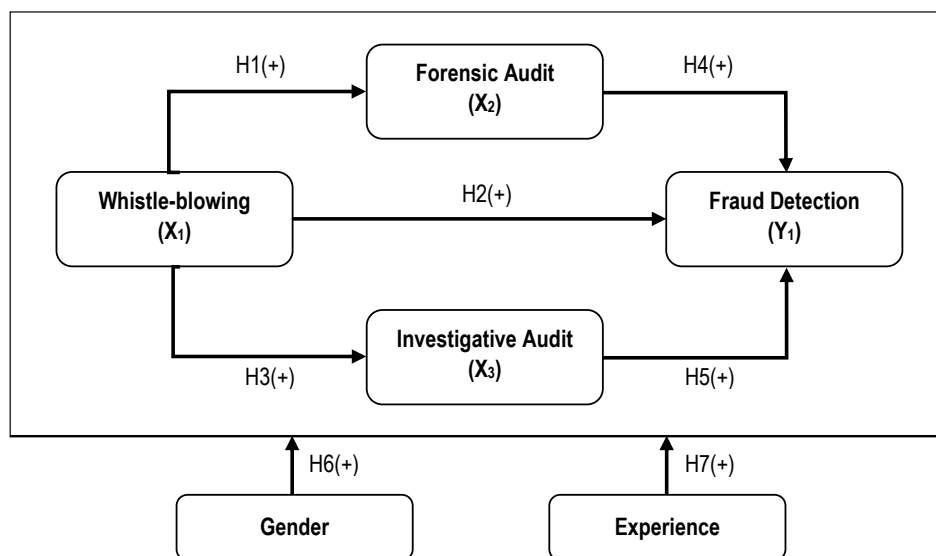


Figure 1. Research Model

Figure 1 shows the development of a fraud detection research model with the role of whistle-blowing, forensic audit and investigative audit in detecting fraud. In addition, this model also combines gender and experience to explore the moderating effects of demographic factors. So a research model can be formulated which is considered to be able to be used as an effective factor to improve the implementation of fraud detection. Figure 1 presents a research model related to the role of whistle blowing on forensic audits and investigative audits, the role of whistle blowing on forensic audits and investigative audits on fraud detection, as well as the role of gender and experience in moderating the relationship between whistleblowing, forensic audits and investigative audits on fraud detection.

Research Methods

This research uses a quantitative approach. The data collection method used was through a survey by distributing questionnaires. The samples for this research were auditors in the investigation sector at the Supreme Audit Agency (BPK) of the Republic of Indonesia, Financial and Development Supervisory Agency (BPKP) of the Republic of Indonesia, BPKP of the Special Region of Yogyakarta, BPKP of Central Java, and BPKP of East Java. The BPK and BPKP investigation sectors were chosen because one of the tasks of the BPK RI and BPKP investigation fields is to carry out forensic audits and investigative audits on deviant cases such as fraud which is detrimental to state finances. In this research, sampling was carried out using a purposive sampling technique, which is sampling with the nature of assessment using certain conditions, because not all populations can be used as samples (Cooper & Schindler, 2014).

Data collection in this research uses a questionnaire with several instruments adopted from previous research and will be modified according to research needs. The questionnaire in this study consisted of 39 questions using a likert scale of 1-6. The operational definition of each research variable is explained and the number of measurement indicators is presented in Table 1.

Table 1. Variables, Operational Definitions, Indicators, and Sources

Variables	Indicators	Sources
<u>Fraud Detection (FD)</u> Efforts to obtain sufficient initial indications regarding fraud, as well as narrowing the space for fraud perpetrators (Kumaat, 2011).	8 Indicators	(Fullerton & Durtschi, 2004); (Enofe et al., 2015)
<u>Whistle-blowing (WB)</u> Disclosures by organizational members of illegal, immoral, or unauthorized practices are brought under the control of their superiors to persons or organizations who may take further action (Near & Miceli, 1985).	14 Indicators	(Rahmayani et al., 2014); (Panjaitan, 2018)
<u>Forensic Audit (FA)</u> Application of accounting, investigative, criminology, and litigation services skills for the purpose of identifying, analyzing, and communicating evidence underlying reporting (Enofe et al., 2015).	7 Indicators	(Enofe et al., 2015); (Durnila & Santoso, 2018); (Fauzan et al., 2014); (Syahputra & Urumsah, 2019)
<u>Investigative Audit (IA)</u> Proving allegations of deviations in the form of fraud, irregularities, illegal expenditures, or abuse of power in the field of state financial management, which fulfill the elements of corruption that must be disclosed by auditors and subsequently pursued by the relevant authorities, such as the public prosecutor's office or the police, based on the provisions of applicable laws and regulations (Fauzan et al., 2014).	10 Indicators	Fauzan et al., (2014); (Tuanakotta, 2016); (Syahputra & Urumsah, 2019)

Results and Discussion

Based on the sampling process using the purposive sampling technique, 97 respondents were selected from the Supreme Audit Agency (BPK) of the Republic of Indonesia, Financial and Development Supervisory Agency (BPKP) of the Republic of Indonesia, BPKP of the Special Region of Yogyakarta, BPKP of Central Java, and BPKP of East Java. Table 2 illustrates that the number of questionnaires available for data processing was limited to 97. The demographic breakdown of respondents by gender revealed 55 males and 42 females, with the majority falling within the 31-40 age group (30%). Furthermore, the most respondents in the length of work category were more than 6 years of work (68%).

Table 2. Demography Characteristics of Participants

	Demography Characterictis	Number of Participants	%
Gender	Male	55	57%
	Female	42	43%
Age	Between 21 to 30 years	24	25%
	Between 31 to 40 years	29	30%
	Between 41 to 50 years	16	16%
	Between 51 to 60 years	28	29%
Education	Diploma	22	23%
	Bachelor degree	61	63%
	Master degree	14	14%
Length of work	Less than 1 year of work	10	10%
	Between 1 to 3 years of work	8	8%
	Between 3 to 6 years of work	13	13%
	More than 6 years of work	66	68%
Workplace	BPK of Republic of Indonesia	8	8%
	BPKP of Republic of Indonesia	33	34%
	BPKP of Special Region of Yogyakarta	39	40%
	BPKP of Central Java	10	10%
	BPKP of East Java	7	7%
Salary income	Less than IDR 5,000,000	11	11%
	Between IDR 5,000,000 to IDR 10,000,000	48	49%
	Between IDR 11.000.000 to IDR 15,000,000	22	23%
	Between IDR 16.000.000 to IDR 20,000,000	13	13%
	More than IDR 20,000,000	3	3%

Validity and Reliability Test

Table 3 indicates that the factor loading values for each indicator are greater than 0.50, implying that all loading values for each indicator meet convergent validity. The Average Variance Extracted (AVE) values obtained for each variable overall are also greater than 0.50 (Chin, 1998). Therefore, it can be inferred that the indicators used in this study are considered valid and meet convergent validity.

Table 4 shows that the square root value of the AVE value for each variable is greater than the largest correlation between that variable and other variables. Thus the data below shows the latent variable shares more variance with the underlying indicator than with other variables (Fornell & Larcker, 1981). The reliability test of the existing construct can be seen through the composite reliability value. If a construct has a composite reliability value above 0.70, then the construct can be declared reliable (Chin, 1998). Based on the composite reliability results obtained from Table 4, the overall value in this study is above 0.70. Thus it can be concluded that overall, the variables used in this research have high reliability.

Table 3. Convergent Validity

Variable	Item	Loading	AVE	Variable	Item	Loading	AVE			
Whistle-blowing/WB	WB 1	0.73	0.514	Investigative Audit/IA	IA 1	0.696	0.618			
	WB 2	0.629			IA 2	0.763				
	WB 3	0.724			IA 3	0.868				
	WB 8	0.681			IA 7	0.865				
	WB 9	0.638			IA 8	0.832				
	WB 10	0.814			IA 9	0.836				
	WB 11	0.855		IA 10	0.825					
	Forensic Audit/FA	WB 12		0.624	0.508	Fraud Detection/FD		FD 1	0.764	0.583
		FA 1		0.732				FD 2	0.85	
		FA 2		0.724		FD 3		0.829		
		FA 3		0.655		FD 4		0.869		
		FA 4		0.696		FD 5		0.587		
FA 5		0.664	FD 6	0.63						
FA 6		0.788	FD 7	0.764						
FA 7		0.721	FD 8	0.85						

Table 4. Composite Reliability (CR), Discriminant Validity

	WB	AF	AI	DF
WB	0.713			
FA	0.456	0.711		
IA	0.633	0.395	0.781	
FD	0.572	0.518	0.632	0.755
CR	0,893	0,878	0,941	0,891

Table 5. T-Test Results

Hypothesis	Correlation	β (Path Coefficients)	t-value	Results
H1	WB \rightarrow FA	0.456	4.895*	supported
H2	WB \rightarrow IA	0.633	9.992*	supported
H3	WB \rightarrow FD	0.193	1.973*	supported
H4	FA \rightarrow FD	0.270	3.150*	supported
H5	IA \rightarrow FD	0.404	3.997*	supported

R-Square = 0.5053

Table 5 presents the detailed results of the path coefficient (β) and t-values obtained from the bootstrapping procedure. The interpretation involves comparing the t-statistics results with the t table, where the t table signifies a significance t value > 1.65 (alpha 10%); > 1.96 (alpha 5%); and > 2.58 (alpha 1%) (Fornell & Larcker, 1981; Chin, 1998). Table 5 indicates that all hypotheses exhibit positive path coefficients, with t-statistic values exceeding 1.96 (alpha 5%). Consequently, it can be concluded that whistle-blowing significantly and positively influences forensic audits, investigative audits, and fraud detection. Additionally, a significant positive relationship is observed between forensic audits and fraud detection, as well as between investigative audits and fraud detection.

Apart from that, Table 5 indicates that the R-square value for the Fraud Detection (FD) construct or variable is 0.5053. This signifies that the Whistle-blowing (WB), Forensic Audit (FA), and Investigative Audit (IA) constructs collectively influence the Fraud Detection construct, explaining 50.53% of its variance. The remaining 49.47% is accounted for by other constructs. The results of testing the moderating effects of gender and experience using the Smith-Satterthwaite t-test are presented in Tables 6 and 7.

Table 6. Smith-Satterthwaite t test results for Gender Subgroup

Path	Gender				Statistics
	Male		Female		
	β (Path Coefficients)	Standard Error from Boots	β (Path Coefficients)	Standard Error from Boots	
WB → FA	0.525	0.067	-0.004	0.069	5.500*
WB → IA	0.686	0.047	0.740	0.084	-0.561*
WB → FD	0.382	0.117	0.387	0.058	-0.038*
FA → FD	0.380	0.086	0.580	0.107	-1.457*
IA → FD	0.150	0.111	-0.009	0.055	1.284*

*t-table = 1.96 (significance level 5%)

Table 6 shows the values from the t-test for several significant effects of gender, namely that there is a significant gender effect on the relationship between: whistle-blowing and forensic auditing ($t = 5.500; \alpha = 0.05$); investigative audit and fraud detection ($t = 1.284; \alpha = 0.05$), but there is also an insignificant effect of gender on the relationship between whistle-blowing and investigative audit ($t = -0.561; \alpha = 0.05$); whistle-blowing and fraud detection ($t = -0.038; \alpha = 0.05$); forensic audit and fraud detection ($t = -1.457; \alpha = 0.05$). This shows that gender as a moderating variable only has two significant relationships and no moderation effects were found in other paths. Based on the overall results, hypothesis 6 is not supported.

Table 7. Smith-Satterthwaite t test results for Experience Subgroup

Path	Experience				Statistics
	Male		Female		
	β (Path Coefficients)	Standard Error from Boots	β (Path Coefficients)	Standard Error from Boots	
WB → FA	0.616	0.058	0.074	0.164	3.116*
WB → IA	0.665	0.059	0.588	0.057	0.939*
WB → FD	0.467	0.117	-0.225	0.102	4.458*
FA → FD	0.143	0.079	0.360	0.086	-1.858*
IA → FD	0.297	0.120	0.628	0.078	-2.313*

*t-table = 1.96 (significance level 5%)

Table 7 shows the values from the t-test of several significant effects of the Experience Subgroup. There is a significant influence of experience on the relationship between whistle-blowing and forensic audit ($t = 3.116; \alpha = 0.05$); whistle-blowing and fraud detection ($t = 4.458; \alpha = 0.05$); whistle-blowing and investigative audits ($t = 0.939; \alpha = 0.05$). However, the relationship between forensic audit and fraud detection is not significant ($t = -1.858; \alpha = 0.05$); Audit Investigation and fraud detection ($t = -2.313; \alpha = 0.05$). This shows that experience as a moderating variable has three significant relationships out of the five relationships that were built. No moderation effect was found on the relationship between whistle-blowing and investigative audits, so based on the overall results, hypothesis 7 is not supported.

The study results from hypothesis 1 (H1) predict that whistle-blowing has a positive effect on forensic audit, which supports this hypothesis. The implementation of whistle-blowing systems will make it easier for whistle-blowers to report violations, so that more reports will come in. This shows that the more violation reports that come in, the greater the possibility of fraud occurring and if fraud does occur, of course it will have an impact on the organization which will bear the losses. These results are in line with Panjaitan (2018) that the application of whistle-blowing systems has been proven to have a significant effect on forensic audits in disclosing acts of

corruption by government auditors. The implication of the results of this research is that the more reports received from whistle-blowers, the greater the possibility of fraud occurring. The implementation of whistle-blowing systems can help government auditors, namely BPK and BPKP auditors who carry out forensic audit activities, because reports submitted to whistle-blowing systems are an early indication of fraud. This report can be followed up by conducting a forensic audit for fraud detection, which is expected to reduce the possibility of fraud occurring. So that it can prevent organizations or companies from losses arising from acts of fraud (Near & Miceli, 1985).

Hypothesis 2 (H2) predicts that whistle-blowing has a positive effect on investigative audits, the results support this hypothesis. People who work in organizations such as government who have the desire, opportunity and ability can commit fraud. The ease with which whistle-blowers can report indications of fraud should be accompanied by a reward, namely protection from retaliation from the reported party, this will provide a sense of security for the whistle-blower. If whistle-blowers feel safe, more indications of fraud will be reported. The implication of the results of this research is that if a whistle-blowing system is implemented, it will make it easier for whistle-blowers to report indications of fraud. With the increasing number of reports coming in from whistle-blowers, the greater the possibility of fraud occurring. This can encourage the organization or company to follow up by conducting an investigative audit. The implementation of whistle-blowing systems can help auditors who carry out investigative audit activities using reports received from the whistle-blowing system which will be followed up in order to reduce the level of fraud in the organization and prevent losses arising from its occurrence of fraud (Near & Miceli, 1985).

The results of testing hypothesis 3 predict that whistle-blowing has a positive effect on fraud detection, and the results support this hypothesis. Whistle-blowing systems serve as mechanisms for reporting alleged criminal acts of corruption involving employees and others within the organization (Larasati et al., 2017). Whistle-blowers reporting fraud indications should receive a reward, namely protection from the reported party, providing a sense of security. A secure environment encourages more whistle-blowers to report fraud through the system. This study supports the study of Wardhani and Urumsah (2018) and Ramadhan and Mulyati (2022) which argues that the application of whistle-blowing plays a role in carrying out investigative audits in detecting fraud. The implication is that implementing a whistle-blowing system facilitates easier reporting of fraud indications. An increase in reports may lead to a greater likelihood of fraud occurrence. This could prompt organizations to conduct forensic and investigative audits. The implementation of whistle-blowing systems not only helps auditors who carry out forensic and investigative audit activities in detecting fraud, but also helps protect organizations or companies from losses due to fraud.

The results of testing hypothesis 4 predict that forensic audit has a positive effect on fraud detection, and the results support this hypothesis. Forensic auditing focuses on detecting, analyzing, and communicating evidence of financial events to prevent fraud (Enofe et al., 2015). Forensic audit investigations are diverse, producing valid evidence for litigation (Akenbor & Ironkwe, 2014). The effectiveness of forensic audits in fraud detection is confirmed by previous studies, such as Enofe et al. (2015) and Ramadhan and Mulyati (2022). The implication is that auditors conducting forensic audits need expertise in various fields, including accounting, auditing, information technology, law, criminology, and communications. Government auditors, namely BPK and BPKP auditors, can utilize forensic audits to carry out, detect and reveal every type of fraud that occurs. However, it must be prepared with adequate knowledge and technological equipment so that carrying out forensic audits can be more effective. On the other hand, the necessary expert staff must be prepared to carry out forensic audits through various types of education and training.

The results of testing hypothesis 5, investigative audit, were proven to have a positive effect on fraud detection. Investigative audits are effective for fraud detection as they tailor the

examination process to the case and collect sufficient and appropriate evidence, especially when used for litigation (Dewi & Ramantha, 2016). Auditors conducting investigative audits require additional competencies in principles, practices, and techniques of investigative audits, including knowledge of laws, regulations, and confidentiality concepts. The results of testing hypothesis 5, namely investigative audit, were proven to have a positive effect on fraud detection. Investigative audits can be used as an effective method for detecting fraud because investigative audits in the examination process are appropriate to the case being examined and the evidence collected must be sufficient and appropriate, especially when this audit is used for a litigation process which will require the auditor to find relevant evidence and legal perspective (Dewi & Ramantha, 2016). The implication of the results of this research is that auditors must have additional competencies in carrying out investigative audits, namely knowledge of the principles, practices and techniques of investigative audits, including ways to obtain evidence from whistle-blowers, knowledge of the application of laws, regulations, and other provisions related to investigative audits; ability to understand the concept of confidentiality and protection of information sources; also the ability to use computer equipment, software and systems effectively to support the investigative audit process (PerMenPANRB, 2013). The effectiveness of carrying out investigative audits also depends greatly on the auditors conducting the investigative audit (BPK and BPKP auditors) who must be prepared with adequate knowledge and technological equipment. This will support fraud detection which can reduce the possibility of fraud occurring. A study conducted by Maulidi (2017) shows that investigators' skills and knowledge are effective in contributing to overcoming fraud in the public sector.

The results of testing hypothesis 6 (H6) for gender effects indicate that gender, as a moderating variable, only exhibits two significant relationships, and no moderation effects were found in other pathways. Based on the overall results, hypothesis H6 is not supported. This could be attributed to the idea that men and women conducting audits possess similar abilities to process available information and data. These findings align with previous research by (Nasution, 2012), suggesting that men may enhance their ability to detect fraud symptoms compared to female auditors. This consistency is further supported by the work of (Yendrawati & Mukti, 2015). Even though gender is not supported in conducting audits for fraud detection, there are differences between male and female auditors when carrying out forensic audit and investigative audit tasks. The effectiveness of carrying out forensic audits and investigations is very dependent on the resources or auditors who carry out the audit, which consists of male and female auditors. The auditor must be prepared with adequate technological knowledge and equipment. Therefore, auditors who carry out forensic audits and investigative audits, both men and women, are given the same opportunity to improve their competence through various types of continuous education and training.

The results of testing hypothesis 7 (H7) using the Smith Satterthwait test, which examined the effect of experience on auditors with more than 6 years of experience and those with less than or equal to 6 years of experience, did not reveal any moderating effect on the relationship between whistle-blowing and investigative audits. Consequently, based on the overall results, H7 is not supported. This indicates that auditors with more than 6 years of experience and those with less than or equal to 6 years of experience exhibit nearly the same ability in conducting forensic audits and investigative audits for fraud detection. This similarity may stem from continuous training received by auditors with less than or equal to 6 years of experience, enabling them to process existing information and data at a comparable level. The implication of these research findings is that although experience is not proven to moderate the relationship between whistle-blowing and forensic audits, investigative audits, and fraud detection, government organizations considering auditors for forensic or investigative audits should take experience into account. This is crucial because experienced auditors are more adept at quickly identifying errors during audits, as suggested by Anggriawan (2014) and Syahputra and Urumsah (2019), making auditors with more than 6 years of experience a recommended choice.

Conclusion

Based on statistical tests conducted, it is proven that, firstly, whistle-blowing has a positive effect on forensic audits, investigative audits, and fraud detection. Whistle-blowing systems serve as a means for whistle-blowers to report violations. Secondly, forensic audits and investigative audits have a positive and significant effect on fraud detection. The process of collecting evidence in forensic and investigative audits requires support from individuals with abilities and experiences across various branches of knowledge, extending beyond mere expertise in accounting or auditing. Thirdly, gender cannot moderate the relationship between whistle-blowing and forensic audits, investigative audits, and fraud detection, nor can it moderate the relationship between forensic audits, investigative audits, and fraud detection. Fourthly, experience cannot moderate the relationship between whistle-blowing and forensic audits, investigative audits, and fraud detection, nor can it moderate the relationship between forensic audits, investigative audits, and fraud detection.

This study unveiled several interesting findings that contribute to both theoretical understanding and practical implications. From a theoretical perspective, the results contribute to the literature on fraud detection by shedding light on the factors influencing fraud detection in the public sector or government agencies. A review of existing literature indicates a gap, as no prior research has empirically tested the simultaneous influence of whistle-blowing on forensic audits, investigative audits, and fraud detection, as well as the impact of forensic audits and investigative audits on fraud detection, while considering gender moderation and experience in the relationship between whistle-blowing and fraud. The inclusion of these two moderating factors in the model suggests a potential contribution to existing theory. Previous studies have identified moderating factors such as gender and experience influencing fraud detection.

The obtained results in this research have practical implications. The existence of a whistle-blowing system facilitates whistle-blowers in reporting indications of fraud. The increasing number of reports serves as an early warning sign that fraud may be occurring. Whistle-blowing systems are valuable tools for government institutions in monitoring internal violations, aiding in efforts to prevent violations and crimes within these institutions, thereby reducing opportunities for fraudulent activities. For government auditors, such as BPK and BPKP auditors engaged in forensic audits and investigative audits, this system helps in expediting the detection of fraud by streamlining the search for evidence of violations.

Although this study yields mostly significant results, it does have certain limitations. Firstly, the sample is limited to auditors from specific regions in Indonesia, not covering all auditors working in the BPK Investigation Unit Auditorate and BPKP investigative auditors nationwide. Secondly, the questionnaire distribution faced challenges due to busy schedules, particularly for respondents in the BPK Investigation Unit Auditorate in Jakarta. Thirdly, the research focuses on gender as a variable in one country, Indonesia. Future research is recommended to expand the scope beyond a single city, preferably covering the entire Indonesia, to generalize the obtained results.

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Appendix

Variables	Indicators (Code)	Sources
Fraud Detection (FD)	The existence of separation of duties can reduce the risk of fraud (FD1)	Fullerton & Durtschi (2004); Enofe et al. (2015)
	Violations of regulations can increase the risk of fraud (FD2)	
	Violations of regulations by organizational leaders can increase the risk of fraud (FD3)	
	Violations of SOPs committed by organizational leaders can increase the risk of fraud (FD4)	
	The absence of fraud reports from auditors indicates a high risk of fraud (FD5)	
	Intentional misstatements in financial statements are unreasonable (DF6)	
	The high number of complaints regarding discrimination experienced by employees indicates fraud (FD7)	
	Organizational leaders who have an authoritarian management style can encourage fraud (FD8)	
Whistle-blowing (WB)	Whistle-blowing is useful and important for government institutions. (WB1)	Rahmayani et al. (2014) Panjaitan(2018)
	Whistle-blowers come from internal and external. (WB2)	
	Whistle-blowing is encouraged internally by Government institutions. (WB3)	
	Government institutions have protection mechanisms for whistleblowers. (WB4)	
	Whistle-blower will report violations by Middle Management employees. (WB5)	
	Whistle-blower will report violations by Senior Management employees. (WB6)	
	The whistle-blower will report violations by employees who are considered close friends. (WB7)	
	The whistle-blower will report violations to External parties (Media). (WB8)	
	Review and Confirm Information from the Whistleblower. (WB9)	
	Implementation of whistle-blowing helps Implement Forensic Audits (WB10)	
	Implementation of whistle-blowing helps carry out investigative audits (WB11)	
	The implementation of whistle-blowing improves the Fraud Detection system (WB12)	
	The application of whistle-blowing helps in a relatively shorter fraud detection process. (WB13)	
	The implementation of whistle-blowing has an impact on reducing the number of frauds. (WB14)	
Forensic Audit (FA)	Forensic audits are used to detect fraud (FA1)	Fauzan et al. (2014) Enofe et al. (2015) Alao (2016) Durnila & Santoso (2018) Syahputra & Urumsah (2019)
	Forensic audits can guarantee that the process of detecting fraud is faster (FA2)	
	Forensic audits are carried out to assist in fraud prevention (FA3)	
	Forensic audits are used to review internal controls (FA4)	
	Forensic audits can guarantee strategies for preventing and detecting fraud in an organization (FA5)	
	Forensic audits can be used as an appropriate method for detecting fraud (FA6)	
	Forensic audits can help ensure the protection of organizational assets from use by unauthorized parties. (FA7)	
Investigative Audit (IA)	Auditors in conducting investigative audits must act independently (IA1)	Fauzan et al. (2014) Tuanakotta (2016) Syahputra & Urumsah (2019)
	Auditors in conducting investigative audits must have an attitude of professional skepticism (IA2)	
	Auditors in conducting investigative audits must have knowledge of statutory regulations and knowledge of the principles of investigation (IA3)	
	Auditors in conducting investigative audits must plan effective investigative techniques (IA4)	
	Auditors in conducting investigative audits need to formulate hypotheses (IA4)	
	Auditors in conducting investigative audits need to carry out observations and interviews (IA5)	
	Auditors in carrying out investigative audits can ask for assistance from other experts (IA6)	
	Auditors in conducting investigative audits must use non-financial data and recognize relationship patterns for each transaction (IA7)	
	Auditors in conducting investigative audits must collect, examine and assess the adequacy and accuracy of evidence (IA8)	
Auditors in conducting investigative audits must critically evaluate any evidence found in order to detect fraud (IA9)		