Role Of Big Data Technology And Whistleblowing System in Distribution of Fraud Detection

Idrawahyuni[1], Gagaring PAGALUNG[2], Darwis SAID[3], Grace T. PONTOH[4]

Purpose: The purpose of the research is to find out and analyze the direct influence of forensic audits and auditor integrity on Distribution of Fraud Detection and indirect effects through big data technology and whistleblowing systems in Indonesian BPK. **The research method** used is a survey research method. Surveys or complete self-administered surveys are primary data collection methods by asking 254 individual respondents. The unit of analysis is an individual, namely the BPK RI auditors. **Results** of this study found a forensic audit has a positive and significant effect on fraud detection, Auditor Integrity has a positive and significant effect on Fraud Detection, A forensic audit has a positive and significant effect on big data technology, A forensic Audit has a positive and significant effect on the whistleblowing system, Integrity auditor has a positive and significant effect on big data technology, The whistleblowing system has a positive and significant effect on fraud detection, Big data technology has a positive and significant effect on fraud detection, The whistleblowing system has a positive and significant effect on fraud detection. conducted side-by-side. Similar to how we used cross-sectional data, future research is urged to use an interview-based qualitative approach to avoid typical technique bias.

Keywords : Big Data Technology, Distribution of Fraud Detection. Whistleblowing System

JEL Classification Code : G20, M41, M48

1. Introduction[1]

The Association of Certified Fraud Examiners (ACFE) defines fraud as a deviant act that is intentionally carried out to violate the law with a specific purpose carried out by certain parties, both internal and external to a company or institution or agency. Fraudulent acts are carried out to gain both personal and group benefits, which will harm other parties, either directly or indirectly (Halbouni et al., 2016).

Based on data from the Indonesia Fraud Survey (SFI) by ACFE for 2019, cases of fraud at the top were corruption cases with a percentage of 64.4%, followed by cases of misuse of state and corporate assets/wealth of 28.9%, and finally the case of financial statements of 6.7%. The findings of the above fraud cases will have an impact on the government's loss of 20.8% with a total loss greater than Rp. 10 billion.

Corruption is an act of fraud that can harm the country's finances and economy. Fraud is considered a very serious challenge for an organization (N'Guilla et al., 2018). Government or public institutions built on the basis of agency theory (agency theory) in which there is a relationship between society (principal) and government (agent).

1 First Author and Corresponding Author. Assistant Professor, Muhammadiyah University, Indonesia. Email: idrawahyuni@unismuh.ac.id
2 Second Author, Professor, Hasanuddin University, Indonesia.
3 Third Author, Associate Professor, Hasanuddin University, Indonesia.
4 Fourth Author, Associate Professor, Hasanuddin University, Indonesia.

It has been extensively studied about several theories driving fraud that have developed over time. The theory of fraud begins with the theory of the fraud triangle which was first introduced by Cressey (1953). This theory consists of pressure, opportunity, and rationalization. Then Wolfe Hermanson in 2004 perfected this theory and developed it into a fraud diamond which comes with a new factor, namely capability. Wolfe & Hermanson (2004) says that fraud occurs when there is adequate ability to commit fraud. Then the diamond fraud developed due to the current conditions to become a pentagon fraud proposed by Jonathan Horwarth (2011) by adding the arrogance factor.

The search for effective and efficient methods in preventing and detecting fraud, especially in the government sector, is still the main focus of various parties. Several previous studies have proven that one effective method for preventing and detecting the occurrence of fraud is a forensic audit (Akenbor & Oghoghomeh, 2013); (Peter et al., 2014); (Enofe & Omagbon, 2015); (Alao, 2016); (Emmanuel & Adeusi, 2019), even a forensic audit is able to reduce fraud cases (Inyada et al., 2019).

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The process of detecting fraud by using a forensic audit, of course, also needs to be supported by other factors. Research (Hipgrave, 2013) and Hartono (2019) one of the factors that can improve the process of detecting fraud is the use of big data technology. Either directly using big data technology can be used in the process of detecting fraud, or used as a tool or tools, namely data analytics tools to increase the effectiveness of the forensic audit process in detecting fraud. This is supported by the implementation at BPK regarding the inspection and detection of fraud by using the big data analytics approach.

Another method that is effectively used to prevent, reduce, and overcome the occurrence of fraud requires someone or other parties who are willing to report or disclose the occurrence of fraud. The activity of reporting or disclosing acts of fraud is referred to as whistleblowing. (Near & Miceli, 1986) defines whistleblowing as disclosure by organizational members of illegal, immoral or illegal practices under the control of their superiors to people or organizations who may be able to take action. The emergence of the Khairiansyah case which reported bribery by one of the General Election Commission (KPU) commissioners to himself and his team, thus making this case a pioneer in the use of the term whistleblower in Indonesia (Nurhidayat, 2017).

The Whistleblowing System is a service that enables the whistleblower to report malpractice or unethical behavior, which will support the implementation of audits, both forensic audits and investigations. Several previous studies have shown that the existence of a whistleblowing system can improve audit results so that they are able to prevent and detect acts of fraud (Dusseyer, 2011); (Noviani & Sambharakreshna, 2014); (Naomi, 2015); (Pamungkas et al., 2017); (Wahyudi et al., 2019); (Antari, 2020); (Panjaitan, 2018); (Shonhadji & Maulidi, 2021); (Hanifah & Clyde, 2022).

However, in Indonesia the whistleblowing system is still not running optimally. Previous research has found that auditors and public accountants in Indonesia are still reluctant to become whistleblowers (Latan et al., 2018) and (Pramudyastuti et al., 2021).

2.   General Background of Research

2.1. Agency Theory

Agency theory was originally put forward by Jensen and Meckling in 1976 which explained that there is a relationship between parties who work together. There is a relationship between the principal (as the owner) and the agent (as the management party) (Parker et al., 2018). With the intention that the agency relationship is established as a contract in which one or more parties (principal) delegate authority in terms of control and decision-making to another party, and the other party acts as an agent, namely the party tasked with performing services for the interests of the principal (Eisenhardt, 1989; Fayezi et al., 2012).

2.2 Attribution Theory

Attribution theory is a theory that explains how a person interprets the occurrence of an event, the reason or cause of his behavior. Heider (1958) explains that attribution theory is a theory about a person's behavior in which it explains the process of how we determine the causes and motives of a person's behavior. This theory refers to how to explain the causes of other people's behavior or himself which will be determined whether from internal factors such as nature, character, attitude, or from external factors such as pressure from certain situations or circumstances that will influence individual behavior (Luthans, 2005).

2.3. Theory of Planned Behavior

Theory of Planned Behavior (TPB) is a theory modified and developed from the previous theory, namely Theory of Reasoned Action (TRA) by Ajzen in 1991. There are deficiencies in Theory of Reasoned Action (TRA) which are not suitable for a behavior that is not under the control of the individual because there are factors that allow it to be a supporter or an obstacle for someone to do the intention to behave. Therefore, Ajzen in Theory of Planned Behavior (TPB) added one factor, namely perceived behavior control.

2.4. Distribution of Fraud Detection

Fraud is an unlawful act committed by the perpetrator, to deceive the victim which can then cause financial losses to the victim (Akenbor & Oghoghomeh, 2013). Furthermore Zimbelman et al., (2014) stated that fraud is an illegal act that requires certain/special expertise to obtain various forms of fraud from the party who is the victim.

Vousinas (2019) states that there are six main factors that can then encourage someone to commit fraud, namely pressure, opportunity, rationalization competence, arrogance and collusion. These six factors that cause fraud can then be referred to as the fraud hexagon. Fraud hexagon is actually a form of development from several previous theories that cause fraud, namely the fraud triangle. Competence and arrogance factors that further strengthen a person to commit acts of fraud from the theory of driving fraud (Mohammed et al., 2015; Apriliana & Agustina, 2017).

2.5. Forensic Audit

A forensic audit is an audit that places more emphasis on the process of finding evidence and assessing the suitability of the evidence or audit findings with the size of evidence required in the trial process. Forensic audit is an extension of the application of standard audit procedures in collecting evidence for trial needs in court, which includes certain procedures or stages carried out with the intention of producing evidence (Panjaitan, 2018). The link between forensic audit and forensic accounting is that forensic accounting is a scientific discipline that uses auditing, accounting and investigative expertise to help resolve financial disputes and prove allegations of fraud. Those who carry out a forensic audit are called forensic auditors who can provide a statement of opinion as an expert in court. Investigative audit services and in its development are better known as forensic audits considering that the subject is related to the litigation process (Hery, 2019). Forensic auditing focuses on the detection, analysis, and communication of evidence of financial events and the underlying reporting. Unlike traditional audits or general audits which are rule-based and based on a single incident, forensic audits are not conducted for the purpose of forming an audit opinion but can be adapted as an internal audit strategy to prevent fraud (Enofe, Omagbon, & Ehigiator, 2015).

2.6. Auditor Integrity

Integrity is a firm personal commitment to ethical ideological principles and becomes part of the self-concept that is displayed through one's behavior (Schlenker, 2008). Integrity requires a person to be honest and transparent, courageous, wise and responsible. Mulyadi (2002) defines integrity as a moral principle that is impartial, honest, a person with high integrity views facts as they are and presents these facts as they are. Integrity is consistency between actions and values and principles. In ethics, integrity is defined as the honesty and truthfulness of one's actions.

2.7. Big Data Technology

The term big data began to appear after it was introduced in 2005 by O'Reilly Media. The application

of big data technology in an institution can be seen from the functions that are already available in its IT infrastructure, so that it can carry out work related to mobile, social, and big data analytics applications.

2.8. Whistleblowing System

Whistleblowing is an important element in order to increase public accountability. This is because the development of a whistleblowing system can reduce unethical actions by bureaucrats in administering the government, such as corruption, maladministration, improper management of state finances, and bureaucratic decisions that result in policies that have the potential to have a negative impact on society. Prior to the existence of the whistleblowing system, these unethical actions were usually reported to the mass media, but the media did not have the formal authority to directly investigate and correct these unethical actions. In addition, the media also does not have a mechanism to protect those who disclose unethical actions (whistleblowing) (Dusseyer et al., 2011). We can see the research model on Figure 1 below.
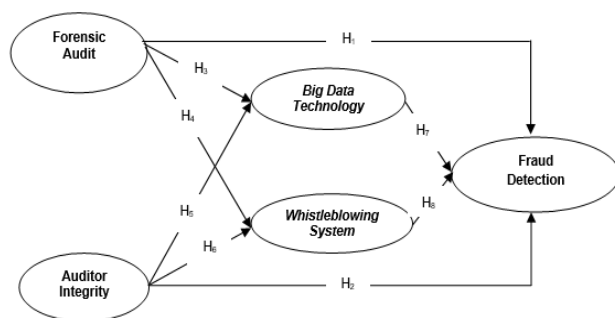

Figure 1: Research Model

H1. A forensic audit has a positive and significant effect on the Distribution of fraud detection.
H2. Auditor Integrity has a positive and significant effect on the Distribution Fraud Detection.
H3. A forensic audit has a positive and significant effect on big data technology.
H4. A forensic Audit has a positive and significant effect on the whistleblowing system.
H5. Integrity auditor has a positive and significant effect on big data technology.

H6. The whistleblowing system has a positive and significant effect on the Distribution fraud detection.
H7. Big data technology has a positive and significant effect on fraud detection.
H8. The whistleblowing system has a positive and significant effect on the Distribution fraud detection.

3. Methodology

The purpose of the research is to To find out and analyze the direct influence of forensic audits and auditor integrity on Distribution of Fraud Detection and indirect effects through big data technology and whistleblowing systems.

The type of this research used is explanatory research which aims to determine the causal relationship between variables through a hypothesis testing with causal research and drawing conclusions based on inferential statistics; (3) the time dimension of this study involves a certain time (cross section); (4) the research method used is a survey research method. Surveys or complete self-administered surveys are primary data collection methods by asking individual respondents questions; and (5) the unit of analysis is an individual, namely the BPK RI auditors who have used big data technology and a whistleblowing system in their audit process.

Respondents were informed that the objective of the research pursued academic purposes and about the anonymity of their responses, in such a way that they voluntarily agreed to complete the questionnaire proposed for the research. Work was carried out under a confidence level of 95% on the 254 surveyed and validated, in such a way that there was a margin of error of 3.25%. We included 50 Likert Scale items with a rating from 1 to 5 (measuring negative responses with 1 and 5 positive responses), which were grouped into 4 constructs that responded to the Forensic Audit and Auditor Integrity (4 items), Big Data Technology (4 items), Whistleblowing System (4 items), and Distribution of Fraud Detection (4 items) and comprising a total of 20 questions in the survey. Structural equations were applied by using the Formative Model where each item raised in the constructs allowed the construction of the latent variable called "satisfaction". The causal model will demonstrate the relationships between each construct

with its latent variable "satisfaction" independently. Finally, the data was tabulated and organized using the Smart-PLS (SEM) software, and the model was structured to establish the relationships between variables and the validity of the proposed model based on the analysis of the main indicators provided by the software.

4. Results

4.1. Socio Demographic Respondent

The results of the research were initially organized with a descriptive analysis where sociodemographic data of the respondent (sex, age and educational level) were established.

Secondly, the reliability of the proposed model was measured through different tests. Finally, with the results of each indicator, it was possible to analyze the hypotheses and determine the relationships between the proposed variables. The sociodemographic data of the Respondents of the BPK Office are shown in table 1, from the data obtained it is evident that 54.33% of the respondents are of the "male" gender, and 45.7% correspond to "female". Of the sample of 254 respondents, 42.50% correspond to people between the ages of 26 and 45. 46.5% correspond to the category "Master Graduate".

Table 1: Socio Demografic Profile of Respondents

Variable	Category	Absolute Frequency	%
Sex **(n = 254)**	Male	138	54.33
	Female	116	45.67
Age **(n = 254)**	< 25	79	31.10
	26-45	108	42.50
	46-59	67	31.10
Studies **(n = 254)**	PhD	14	5.5
	Master	118	46.5
	Bachelor	122	47.6

4.2. Individual Validity and Reliability

To determine the relationships between variables, they are identified as: "observed" and "latent", finding the indicators: weights and p-value (table 2).

Through the structural equations model, the coefficients for the normalized model were calculated. The standardized coefficients are established with the limited probability of the elements in the sample for the constructs to be significant in the model.

The convergent and discriminant validity of each item has been evaluated to confirm that it measures only its construct. Coefficients have been obtained from each item that is greater than in its construct compared to the rest, so there are two types of validity convergent and discriminant because, in addition to the coefficients being low, they are the lowest possible. For the analysis of validity and reliability, we used the training model. Convergent validity tests were applied with the results obtained in the constructs. Values higher than 0.70 were obtained in the formative items of the model and the variables and constructs were analyzed to observe simple correlations, and it is evident that the variables were accepted as part of the construct. The reliability of the items that correspond to each construct were determined by means of results greater than 0.70 for 50 of 54 reflective items.

Table 2: Reliability and validity

	Cronbach Alpha	Composite Reliability	Avg Var Extracted
Auditor Integrity	0.722	0.828	0.548
Big Data Technology	0.778	0.857	0.600
Forensic Audit	0.774	0,855	0.596
The Distribution Fraud Detection	0.819	0.880	0.648
Whistleblowing System	0.811	0.875	0,637

Cronbach Alpha

In Table 2 above, Cronbach's alpha value demonstrated the consistency and dependability of the data items, which had to be greater than 0.7 (Hair, Anderson, Tatham, William & Black, 1998). An excellent Cronbach alpha value is between 0.8 and 1.0. The aforementioned numbers indicated that the Cronbach's alpha values were greater than 0.7, indicating that the data were internally consistent and reliable.

Composite Reliability

Cronbach's alpha is not always appropriate, thus composite reliability is suggested; its value must range from 0.6 to 1.0 (Chin, 1998). A composite reliability rating of higher than 0.8 is regarded as adequate for confirmatory research (Daskalakis & Mantas, 2008). The composite reliability ratings ranged above the threshold in the examples mentioned above.

The Average Variance Extracted (Ave)

The AVE (average variance extracted) can also be used to assess the validity of a table; its value must be more than 0.5 (Chin, 1998). All of the constructs' values—which ranged from 0.515 to 1.000—were more than 0.5 for Auditor Integrity, Big Data Technology, Fraud Detection, Forensic Audit and Whistleblowing System.

Table 3: Discriminant Validity

	AI	BDT	FA	FD	WS
AI	0.741				
BDT	0.670	0.775			
FA	0.632	0.717	0.772		
FD	0.621	0.659	0.644	0.805	
WS	0.664	0.700	0.703	0.674	0.798

Correlation Matrix

The correlations matrix reveals on table 3 that the construct investment decision was positively correlated as the r Auditor Integrity was (r = 0.741), the Big Data Technology was (r = 0.7775), the Forensic Audit was (r=0.613), the Distribution of Fraud Detection was (r = 0.644) and Whistleblowing System was (r=0.798) at a significance level of 0.01

Table 4: Fitness of the Model

	R Square
Big Data Technology	0.592
Whistleblowing system	0.574
The Distribution Fraud Detection	0.556

R-Square

The R square's value on table 4 must be above 0.6 and near to 0.9 for a good fit of the model (Chin, 2010). The values of Big Data Technology was under 0.7, the Whistleblowing System was under 0.7 and Distribution of Fraud Detection was under 0.7.

4.3. Structural Equation Modeling

To run the SEM in the SMART-PLS, a bootstrapping analysis was performed. After managing the analysis of the missing data, the data were statistically analyzed using Smart-PLS software. According to Ramayah, Cheah, Chuah, Ting, and Memon (2018), smart-PLS software is best suited for high predictability in a small size data set. The postulated direct and mediated relationship was examined using structural equation modeling (SEM). SEM is a multivariate statistical method that evaluates structural hypotheses using both latent and observable variables (Carvalho & Chima,

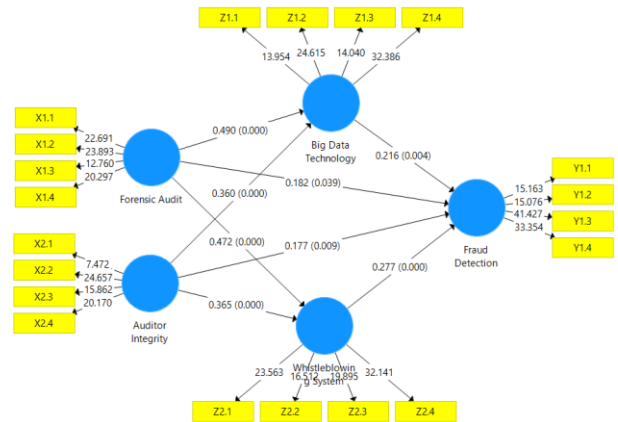2014), we can see the results on the figure 2 below.

Figure 2: Structural Equation Model (PLS Algorithm)

Table 5: Hypotheses testing through Path Coefficient

	Sample Mean (M)	T Statistics	P Values
AI ->	0.352	6.285	0.000
BDT	0,173	2.608	0.009
AI -> FD	0,358	5.841	0.000
AI -> WS	0,214	2.865	0.004
BDT->	0,494	10.045	0.000
FD	0,185	2.073	0.039
FA->	0,473	8.836	0.000
BDT	0,275	3.663	0.000
FA-> FD			
FA-> WS			
WS-> FD			

In the above Table 5, Auditor Integrity had an significant impact on Big Data Technology, Distribution of Fraud Detection and Whistleblowing System. Thus H2, H5 and H6 was accepted. Similarly, Forensic Audit had a significant positive relationship with Big Data Technology, Distribution of Fraud Detection and Whistleblowing System, with a p-value of 0.000, which meant that with an increase in rconfidence, the financial literacy increased, and thus H1, H3 and H4 was accepted. Furthermore, the Whistle Blowing and Bigdata Technology had an significant impact on the Distribution Fraud Detection, with values of 0.0.004 and 0.000, which meant H7 and H8 was accepted.

5. Discussion of the Findings

Table 6: Hypotheses Result

The results of the hypothesis on this research we can simply see on the table 6 below :

Hypotheses	Accepted/Rejected
H1. A forensic audit has a positive and significant effect on the Distribution fraud detection.	Accepted
H2. Auditor Integrity has a positive and significant effect on the Distribution Fraud Detection.	Accepted
H3. A forensic audit has a positive and significant effect on big data technology.	Accepted
H4. A forensic Audit has a positive and significant effect on the whistleblowing system.	Accepted
H5. Integrity auditor has a positive and significant effect on big data technology.	Accepted
H6. The whistleblowing system has a positive and significant effect on distribution fraud detection.	Accepted
H7. Big data technology has a positive and significant effect on the distribution fraud detection.	Accepted
H8. The whistleblowing system has a positive and significant effect on the distribution fraud detection.	Accepted

5.1. A forensic audit Implication on the distribution fraud detection.

The Badan Pemeriksa Keuangan (BPK) or Audit Board of Indonesia is the high state body that carries out audits over the management and responsibility of state finances. Given its role in overseeing government financial operations, the application of forensic auditing techniques could indeed have a positive and significant effect on the Distribution fraud detection.

The application of forensic audits in BPK Indonesia can provide the following benefits to identify Hidden Fraud: Forensic audits can help BPK identify hidden fraudulent transactions that might not be visible through regular audits. They can help detect irregularities in the financial records of public entities and state-owned enterprises, helping to ensure the proper use of public funds.

Strengthen Public Trust: By detecting and preventing fraudulent activities, forensic audits can enhance public trust in government institutions and state-owned enterprises. They can demonstrate to the public that the government is serious about combating corruption and ensuring fiscal responsibility.

Improve Financial Management: By identifying weaknesses and vulnerabilities in financial management systems, forensic audits can help BPK recommend improvements to those systems, leading to better control over public funds.

Enhance Legal Enforcement: In cases where fraud is detected, the evidence collected during a forensic audit can be used in court. This enhances the ability of law enforcement agencies to prosecute and recover assets from those who have committed financial fraud.

Deter Potential Fraud: The knowledge that a forensic audit could be conducted may deter potential fraudsters within the government or state-owned enterprises from committing fraudulent acts in the first place.

5.2. Auditor Integrity Implication on the Distribution Fraud Detection.

Auditor integrity plays a crucial role in effective the Distribution fraud detection. Auditors are often the first line of defense against fraudulent activities in an organization, and their integrity significantly affects their ability to detect, prevent, and respond to such activities.

Independence: An auditor with high integrity will maintain their independence and objectivity. They will not allow personal relationships, financial incentives, or other influences to impact their audit judgments. Independence is key for auditors to effectively detect fraud, as it allows them to question and investigate management's financial representations without bias.

Professional Skepticism: Integrity drives auditors to maintain a mindset of professional skepticism, which involves a questioning mind and a critical assessment of audit evidence. This skepticism enables them to identify potential red flags for fraud and investigate them thoroughly.

Ethical Standards: Auditors with integrity adhere to ethical standards, such as confidentiality and honesty. By doing so, they can ensure that their audit work is reliable and trustworthy, increasing the likelihood of uncovering fraudulent activities.

Quality of Work: Auditors with high integrity will strive to ensure the quality of their work. They will follow auditing standards and procedures diligently, perform necessary audit tests, and adequately document their findings, all of which are crucial for effective the Distribution fraud detection.

Reporting of Fraud: If an auditor with integrity detects fraud, they will feel compelled to report it, even if doing so may have negative implications for them or the organization. This courage to act is crucial for stopping fraudulent activities and holding those responsible accountable.

Confidence in the Financial System: The integrity of auditors helps build confidence in the financial system. When auditors act with integrity and detect fraud, it reassures stakeholders that the financial information they are using is reliable.

In conclusion, auditor integrity is pivotal for fraud detection. A lack of integrity can lead to biases, overlooked errors, and unreported fraud, weakening the effectiveness of the auditing process and compromising stakeholders' trust in the financial reporting process.

5.3. A forensic audit Implication on big data technology.

Forensic auditing and big data technology are interconnected in many ways. With the massive amount of data that businesses generate, big data technologies can significantly aid the process of a forensic audit, leading to more effective Distribution of Fraud Detection and prevention.

Data Analysis Tools: A forensic audit often involves the use of advanced data analysis tools that can process and analyze big data. For instance, auditors may use machine learning algorithms to identify patterns and anomalies that could indicate fraudulent activities.

Real-Time Fraud Detection: Big data technology can enable real-time or near-real-time fraud detection. With real-time processing, a forensic audit can detect fraudulent activities as they happen, which can significantly reduce the financial and operational impact of such activities.

Predictive Analytics: Through big data analytics, forensic audits can move beyond detecting and responding to fraud to predicting where it is most likely to occur. Predictive models can analyze historical data to identify patterns and trends that often precede fraudulent activities, which can enable auditors to take preventative actions.

Complex Data Integration: Big data technology can handle different types of data from various sources, such as transaction records, emails, social media posts, and more. In a forensic audit, integrating and analyzing all these types of data can provide a more comprehensive view of a company's activities and help detect fraud that may not be evident from financial data alone.

Evidence Gathering and Preservation: Big data tools can assist in the collection and preservation of digital evidence. This evidence can be critical in legal proceedings related to fraud. Big data technology can also help ensure that the data is handled in a way that maintains its integrity and chain of custody.

However, using big data technology in forensic auditing also presents challenges. For instance, ensuring data privacy can be a concern, especially with regulations like the GDPR and CCPA. The ability to handle the volume, velocity, and variety of big data also requires significant computational resources and specialized skills. Therefore, businesses and auditing firms need to balance these challenges with the benefits that big data can provide in forensic auditing.

5.4. A forensic Audit Implication on the whistleblowing system.

A forensic audit can indeed have a positive and significant effect on the whistleblowing system. The whistleblowing system is crucial for any organization because it provides a platform for employees to report potential fraudulent or unethical activities confidentially. The forensic audit, in turn, can

substantiate these claims, validate the whistleblowing system, and demonstrate the organization's commitment to ethical conduct.

Supports Whistleblower Claims: If an employee reports potential fraud, a forensic audit can be initiated to investigate the claim in detail. This can provide the necessary evidence to support the whistleblower's claim, leading to appropriate action against the perpetrator(s).

Encourages Reporting: When employees see that the organization takes whistleblowing claims seriously enough to conduct a detailed forensic audit, it can encourage more employees to come forward with their concerns. This can enhance the effectiveness of the whistleblowing system, as more potential fraud could be uncovered.

Enhances Credibility: The meticulous nature of a forensic audit can help to establish the credibility of the whistleblowing system. By proving or disproving allegations made through the system, the organization can demonstrate the system's validity and its dedication to promoting ethical conduct.

Improves Internal Controls: Forensic audits often lead to improvements in an organization's internal controls by highlighting weaknesses that fraudsters have exploited. An improved control environment can, in turn, strengthen the whistleblowing system by making it an integral part of the organization's broader control and risk management framework.

Deters Fraud: The knowledge that a whistleblower's report can trigger a forensic audit may act as a deterrent to potential fraudsters within the organization.

Provides Legal Evidence: In the event of legal proceedings, the findings of a forensic audit can serve as evidence. This can potentially protect the whistleblower from retaliatory legal action by those they have accused.

In conclusion, the relationship between a forensic audit and a whistleblowing system is mutually beneficial. A strong whistleblowing system can lead to effective forensic audits, and successful forensic audits can in turn strengthen the whistleblowing system.

5.5. Integrity auditor Implication on big data technology.

Auditor integrity can indeed have a positive and significant effect on the use of big data technology in auditing. The integration of big data technologies has revolutionized auditing by allowing auditors to analyze more data at a faster rate, providing deeper insights into potential anomalies, patterns, or fraudulent activities. However, the successful implementation of these technologies relies heavily on the integrity of the auditor for several reasons:

Data Privacy and Ethical Use: The use of big data in auditing brings about privacy and ethical considerations. An auditor with high integrity will ensure the ethical use of data and respect privacy rights, adhering to regulations such as the General Data Protection Regulation (GDPR) and other relevant data privacy laws.

Quality of Data Analysis: Integrity in an auditor is crucial for the correct interpretation and analysis of big data. With the large volume of data, there may be a temptation to cherry-pick data to support a particular conclusion. An auditor with high integrity would resist such temptation and ensure an unbiased and comprehensive analysis.

Accuracy and Completeness: An auditor with high integrity would ensure that the data used in the audit process is accurate and complete. They would check the sources of the data, evaluate its quality, and ensure that it accurately represents the organization's transactions and events.

Disclosure of Findings: If an auditor's analysis of big data reveals issues such as financial discrepancies or potential fraud, an auditor with high integrity will disclose these findings to the appropriate parties, regardless of any potential adverse consequences.

Professional Skepticism: Integrity plays a significant role in maintaining a mindset of professional skepticism, which is critical when dealing with big data. This includes questioning the data's origin, assessing its reliability, and being cautious of any anomalies detected in the data set.

Continual Learning: Big data technology continually evolves, and it requires auditors to regularly update their knowledge and skills. An auditor with high integrity will acknowledge the importance of continual learning to remain effective in using big data technology.

In summary, the integrity of an auditor significantly influences the effectiveness and reliability of using big data technology in the audit process. An auditor with high integrity can enhance the quality of the audit,

build trust with stakeholders, and uphold the ethical standards of the profession.

5.6. The whistleblowing system Implication on the Distribution fraud detection.

The whistleblowing system indeed has a positive and significant effect on fraud detection. It serves as an essential component of an organization's internal control and risk management systems. By encouraging individuals to report suspicious activities, it aids in uncovering fraudulent activities that might not be detected by other means.

Early Detection: Employees often have direct knowledge of their workplace operations and may be the first to notice irregularities. A whistleblowing system allows them to report these irregularities, leading to earlier detection of fraud.

Greater Coverage: While certain controls or audits may only review a sample of transactions or activities, whistleblowers can identify fraud anywhere within the organization, providing broader coverage.

Anonymous Reporting: If a whistleblowing system allows for anonymous reporting, employees may be more likely to report fraudulent activities. Fear of retaliation can often deter potential whistleblowers; anonymity can help mitigate this fear.

Cultural Impact: An effective whistleblowing system can help foster a culture of integrity and transparency. This cultural shift can make fraudulent activities less likely to occur and more likely to be reported.

Detailed Information: Whistleblowers often provide detailed firsthand information that can be crucial in investigating potential fraud. This information may not be available through other means.

Deterrence Effect: The existence of a whistleblowing system can act as a deterrent to potential fraudsters. Knowing that their colleagues can easily report their actions may discourage them from committing fraudulent acts.

However, the effectiveness of a whistleblowing system depends on several factors, including how it's implemented, whether employees trust the system, and whether the organization takes reported concerns seriously and acts on them appropriately. It's important for organizations to continually review and improve their whistleblowing systems to ensure they remain effective.

5.7. Big data technology Implication effect on the Distribution fraud detection.

big data technology has a significant and positive effect on fraud detection. The large volumes of data collected by organizations can be effectively used to prevent, detect, and investigate fraud. The ability to process and analyze vast amounts of data in real-time can help detect fraud more quickly and accurately than ever before.

Anomaly Detection: Big data analytics can process large volumes of transactions to identify patterns and trends, and spot anomalies that may suggest fraudulent activity. Machine learning algorithms can "learn" what normal behavior looks like and then flag unusual patterns for further investigation.

Predictive Analysis: Big data technology can help build predictive models to identify potential fraud risks before they occur. By analyzing past fraudulent activities and recognizing patterns, predictive models can anticipate future risks and prompt preventive measures.

Network Analysis: With big data technology, auditors can build a network of relationships among different data elements to detect complex the Distribution fraud schemes. This technique is particularly useful for detecting collusion and organized fraud rings.

Text Mining: Fraud investigators can use big data tools to analyze unstructured data, such as emails, customer reviews, or social media posts, to identify potential signs of fraud.

Real-Time Monitoring: Big data technology enables real-time monitoring of transactions. This can greatly reduce the time taken to detect fraud, thereby minimizing potential losses.

Improved Decision Making: By providing a more comprehensive view of the company's data, big data technology enables auditors and investigators to make better-informed decisions when it comes to Distribution of Fraud Detection and prevention.

However, the effective use of big data for Distribution of Fraud Detection requires sophisticated technology and skilled personnel capable of managing

and interpreting the data. There are also privacy and security issues to consider, as well as the need for significant computational resources. Despite these challenges, the potential benefits of using big data for Distribution of Fraud Detection are significant.

5.8. The whistleblowing Implication on fraud detection.

Whistleblowing system can indeed have a significant positive effect on fraud detection. Whistleblowing systems offer a confidential, and often anonymous, channel for employees, customers, vendors, or other parties to report suspected fraudulent activities or unethical behavior within an organization.

Early Detection: Employees and other insiders often have the earliest access to information about fraudulent activities. A whistleblowing system enables these individuals to report suspicious activities promptly, which can potentially lead to early detection of fraud.

Broad Reach: A well-implemented whistleblowing system can cover all levels and departments within an organization, making it a broad-spectrum tool for detecting fraud in areas that might not be adequately covered by other oversight mechanisms.

Encourages Reporting: With a safe and anonymous reporting mechanism, employees and others are more likely to report potential fraudulent activities, which they might hesitate to do without such a system for fear of retaliation.

Detailed Information: Whistleblowers often provide detailed, firsthand information that can be instrumental in detecting and investigating fraud. This type of information might not be easily accessible through other Distribution of Fraud Detection methods.

Deterrence Effect: The presence of an effective whistleblowing system can serve as a deterrent for potential fraudsters. Knowing that anyone in the organization can report fraudulent behavior could discourage such activities.

Reinforces a Culture of Ethics: Whistleblowing systems emphasize an organization's commitment to ethical conduct. By encouraging employees to speak up against fraudulent or unethical behavior, they contribute to creating a culture that values integrity and transparency.

For a whistleblowing system to have the most significant positive effect on fraud detection, it needs to be well-designed and effectively implemented. It should guarantee confidentiality, provide protection from retaliation, ensure thorough investigation of all reports, and establish clear procedures for reporting and follow-up. Also, the organization must communicate about the system effectively and frequently to all stakeholders, encouraging them to use it.

6. Conclusions

So, this study looks a forensic audit has a positive and significant effect on fraud detection, Auditor Integrity has a positive and significant effect on the Distribution Fraud Detection, A forensic audit has a positive and significant effect on big data technology, A forensic Audit has a positive and significant effect on the whistleblowing system, Integrity auditor has a positive and significant effect on big data technology, The whistleblowing system has a positive and significant effect on fraud detection, Big data technology has a positive and significant effect on fraud detection, The whistleblowing system has a positive and significant effect on fraud detection. conducted side-by-side. Similar to how we used cross-sectional data, future research is urged to use an interview-based qualitative approach to avoid typical technique bias.

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