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The Synergistic Role of Whistleblowing Systems and Investigative Audits as Governance Mechanisms in Regional Budget Fraud Detection

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Abstract
This study examines the synergistic role of the whistleblowing system and investigative audits as governance mechanisms in detecting regional budget fraud. The persistence of fraud in regional financial management highlights the need for effective detection instruments, particularly at the level of Regional Work Units (SKPD). This research employs a quantitative approach using a census method, involving 60 respondents consisting of financial administration and accounting officers from all SKPDs in the City of Lhokseumawe. Data were collected through questionnaires and analyzed using multiple linear regression analysis with SPSS. The results showed that the whistleblowing system has a positive and significant effect on regional budget fraud detection, as indicated by a regression coefficient of 0.262 and a significance value of 0.000. Similarly, investigative audits have a positive and significant effect on fraud detection, with a regression coefficient of 0.484 and a significance value of 0.000. Furthermore, the simultaneous test results indicate that the whistleblowing system and investigative audits jointly have a significant effect on fraud detection. The coefficient of determination ($R^2 = 0.524$) suggests that 52.4% of the variation in fraud detection can be explained by these two governance mechanisms. These findings imply that strengthening

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whistleblowing systems and enhancing investigative audit practices are essential to improving fraud detection in regional budget management. This study contributes to the public sector accounting literature by emphasizing the importance of integrating reporting mechanisms with investigative oversight to support transparency, accountability, and good governance in local governments.

Keywords: Whistleblowing System; Investigative Audit; and Fraud Detection.

Abstrak

Penelitian ini bertujuan untuk menganalisis sinergis whistleblowing system dan audit investigasi sebagai mekanisme tata kelola dalam mendeteksi fraud anggaran daerah. Masih maraknya praktik kecurangan dalam pengelolaan keuangan daerah menunjukkan pentingnya instrumen deteksi yang efektif, khususnya pada tingkat Satuan Kerja Perangkat Daerah (SKPD). Penelitian ini menggunakan pendekatan kuantitatif dengan metode sensus, melibatkan 60 responden yang terdiri dari pejabat penatausahaan keuangan dan aparatur yang menjalankan fungsi akuntansi pada seluruh SKPD di Kota Lhokseumawe. Data dikumpulkan melalui kuesioner dan dianalisis menggunakan analisis regresi linear berganda dengan bantuan perangkat lunak SPSS. Hasil penelitian menunjukkan bahwa whistleblowing system berpengaruh positif dan signifikan terhadap fraud detection anggaran daerah, yang ditunjukkan oleh nilai koefisien regresi sebesar 0,262 dan tingkat signifikansi 0,000. Selain itu, audit investigasi juga berpengaruh positif dan signifikan terhadap fraud detection, dengan nilai koefisien regresi sebesar 0,484 dan tingkat signifikansi 0,000. Hasil uji simultan menunjukkan bahwa whistleblowing system dan audit investigasi secara simultan berpengaruh signifikan terhadap fraud detection anggaran daerah. Nilai koefisien determinasi (R^2 = 0,524) mengindikasikan bahwa 52,4% variasi fraud detection anggaran daerah dapat dijelaskan oleh kedua variabel tersebut. Temuan ini menunjukkan bahwa penguatan whistleblowing system dan peningkatan efektivitas audit investigasi merupakan langkah strategis dalam meningkatkan kemampuan deteksi fraud pada pengelolaan anggaran daerah. Penelitian ini diharapkan dapat memberikan kontribusi bagi pengembangan literatur akuntansi sektor publik serta menjadi bahan pertimbangan bagi

pemerintah daerah dalam memperkuat transparansi, akuntabilitas, dan tata kelola keuangan publik yang baik.

Kata Kunci: Whistleblowing System; Audit Investigasi; and Fraud Detection.

Introduction

Good governance in local government requires transparency, accountability, and integrity in the management of public finances. Regional budgets derived from both the State Budget (APBN) and locally generated revenue (PAD) should be managed effectively and efficiently to serve public interests (Raudhatinur and Endang, 2019). However, in practice regional budget management is often exposed to the risk of fraud, which can cause financial losses to the state and hinder regional development. Fraud in the public sector may occur throughout the entire budget cycle from planning and implementation to accountability, thus necessitating effective governance mechanisms to detect and prevent such practices (Nabila, 2025).

The persistence of fraud in regional budget management spanning planning, budgeting, implementation, and accountability remains a serious challenge to public sector governance in Indonesia. Normatively, the Government Internal Control System (SPIP) as stipulated in Government Regulation No. 60 of 2008 emphasizes the importance of a sound control environment, risk assessment, control activities, information and communication, and monitoring to prevent and detect irregularities. Nevertheless, uneven implementation across local governments has left control gaps, making detective governance mechanisms such as whistleblowing systems (WBS) and investigative audits increasingly crucial to strengthening early warning capabilities and enforcement against suspected fraud.

Recent developments indicate that fraud remains prevalent in Aceh, including the City of Lhokseumawe. In 2023, the Lhokseumawe District Prosecutor's Office uncovered two major corruption cases: alleged mismanagement of funds at Arun Hospital (2016–2022) with an estimated state loss of IDR 44.9 billion, and alleged corruption involving the Street Lighting Tax (PPJ) from 2018–2022 amounting to IDR 3.4 billion (Antara, 2023). The PPJ case continued to evolve, culminating in 2025 when the Supreme Court sentenced several civil servants (ASN) in Lhokseumawe to imprisonment for manipulating

PPJ incentive payments (Kompas, 2025). These cases highlight weaknesses in early detection systems at the level of local government work units (SKPD).

Furthermore, the Aceh Transparency Society (MaTA) reported dozens of corruption cases throughout Aceh in 2024, with the majority resulting in light to moderate court sentences (Serambi Indonesia, 2024). In addition, the Audit Board of Indonesia (BPK) raised concerns regarding the rationality of Lhokseumawe's locally generated revenue (PAD) realization in 2024 and highlighted issues in the formulation of the 2025 regional budget (APBK) (Waspada, 2024). These facts demonstrate that fraud detection remains a critical challenge in regional financial governance.

Over the past three years, the dynamics of corruption cases in Aceh further underscore this urgency. In 2023, the Lhokseumawe Prosecutor's Office revealed two prominent corruption cases involving the management of Arun Hospital funds (FY 2016–2022) with estimated losses of IDR 44.9 billion, and the misappropriation of the Street Lighting Tax (PPJ) for FY 2018–2022 amounting to IDR 3.4 billion. These cases indicate weaknesses in control over both revenue and expenditure cycles, including governance practices within SKPDs responsible for healthcare services and regional tax administration.

The PPJ case continued into 2025, when the Supreme Court imposed prison sentences on several civil servants involved in the manipulation of PPJ incentive payments. This development reinforces the notion that fraud schemes may involve the manipulation of incentive policies and payment mechanisms that should otherwise be governed by robust internal accountability systems within local governments.

Within the framework of governance mechanisms, the whistleblowing system (WBS) serves as a vital instrument by providing reporting channels for employees and the public to disclose suspected violations. WBS functions as an early warning system to identify indications of fraud before they escalate. Suka (2025) argue that the existence of WBS enhances transparency and fosters a culture of integrity by offering a safe reporting environment for whistleblowers.

In terms of prevention and detection, WBS plays a central role as a reporting channel that protects whistleblowers while expanding early detection coverage to individual employees and the broader public. National practices demonstrate continuous strengthening of WBS across ministries, agencies, and local governments. For instance, The Corruption Eradication Commission (KPK) has actively promoted WBS integration to cultivate transparency and protect whistleblowers through inter-agency collaboration during 2024–2025. At the regional level, the Aceh Inspectorate operates a WBS application emphasizing reporter anonymity, which is a prerequisite for public trust in reporting mechanisms.

This study integrates Agency Theory and Fraud Triangle Theory into a coherent conceptual framework to explain the mechanisms underlying fraud detection in the public sector. Agency Theory explains that conflicts of interest and information asymmetry between government officials (agents) and the public (principals) create conditions that may lead to opportunistic behavior, including fraud. In this context, effective governance mechanisms are required to reduce information asymmetry and improve accountability.

Meanwhile, Fraud Triangle Theory provides a behavioral perspective by explaining that fraud occurs due to the presence of pressure, opportunity, and rationalization. Among these elements, opportunity is considered the most controllable factor through organizational control systems and monitoring mechanisms.

By integrating these two theories, this study argues that governance mechanisms such as whistleblowing systems and investigative audits play a crucial role in reducing fraud risk and enhancing fraud detection. The whistleblowing system functions as an early detection and monitoring tool that reduces information asymmetry and limits opportunities for fraud by encouraging reporting of irregularities. On the other hand, investigative audits serve as a formal control mechanism that strengthens verification processes, uncovers hidden fraud schemes, and reduces rationalization through enforcement and accountability.

Therefore, the integration of Agency Theory and Fraud Triangle Theory provides a stronger theoretical foundation for explaining how governance mechanisms improve fraud detection. This approach moves beyond a purely descriptive framework by emphasizing the causal mechanisms through which whistleblowing systems and investigative audits contribute to the effectiveness of fraud detection in regional financial management.

However, WBS cannot operate effectively in isolation. Information obtained from whistleblower reports requires further verification through investigative audits. Investigative audits are specialized audits designed to uncover irregularities, identify fraud schemes, and calculate state financial losses. Jannah (2021) emphasize that investigative audits play a crucial role in strengthening the function of Government Internal Supervisory Apparatus (APIP) by producing forensic evidence that can be utilized in legal proceedings related to corruption cases.

Several prior studies support the importance of synergy between WBS and investigative audits in fraud detection. Nisa et al. (2025) demonstrate that the combination of WBS and investigative audits enhances the accuracy of fraud detection by enabling systematic verification of reported information. Similarly, Riyanto & Arifin (2022) find that governance mechanisms, including WBS have a significant impact on preventing accounting fraud in local governments in Indonesia. Moreover, Ziah & Kuntadi (2023) reveal that internal reporting systems followed up by investigative audits can effectively reduce fraud risk in regional expenditures.

Previous studies have extensively examined the role of whistleblowing systems and investigative audits in fraud detection within the public sector. Several studies highlight that whistleblowing systems contribute to early fraud detection by providing secure reporting channels, while investigative audits are effective in uncovering financial irregularities through in-depth examination. In addition, some prior research has explored the relationship between these variables using mediation or governance perspectives.

However, despite these contributions, there are still several gaps in the existing literature. From a theoretical perspective, most studies tend to analyze whistleblowing systems and investigative audits separately, without positioning them as complementary governance mechanisms within a unified framework for fraud detection. From a methodological perspective, prior research often focuses on indirect relationships, such as mediation models, while limited studies examine the direct effect of both mechanisms simultaneously within a single empirical model. From a contextual perspective, previous studies are generally conducted in broader public sector environments, with limited attention given to regional government institutions that face unique administrative complexities, such as local political dynamics, limited oversight, and varying levels of institutional capacity.

Therefore, this study aims to address these gaps by examining the effect of whistleblowing systems and investigative audits on regional budget fraud detection within local government institutions, specifically in the Regional Work Units (SKPD) of the City of Lhokseumawe. By focusing on the regional government context, this study provides a more specific and relevant understanding of fraud detection mechanisms in decentralized public financial management.

Based on empirical phenomena and prior literature, a research gap remains evident. Most existing studies examine WBS or investigative audits independently, while research on their synergistic role as an integrated governance mechanism is still limited, particularly at the SKPD level. This gap is critical, given that SKPDs serve as the frontline of regional budget implementation and thus face heightened fraud risks when detection mechanisms are suboptimal.

Accordingly, this study focuses on SKPDs in the City of Lhokseumawe to examine the "The Effect of Whistleblowing System and Investigative Audits on Regional Budget Fraud Detection." The selection of this research setting is motivated by the presence of recent corruption cases in Lhokseumawe, documented control weaknesses identified by BPK, and the urgent need to strengthen internal supervision. The findings are expected to contribute theoretically to the public sector accounting literature and provide practical recommendations to enhance the effectiveness of fraud detection in local governments.

Methods

This study employs a quantitative research design. The research was conducted at the Regional Work Units (SKPD) of the City of Lhokseumawe. The population of this study comprises all Regional Work Units (SKPD) within the City of Lhokseumawe. A detailed list of the research population is presented in Table 1.

Table 1. Population Research

No	Unit Organisasi	Jumlah
1	Sekretariat Daerah Kota Lhokseumawe	2
2	Sekretariat Dewan Perwakilan Rakyat (DPR) Kota Lhokseumawe	2
3	Dinas Kelautan Perikanan, Pertanian dan Pangan	2
4	Dinas Kependudukan dan Pencatatan Sipil	2
5	Dinas Kesehatan Kota Lhokseumawe	2
6	Dinas Komunikasi, Informatika dan Persandian	2
7	Dinas Lingkungan Hidup	2
8	Dinas Pekerjaan Umum dan Perumahan Rakyat	2
9	Dinas Pemberdayaan Masyarakat dan Gampong	2
10	Dinas Pemberdayaan Perempuan, Perlindungan Anak, Pengendalian Penduduk dan Keluarga Berencana	2
11	Dinas Pemuda, Olahraga dan Pariwisata	2
12	Dinas Penanaman Modal, Pelayanan Terpadu Satu Pintu dan Tenaga Kerja	2
13	Dinas Pendidikan dan Kebudayaan	2
14	Dinas Perhubungan	2
15	Dinas Perindustrian, Perdagangan, Koperasi dan Usaha Kecil Menengah	2
16	Dinas Perpustakaan dan Kearsipan	2
17	Dinas Pertanahan	2
18	Dinas Sosial	2
19	Dinas Syariat Islam dan Pendidikan Dayah	2
20	Satuan Polisi Pamong Praja dan Wilayatul Hisbah	2
21	Badan Kepegawaian dan Pengembangan Sumber Daya Manusia	2
22	Badan Kesatuan Bangsa dan Politik	2
23	Badan Penanggulangan Bencana Daerah	2
24	Badan Pengelolaan Keuangan Daerah	2

25	Badan Perencanaan Pembangunan Daerah	2
26	Inspektorat Kota Lhokseumawe	2
27	Sekretariat Baitul Mal Kota Lhokseumawe	2
28	Sekretariat Majelis Adat Aceh Kota Lhokseumawe	2
29	Sekretariat Majelis Pendidikan Daerah	2
30	Sekretariat Majelis Permusyawaratan Ulama	2
Jumlah		**60**

The sampling technique applied in this study is non-probability sampling using the census method, in which the entire population is included as the research sample. This approach ensures that all units within the population are observed (Sugiyono (2019). The respondents in this study are Financial Administration Officers (Pejabat Penatausahaan Keuangan, PPK) or personnel responsible for accounting functions in each Regional Work Unit of the City of Lhokseumawe, totaling 60 respondents. The selection of these respondents is consistent with the provisions stipulated in Law No. 32 of 2004 concerning Regional Government, as well as with prior empirical studies that identify PPK or accounting officers as key informants in research related to regional financial management and fraud detection.

This study employs a census method involving 60 respondents drawn from Financial Administration Officers and accounting personnel within the Regional Work Units (SKPD) of the City of Lhokseumawe. The use of a census approach ensures that all relevant members of the target population are included, thereby minimizing sampling bias and enhancing the representativeness of the data. The respondents in this study consist of Financial Administration Officers and accounting personnel within SKPD. These individuals were selected because they are directly involved in financial management, budgeting processes, and financial reporting within their respective institutions. As such, they possess relevant knowledge and practical experience related to internal control systems, fraud risks, and financial accountability.

The following table presents the operationalization of variables used in this study:

Table 2. Operationalization Of Variables

Variabel	**Operational Definition**	**Indicators**	**Scale**	**Source**
Whistleblowing System (X1)	A whistleblowing system is a reporting mechanism provided by an organization that enables employees or third parties to report suspected fraud or misconduct without fear of retaliation.	Existence of clear WBS policies and procedures .1 Availability of reporting channels (website, hotline, email) .2 Protection for whistleblowers .3 Confidentiality of whistleblower identity .4 Follow-up on reported cases .5 Dissemination and training of WBS to employees .6	Interval	ACFE (2020);
Investigative Audit (X2)	An investigative audit is an audit conducted in a specific and in-depth manner by supervisory authorities to uncover fraud and collect sufficient evidence for law	Clear assignment of investigative audits .1 Auditor competence in investigation .2 Evidence collection and analysis .3 Interviews and examination of witnesses/reported parties .4 Reporting of investigative audit results .5	Interval	Oktaviani et al. (2020)

	enforcement purposes.	Recommendations and follow-up of audit results .6		
***Fraud* Detection (Y)**	Fraud detection is the organization's ability to identify indications or occurrences of fraud in regional budget management.	Number of detected fraud cases .1 Speed of detection after reporting .2 Accuracy of detection results .3 Follow-up of fraud cases .4 Reduction of fraud potential over time .5	Interval	ACFE (2020); Putri & Rahmawati (2022);

In this study, data collection was conducted through the distribution of questionnaires. The questionnaire employed a five-point Likert scale to measure respondents' perceptions. The data analysis method applied in this research is Multiple Linear Regression Analysis, which is used to examine whether the independent variables have a significant effect on the dependent variable.

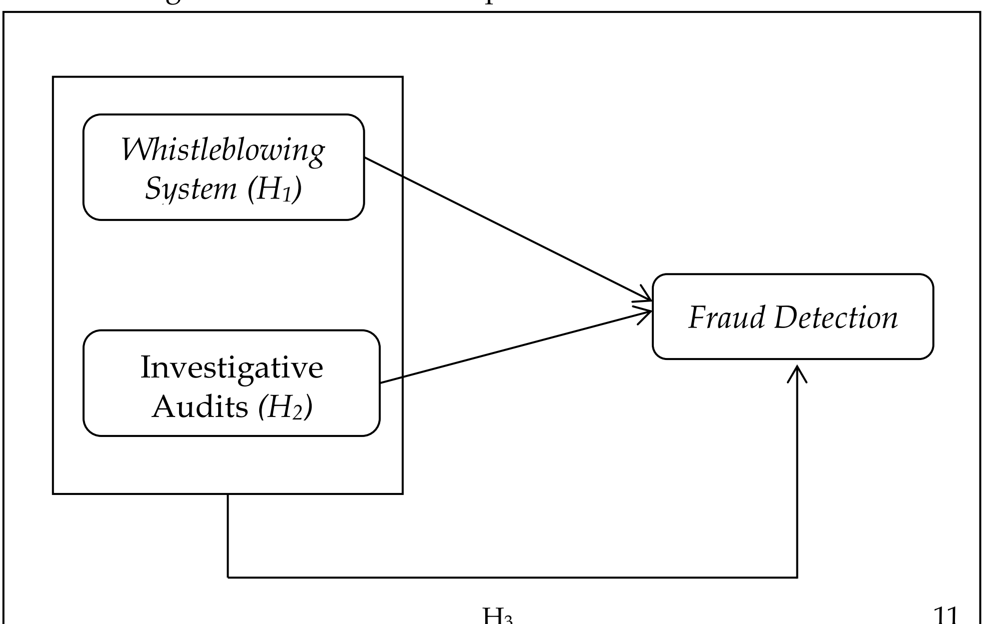

Figure 1. Conceptual Framework

H_1: The whistleblowing system has a positive effect on regional budget fraud detection.
H_2: Investigative audits has a positive effect on regional budget fraud detection.
H_3**:** The whistleblowing system and investigative audits simultaneously have a positive effect on regional budget fraud detection.

Result and Discussion

Descriptive Statistics

Descriptive statistics provide an overview of the characteristics of the data for the variables used in this study. The purpose of descriptive analysis is to identify the minimum value, maximum value, mean, and standard deviation of each research variable.

Table 3. Descriptive Statistics

	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Fraud Detection (Y)	60	20.00	25.00	20.8833	1.46243
Whistleblowing Systems (X1)	60	28.00	35.00	30.2167	2.44320
Investigative Audits (X2)	60	24.00	30.00	26.9333	2.76704
Total	60				

The Fraud Detection variable (Y) has a minimum value of 20.00 and a maximum value of 25.00, with a mean score of 20.8833 and a standard deviation of 1.46243. The relatively small standard deviation indicates that respondents' perceptions of fraud detection practices across SKPDs in the City of

Lhokseumawe are relatively homogeneous and clustered around the mean.

The Whistleblowing Systems variable (X1) records a minimum value of 28.00 and a maximum value of 35.00, with a mean of 30.2167 and a standard deviation of 2.44320. This suggests that the implementation of whistleblowing systems within the observed SKPDs is perceived to be relatively good, although some variation in respondents' assessments still exists.

Meanwhile, the Investigative Audits variable (X2) shows a minimum value of 24.00 and a maximum value of 30.00, with a mean of 26.9333 and a standard deviation of 2.76704. The higher standard deviation compared to the other variables indicates greater variability in respondents' perceptions regarding the effectiveness and intensity of investigative audit practices.

Validity Test Results

Table 4. Validity Test Results

No	Item	Variabel	Koefisien Korelasi (R_{Hitung})	Nilai Kritis 5% (R_{Tabel})	Ket
1	X1.1	**Whistleblowing System (X1)**	0,367	**0.254**	**Valid**
2	X1.2		0,688		
3	X1.3		0,806		
4	X1.4		0,863		
5	X1.5		0,910		
6	X1.6		0,894		
7	X1.7		0,832		
8	X2.1	**Investigative Audit (X2)**	0,927	**0.254**	**Valid**
9	X2.2		0,937		
10	X2.3		0,951		
11	X2.4		0,948		
12	X2.5		0,928		
13	X2.6		0,816		

14	**Y.1**	*Fraud* **Detection (Y)**	**0,830**	**0.254**	**Valid**
15	Y.2		0,896		
16	Y.3		0,871		
17	Y.4		0,773		
18	Y.5		0,651		

Based on the data in Table 4, it can be concluded that each question in this research questionnaire is valid. This is demonstrated by the correlation value, which is greater than the critical value (N=60), which is 0.254 (seen in the critical value table for the r product moment correlation), or a significance value of 5% for all questions. Therefore, the data obtained is valid and can be used for research.

Reliability Test Results

Tabel 5. Reliability Test Results

Variabel	Number of Statement Items	*Cronbach Alpha*	Cronbach's Alpha Critical Value	Add
Whistleblowing System (X1)	7	0,896	0,60	Reliable
Investigative Audit (X2)	6	0,963	0,60	Reliable
***Fraud* Detection (Y)**	5	0,854	0,60	Reliable

Based on the data contained in Table 5, it can be concluded that the questionnaire in this study can achieve the research objectives, this can be proven from the Cronbach alpha coefficient value which is greater than 0.60.

Normality Test Results

The normality test can be conducted by examining whether the data points in the graphical display form a linear pattern or follow the diagonal line in the normal probability plot. If the data points follow or are close to the diagonal line, the data are considered to be normally distributed.

In addition to graphical analysis, the normality of the data can also be assessed using the Kolmogorov–Smirnov statistical test. If the significance value is greater than 0.05, the data are considered to be normally distributed. Conversely, if the significance value is less than 0.05, the data are not normally distributed.

Table 6. Kolmogorov–Smirnov normality test

	Unstandardized Residual
Asymp. Sig. (2-tailed)	0,084

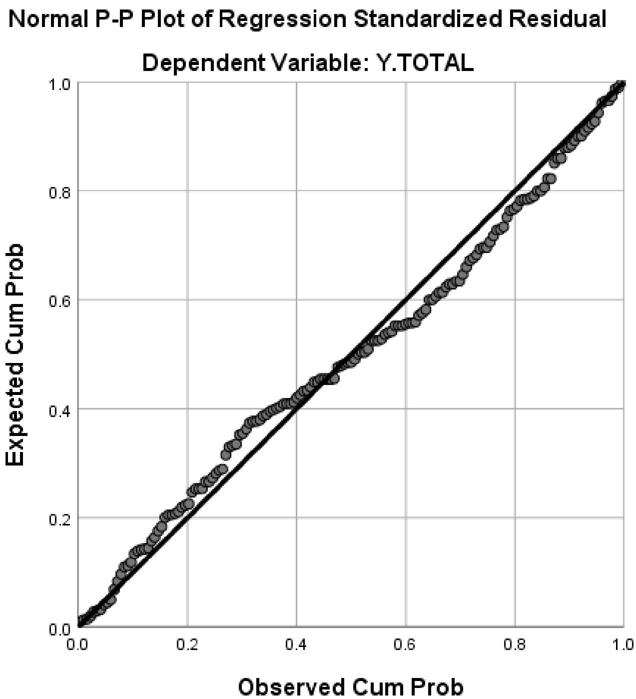

Figure 2. Normality Test

Based on Table 6, the significance value (Asymp. Sig. 2-tailed) is 0.084. Since this value exceeds the threshold of 0.05, the data are considered to be normally distributed. Furthermore, Figure 1 shows that the data points in the normal probability plot closely follow the diagonal line. Therefore, it can be concluded that the residuals are normally distributed and that the regression model satisfies the normality assumption.

Multicollinearity Test Results

A good regression model is characterized by the absence of high correlation among independent variables. Multicollinearity can be detected by examining the Variance Inflation Factor (VIF) and tolerance values. If the tolerance value is greater than 0.10 and the VIF value is less than 10, multicollinearity is not present. Conversely, if the tolerance value > 0.10 and the VIF value < 10, multicollinearity is indicated.

Table 7. Multicollinearity Test

Model	***Tolerance***	**VIF**
Whistleblowing Systems (X1)	0.601	1.663
Investigative Audits (X2)	0.601	1.663

Based on the data presented in Table 7, it can be concluded that multicollinearity is not present in the regression model. This is evidenced by the fact that all independent variables exhibit tolerance values > 0.10 and Variance Inflation Factor (VIF) values < 10.

Heteroscedasticity Test Results

A good regression model is one that does not exhibit heteroscedasticity. In this study, heteroscedasticity is assessed using a scatterplot graph to examine the distribution of the residuals. If there is no clear pattern and the data points are randomly dispersed above and below the zero value on the Y-axis, it can be concluded that heteroscedasticity is not present in the regression model.

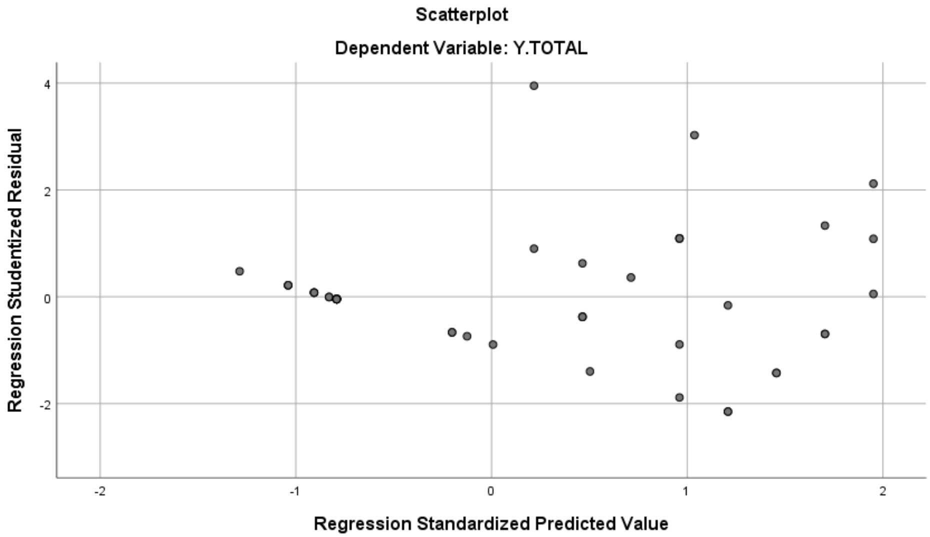

Figure 2. Heteroscedasticity Test

Based on Figure 2, there is no discernible pattern in the distribution of the data points, and the points are randomly scattered above and below the zero value on the Y-axis. Therefore, the regression model in this study does not exhibit heteroscedasticity.

Multiple Linear Regression Analysis

The method used to determine the effect of the independent variables on the dependent variable is multiple linear regression analysis, assisted by the SPSS software. There are two independent variables in this study, namely Whistleblowing System (X1) and Investigative Audit (X2). Meanwhile, the dependent variable is Fraud Detection (Y). Table 5 presents the results of the multiple linear regression analysis.

Table 5. Multiple Linear Regression Analysis Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		

1	(Constant)	15.775	1.692		9.325	.000
	Whistleblowing Systems (X1)	0.262	0.071	1.438	3.716	.000
	Investigative Audits (X2)	0.484	0.062	1.916	7.765	.000

Based on Table 5, the calculated *t*-value for the Whistleblowing System variable is 3.716, while the *t*-table value is 2.002. As explained previously, if the calculated *t*-value is greater than the *t*-table value at a 5% significance level, the hypothesis is accepted. Therefore, since 3.716 > 2.002 with a significance value (*sig.*) of 0.000, the null hypothesis (H_{01}) is rejected and the alternative hypothesis (H_{a1}) is accepted. This result indicates that the whistleblowing system has a positive effect on fraud detection in regional budget management.

Furthermore, based on Table 5, the calculated *t*-value for the Investigative Audit variable is 7.765, while the *t*-table value is 2.002. Applying the same decision rule, since 7.765 > 2.002 with a significance value (*sig.*) of 0.000, the null hypothesis (H_{02}) is rejected and the alternative hypothesis (H_{a2}) is accepted. This finding indicates that investigative audits has a positive effect on fraud detection in regional budget management.

Results of Simultaneous Testing (F-Test)

The F-test is conducted to examine whether the independent variables simultaneously affect the dependent variable. If the calculated F-value exceeds the critical F-value at a 5% significance level, the independent variables are considered to have a significant simultaneous effect on the dependent variable, and vice versa. Table 8 presents the results of the simultaneous test.

Table 8. F Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	66.066	2	33.033	31.321	.000[b]
	Residual	60.117	57	1.055		
	Total	126.183	59			

Based on Table 8, the results of the simultaneous testing indicate that the Whistleblowing System (X1) and Investigative Audits (X2) produce an F-statistic of 31.321 with a significance level of 0.05. Accordingly, it can be concluded that the whistleblowing system and investigative audits as governance mechanisms have a simultaneous and significant effect on regional budget fraud detection within the Regional Work Units (SKPD) of the City of Lhokseumawe.

Results of the Coefficient of Determination (R^2)

The coefficient of determination (R^2) is used to measure the extent to which the regression model explains the variance in the dependent variable. The value of the coefficient of determination ranges from zero to one, with values closer to one indicating a greater explanatory power of the independent variables on the dependent variable. The results of the coefficient of determination test are presented in Table 9.

Table 9. Coefficient of Determination (R^2)

Model	R	R Square	Adjusted R Square
1	0.724[a]	0.524	0.507

Based on the results of the coefficient of determination (R^2) test, the R Square value is 0.524**.** This indicates that 52.4% of the variation in regional budget fraud detection can be explained by the whistleblowing system and investigative audit variables in this research model. Meanwhile, the remaining 49.3% is explained by other variables that were not examined in this study.

Discussion

The Effect of Whistleblowing on Regional Budget Fraud Detection

Based on the results of multiple linear regression analysis, the Whistleblowing System variable is proven to have a positive and significant effect on regional budget fraud detection in the City of Lhokseumawe. This is indicated by a regression coefficient of 0.262, a calculated *t*-value of 3.716, and a significance level of 0.000, which is lower than the predetermined significance level of 0.05. Therefore, the alternative hypothesis stating that the whistleblowing system affects regional budget fraud detection is accepted.

The positive regression coefficient indicates that the better the implementation of the whistleblowing system within the Lhokseumawe City Government, the higher the organization's ability to detect regional budget fraud. The whistleblowing system provides a secure and confidential channel for government officials and related parties to report suspected budget irregularities without fear of retaliation. The existence of an effective reporting mechanism encourages greater participation from whistleblowers in revealing indications of fraud at an early stage, thereby minimizing potential losses to the region (Fajrianti et al., 2025).

Although the whistleblowing system shows a significant effect on fraud detection, its impact tends to be relatively weaker compared to investigative audits. This condition may be explained by several contextual factors within local government institutions. The effectiveness of whistleblowing systems heavily depends on individual willingness to report misconduct, which is often influenced by organizational culture. In many Indonesian local government settings, hierarchical structures and high power distance may discourage employees from reporting fraud, particularly when it involves higher-level officials.

In addition, concerns regarding retaliation, lack of trust in anonymity protection, and uncertainty about follow-up actions may reduce employees' intention to utilize whistleblowing channels (Syahputra, 2021; Razali, 2024). Even when formal mechanisms such as websites, hotlines, and reporting procedures are available, their effectiveness may remain limited if they are not supported by strong protection policies and a transparent reporting process.

Furthermore, the relatively early stage of whistleblowing system implementation in some local governments may also contribute to its limited impact. Inadequate socialization, lack of training, and low awareness among employees can hinder optimal utilization of the system. Therefore, strengthening organizational trust, improving protection mechanisms, and ensuring consistent follow-up are essential to enhance the effectiveness of whistleblowing systems in fraud detection.

From the perspective of fraud triangle theory, the whistleblowing system plays an important role in reducing the opportunity element of fraud. When officials are aware that any irregularities are likely to be reported and followed up, the risk of fraud detection increases. This condition indirectly creates a deterrent effect and strengthens a culture of integrity in regional budget management (Prayogi, 2023).

Furthermore, the whistleblowing system functions as a preventive component of the government's internal control system. It complements formal oversight carried out by the inspectorate and the Government Internal Supervisory Apparatus. In the context of the City of Lhokseumawe, the effective implementation of a whistleblowing system reflects the local government's commitment to realizing transparent and accountable governance, particularly in the management of regional budgets that are vulnerable to fraudulent practices (Nur'aini & Arismutia, 2024).

The findings of this study are also consistent with agency theory, which explains the potential conflict of interest between the government as an agent and the public as the principal. The whistleblowing system serves as a monitoring mechanism that can reduce information asymmetry and opportunistic behavior among government officials. With a well-functioning reporting system, the public and other stakeholders are assured that any indications of budget irregularities can be detected and addressed objectively (Clyde & Hanifah, 2022).

These results are in line with previous studies. Research by Sari and Nugroho (2021) found that whistleblowing systems have a significant effect on enhancing fraud detection and prevention in the public sector. Similarly, Priyadi, et al. (2022) concluded that the effectiveness of whistleblowing systems contributes positively to the ability of local governments to detect budget fraud. In addition, Zahra et al. (2024) identified whistleblower protection and clear reporting procedures as key factors in the success of whistleblowing systems in uncovering fraud within government institutions.

Therefore, this study emphasizes that strengthening the whistleblowing system within the Lhokseumawe City Government through increased socialization, legal protection for whistleblowers, and transparent follow-up of reports—is essential to enhancing the effectiveness of regional budget fraud detection. An optimally implemented whistleblowing system not only plays a crucial role in detecting fraud but also promotes the development of an organizational culture that upholds integrity and public accountability.

The Effect of Investigative Audits on Regional Budget Fraud Detection

Based on the results of multiple linear regression analysis, the Investigative Audit variable is proven to have a positive and significant effect on regional budget fraud detection. This is indicated by a regression coefficient of 0.484, a calculated *t*-value of 7.765, and a significance level of 0.000, which is lower than the predetermined significance level of 0.05. Therefore, the alternative hypothesis stating that investigative audit affects regional budget fraud detection is accepted.

The positive regression coefficient indicates that the more effective the implementation of investigative audits, the higher the organization's ability to detect regional budget fraud (Pagalung et al., 2025). Investigative audit is a specialized form of audit conducted to uncover indications of irregularities, abuse of authority, and fraudulent practices that may cause losses to regional finances. Through an in-depth, systematic, and evidence-based audit approach, investigative audits are able to trace abnormal transactions and identify fraud patterns that cannot be detected through routine audits (Teng & Hakiman, 2024).

The stronger influence of investigative audits on fraud detection reflects the critical role of formal control mechanisms within local government governance. Investigative audits are conducted using systematic procedures, professional standards, and evidence-based approaches, allowing auditors to identify fraud more accurately and comprehensively. Unlike whistleblowing systems, which rely on voluntary reporting, investigative audits actively examine financial activities and detect irregularities through structured processes.

This finding also indicates that institutional capacity plays an important role in fraud detection. Investigative audits are typically supported by regulatory frameworks, auditor competence, and formal authority, which enhance their effectiveness. In the Indonesian local government context, supervisory bodies are mandated to conduct audits and ensure accountability, making investigative audits a more consistent and reliable tool for detecting fraud.

Moreover, the stronger effect of investigative audits may also be associated with the maturity of internal control systems. Organizations with more developed control environments are better equipped to conduct in-depth audits, collect relevant evidence, and enforce audit recommendations. This not only improves fraud detection but also strengthens deterrence, as the likelihood of fraud being uncovered and sanctioned becomes higher.

From the perspective of agency theory, investigative audits function as a monitoring mechanism to minimize conflicts of interest between local governments as agents and the public as principals (Raudhatinur et al., 2023). The presence of effective investigative audits can reduce information asymmetry and suppress opportunistic behavior among government officials in managing regional budgets. Thus, investigative audits play an important role in enhancing public financial accountability and transparency (Wiyandari & Susilowati, 2025).)

In addition, investigative audits also have a strategic role within the fraud triangle framework, particularly in reducing the elements of opportunity and rationalization. When officials are aware that any indications of budget irregularities can be thoroughly examined through investigative audits, the opportunity to commit fraud becomes smaller. On the other hand, the existence of firm and professional investigative audits also weakens fraud perpetrators' rationalization due to clear legal consequences and administrative sanctions (Wulandari et al., 2021).

The findings of this study indicate that the influence of investigative audits on fraud detection is more dominant than that of the whistleblowing system, as reflected in the larger regression coefficient and *t*-value. This finding suggests that investigative audits are the primary instrument in uncovering regional budget fraud, particularly at the enforcement and evidentiary stages. In the context of local government, investigative audits conducted by the Government Internal Supervisory Apparatus and external audit institutions play a crucial role in ensuring that every report or indication of irregularities is followed up in a professional and objective manner (Dako et al., 2020).

These results are consistent with previous studies. Research by Abdullah et al. (2024) stated that investigative audits have a significant effect on fraud disclosure in government institutions. Furthermore, Yusuf & Harefa (2022) found that the implementation of risk-based investigative audits enhances the effectiveness of fraud detection in public sector financial management. Similar findings were also reported by Pertiwi et al. (2022) who concluded that investigative auditors' competence and the use of specialized audit techniques contribute positively to the success of fraud disclosure.

Therefore, this study emphasizes that strengthening investigative audits in regional budget management is highly necessary, whether through improving the competence of investigative auditors, utilizing audit technology, or providing policy support from local government leaders. Investigative audits conducted independently, professionally, and continuously not only enhance fraud detection capabilities but also serve as a deterrent mechanism against the occurrence of regional budget fraud.

Conclusion

This study examines the relationship between whistleblowing systems and investigative audits on fraud detection in local government contexts. The findings indicate that both mechanisms are positively associated with fraud detection, with investigative audits demonstrating a stronger statistical relationship. However, given that this study employs a cross-sectional design and relies on respondents' perceptions, the results should be interpreted with caution. The findings reflect statistical associations rather than definitive causal relationships. Therefore, future research is encouraged to adopt longitudinal designs or utilize objective fraud data to better capture causal effects.

From a practical perspective, this study provides several important implications for policymakers and local government institutions. First, strengthening whistleblowing systems should go beyond formal implementation by enhancing whistleblower protection policies, ensuring strict confidentiality, and building trust in reporting mechanisms. The integration of secure and anonymous digital reporting platforms, such as web-based or mobile-based systems, can further encourage reporting behavior.

Second, improving the effectiveness of investigative audits requires strengthening auditor competencies, particularly in forensic accounting and fraud examination techniques. Continuous training, certification programs, and the adoption of forensic audit technologies can enhance auditors' ability to detect complex fraud schemes. In addition, stronger inter-agency coordination between internal auditors, external auditors, and law enforcement agencies is necessary to ensure effective follow-up and enforcement of audit findings.

Third, local governments should focus on improving internal control maturity and fostering an organizational culture that supports transparency and accountability. These efforts will not only enhance fraud detection but also contribute to fraud prevention in the long term. Finally, this study contributes to the literature by providing empirical evidence on governance mechanisms in the public sector, particularly in the context of developing countries. Nevertheless, future studies are encouraged to incorporate more diverse data sources and engage with broader international literature on fraud risk management, forensic auditing, and whistleblowing effectiveness to strengthen theoretical development and global relevance.

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