



The Role of Internal Control Systems in Moderating the Effect of Audit Digitalization and Auditor Human Resource Quality on Fraud Intensity (A Study on Auditors of the Micro Capital Service Unit (ULaMM) of PT. Permodalan Nasional Madani)

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ARTICLE INFO

Keywords: Audit Digitalization, Auditor Human Resource Quality, Internal Control System, Fraud Intensity

Received : 6 March 2026

Revised : 21 April 2026

Accepted: 22 May 2026

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ABSTRACT

The research aims to analyze the effect of audit digitalization and auditor human resource quality on the effectiveness of the Internal Control System (SPI), as well as to examine the role of SPI in moderating the impact of audit digitalization and auditor human resource quality on fraud intensity. The study uses a causal quantitative approach on 70 internal auditors of ULaMM PT PNM. Data were analyzed using SPSS 30 through multiple linear regression and Moderated Regression Analysis. The results show that audit digitalization and auditor human resource quality have a significant positive effect on SPI effectiveness. SPI has been proven to be a pure moderation that strengthens the relationship between audit digitalization and auditor human resource quality toward reducing fraud intensity. Conclusion: the synergy of audit digitalization, auditor competence, and SPI is effectively key to strengthening governance and fraud risk control

INTRODUCTION

The development of information technology has experienced a very rapid acceleration and has had a transformational impact across various sectors, including in the fields of accounting and auditing. One innovation that has emerged in response to the complexity of modern business is audit digitization. Audit digitization is the process of integrating digital technologies such as big data analytics, cloud computing, artificial intelligence (AI), and machine learning into audit systems to enhance efficiency, effectiveness, and the ability to detect anomalies or potential fraud.

This digital transformation is not only a trend but also a necessity, especially in financial supervision and control systems in financial institutions, both private and state-owned. Audit digitalization can replace traditional audit methods that tend to be manual, limited in scope, and prone to human error. With the right technology, auditors can identify suspicious patterns or outliers that indicate potential fraud. However, the use of this technology cannot stand alone. The quality of human resources, particularly auditor competence, plays a key role in ensuring the effectiveness of the digital audit process.

Previous research by Budiantoro (2022) showed that auditors' ability to detect fraud is influenced by workload, professional skepticism, and audit experience, but fraud audit training as a moderating variable has not yielded consistent results, so it needs to be studied further in the context of different organizations. In addition, research by Nadhifah (2024) emphasizes that the quality of financial reports is largely determined by the effectiveness of internal controls and human resource competence, moderated by internal audit, indicating that strengthening both internal and external audit functions is an urgent need to ensure accountability, transparency, and more optimal fraud prevention.

In the context of financial supervision, the internal control system functions as a fundamental structure that ensures the achievement of organizational goals, the reliability of financial reports, and compliance with laws and regulations. An effective Internal Control System includes elements such as the control environment, risk assessment, control activities, information and communication, and monitoring. Wulandari (2025) emphasizes that the absence of a strong Internal Control System will weaken efforts to detect and prevent fraud, even when audit technology has been implemented and auditors have adequate competence.

The problem is that most previous studies only focused on the direct relationship between audit digitalization or the quality of auditors' human resources and the intensity of fraud, without considering the important role of the internal control system as a moderating variable. The study by Choirunnisa & Rufaedah (2022) indicated a gap due to the lack of studies that integrate these three variables into a single research model. This raises important questions, such as whether the implementation of audit digitalization and auditor competence is truly effective in reducing the intensity of fraud if not carried out together with the strengthening of the internal control system. Furthermore, previous research generally focused on research objects in the banking sector or public companies,

while studies focusing on state-owned financial institutions such as PT Permodalan Nasional Madani (PNM), especially in the Microcapital Service Unit (ULaMM), are still limited.

Despite theoretical advancements, fraud remains a critical challenge for microfinance institutions (MFIs), driven by rapid disbursements, limited monitoring, and a heavy reliance on manual reporting. According to the Financial Services Authority (OJK), fraud cases in Indonesia's non-bank financial sector rose by 18.7% in 2024, a trend reflected at PT Permodalan Nasional Madani's ULaMM unit, where a 60% manual monitoring rate has exacerbated issues like moral hazard, data manipulation, and transaction discrepancies amidst a growing customer base. This vulnerability is underscored by a national microfinance non-performing loan (NPL) rate of 4.2% in 2023, far outstripping the commercial sector and highlighting an urgent need for enhanced accountability. While audit digitalization offers a strategic solution to strengthen supervision, its implementation is currently hindered by infrastructure deficits, weak compliance cultures, and significant skill gaps, with over 30% of internal auditors lacking data-analytics competency (Pagalung et al., 2025). Consequently, the transition to digital auditing requires the support of a robust, adaptive Internal Control System to prevent the technology from inadvertently creating new avenues for access misuse and system overrides.

LITERATURE REVIEW

Audit Digitalization

Audit digitalization is the process of transforming the traditional manual and paper-based audit system into a modern audit system that fully integrates digital technology across all stages of the audit, from planning, execution, evaluation, to reporting. Technologies such as big data analytics, artificial intelligence (AI), machine learning, robotic process automation (RPA), and cloud computing have fundamentally changed the way auditors work, access data, and make assessments of audit risk (Nisaa et al., 2024). With the adoption of these technologies, auditors are not only able to process very large volumes of data in a short time, but also gain deeper, data-driven insights into the activities of the audited clients. This expands the scope of audits and enhances the effectiveness of detecting anomalies, deviations, or indications of fraud that were previously difficult to identify with manual methods. Digitalization also allows audits to be conducted in real-time, so that the potential for errors or fraud can be immediately identified and addressed.

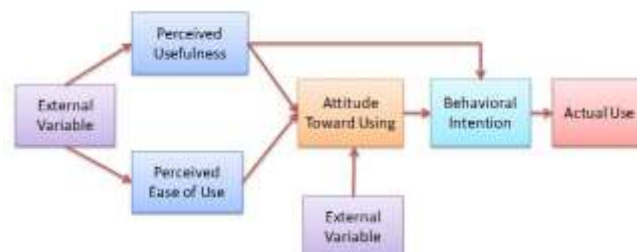


Figure 1. Technology Acceptance Model

The theoretical foundation that supports the adoption of audit digitalization is the Technology Acceptance Model (TAM) developed by Davis (Prastiawan et al., 2021). TAM explains that the extent to which someone is willing to use technology is largely determined by two main perceptions, namely perceived usefulness (perception of the technology's benefits) and perceived ease of use (perception of the ease of using the technology). In the context of auditing, when auditors feel that using digital technology will help them work faster, more accurately, and efficiently, and feel that the technology is easy to learn and operate, their tendency to accept and integrate it into audit practices will increase significantly. In other words, the level of auditors' acceptance of audit digitalization is greatly influenced by their understanding of the benefits of technology in supporting audit performance and the ease of technology implementation.

Auditor Human Resource Quality

The quality of human resources among auditors is the main foundation in determining the success of the audit process, especially in the digital era full of challenges and data complexities (Gaffar et al., 2024). This competence is not only limited to technical skills in accounting and auditing but also includes a deep understanding of applicable auditing standards, analytical skills in evaluating audit evidence, as well as proficiency in operating advanced audit software and technology. In facing the era of audit digitalization, auditors are required not only to be able to carry out traditional audit procedures but also to be able to adapt to the dynamics of big data, cloud computing, artificial intelligence, and other digitally based financial information systems (Winarto, 2021).

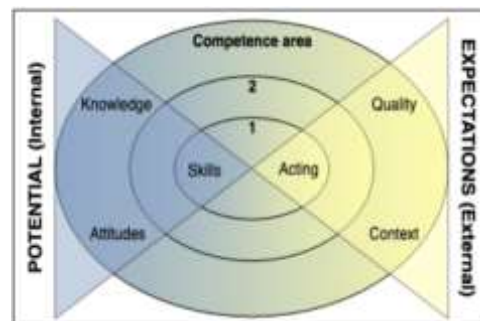


Figure 2 Competency Theory

According to Priardhina & Sari, (2022), auditor competence is one of the dominant determinants of audit quality, especially when audits are conducted in an information technology-based environment full of fraud risks. They emphasize that without adequate competence, auditors will have difficulty in identifying complex audit risks, as well as failing to utilize digital systems to enhance the effectiveness of supervision.

Intensity of Fraud

The intensity of fraud is a concept that refers to how often fraud occurs as well as the magnitude or severity of its impact on an organization, whether financially, operationally, or reputationally (Saputra et al., 2021). In this context, intensity not only describes the quantity of fraud cases that occur but also takes into account the quality or complexity level of the fraud committed. The higher the intensity, the more serious the issues of governance, ethics, and control within

an entity. Some of the main factors that influence the intensity of fraud include weak internal control systems, low individual integrity within the organization, and limited system capabilities to detect and respond to fraudulent actions. Inadequate internal supervision tends to create gaps that can be exploited by perpetrators to commit fraud repeatedly or on a larger scale. In addition, a low commitment to ethical values, such as honesty and responsibility, will worsen the situation because individuals with deviant tendencies feel there are no significant obstacles in committing fraud. To further understand why the intensity of fraud can arise and develop within an organization, a theoretical framework is needed that systematically explains the factors driving someone to commit fraudulent acts. The following theories on fraud have been developed to describe the root causes and dynamics of fraud occurrence:

1. Fraud Theorem

Fraud Theorem's is one of the important concepts developed to serve as the main reference in managing fraud risks, formulating anti-fraud policies, and designing comprehensive monitoring strategies. This theory comes by offering a clear foundation in efforts to eradicate corruption and other fraud in various sectors, as it provides a measurable vision as a basis in every strategy implemented. Through the conceptual framework established, Fraud Theorem emphasizes that prevention and enforcement activities must be carried out in a directed, consistent manner and their achievements can be measured over time. Thus, the effectiveness of an anti-fraud strategy is not only assessed by how much fraudulent activity can be suppressed, but also by the extent to which annual achievements can be monitored using objective and accountable indicators (Siahaan & Haryono, n.d.).

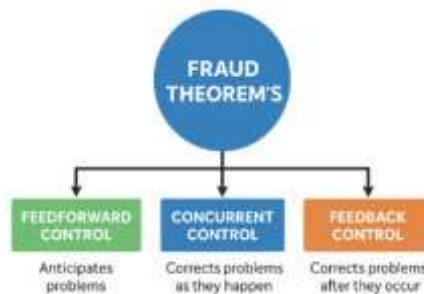


Figure 3. Fraud Theorems

2. Fraud Star

The Fraud Star model developed by Prof. Haryono Umar is an expansion of the classical Fraud Triangle and Fraud Diamond theories by adding a new dimension to explain the factors that cause fraud. While the Fraud Triangle emphasizes three aspects, namely pressure, opportunity, and rationalization, and the Fraud Diamond adds the element of capability, the Fraud Star completes the framework by including the dimension of integrity. Thus, the Fraud Star consists of five main elements, namely pressure, opportunity, rationalization, capability, and integrity. These five factors are believed to provide a more comprehensive picture of individual or organizational behavior in committing fraud. Pressure, opportunity, rationalization, and ability are viewed as driving factors for fraud, while integrity acts as a control because the higher the level of

individual or organizational integrity, the lower the tendency to commit fraud (Umar et al., 2022).



Figure 4. Fraud Star

3. Agency Theory

Agency theory is one of the most widely used theoretical frameworks in the fields of accounting, auditing, and corporate governance because it provides a strong conceptual basis for understanding the complex relationship between the principal and the agent in an organization (Satria, 2022). This theory was first systematically introduced by Jensen & Meckling (2019), who explained that an agency relationship is formed when the principal delegates authority to the agent to make decisions and carry out activities on behalf of the principal (Arwani et al., 2020). However, in this relationship, there is often an information imbalance (information asymmetry), where the agent tends to have broader access to



operational information compared to the principal. This inequality creates the potential for conflicts of interest, especially when agents prioritize their personal interests over those of the principal, such as in the form of financial statement manipulation, asset embezzlement, and fraudulent actions that harm the organization. Therefore, this theory emphasizes the importance of strong supervision and effective control mechanisms to minimize the risks of moral hazard and agency costs, which are costs arising from differences in objectives between the principal and the agent (Jensen & Meckling, 2019).

Figure 5. Agency Theory

Internal Control System

The effectiveness of the internal control system becomes a fundamental element in creating good organizational governance, especially in ensuring the reliability of financial reporting, operational efficiency, as well as compliance with applicable regulations and policies. An effective internal control system not only functions as a management oversight tool over organizational activities but also plays an important role in preventing and detecting various forms of misconduct such as fraud, asset misuse, and material errors in financial reporting. The framework most widely used globally in designing and evaluating internal control systems is the COSO Internal Control Integrated Framework, developed by the Committee of Sponsoring Organizations of the Treadway Commission (D'Aquila, 2013). The following is a picture of the COSO ERM Model:

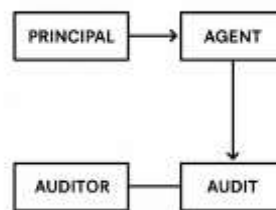


Figure 1. COSO Framework

The COSO ERM model above is a framework widely used to understand and evaluate the effectiveness of internal control systems within an organization. This model emphasizes that internal control is not just an administrative procedure, but an integrated and comprehensive system to ensure that the organization achieves its objectives effectively, efficiently, and free from fraud. COSO ERM was developed by the Committee of Sponsoring Organizations of the Treadway Commission as a practical guide for organizations to systematically manage risk (Moeller, 2007). Conceptually, COSO ERM consists of three main dimensions, namely:

- a. Categories of organizational objectives,
- b. Levels of organizational structure
- c. Components of internal control.

In the context of modern financial governance, efforts to strengthen accountability and transparency have become very important, especially when organizations face increasingly complex fraud risks. The rapid digital transformation has encouraged institutions to adopt audit digitalization as part of the modernization of oversight systems. Audit digitalization not only improves the accuracy and speed of inspection processes but also has the potential to enhance the effectiveness of internal control systems through the use of more accurate data and advanced analytical technology. Therefore, this study needs to examine how audit digitalization can directly affect the effectiveness of the Internal Control System.

In addition to technological aspects, the quality of the auditor's human resources is also a factor that greatly determines the effectiveness of the internal control system. Auditors who have technical competence, integrity, analytical

skills, and adequate digital literacy will be better able to detect deviations, evaluate risks, and ensure that every organizational activity runs according to control procedures. Thus, the quality of the auditor's human resources is expected to contribute positively to the effectiveness of the internal control system, and therefore this needs to be tested empirically in research.

Furthermore, the effectiveness of the internal control system not only plays a role as a dependent variable, but also acts as a key factor that can strengthen or weaken the relationship between independent variables and fraud intensity. An effective internal control system is believed to be able to increase the success of using audit digitalization in reducing fraud opportunities. This means that when internal control functions optimally, audit digitalization is more capable of detecting transaction anomalies, risk patterns, and data-based indications of fraud. Therefore, the internal control system is positioned as a moderating variable in the relationship between audit digitalization and fraud intensity.

The same applies to the relationship between the quality of auditors' human resources and the intensity of fraud. Qualified auditors will be more effective in assessing, evaluating, and supervising organizational activities. However, the performance of these auditors will be even stronger if supported by an internally functioning internal control system optimally. Thus, the effectiveness of the internal control system is predicted to strengthen the relationship between the quality of auditors' human resources and the reduction of fraud intensity. When the internal control system is weak, the competence of auditors alone is not enough to minimize the risk of fraud. Conversely, the combination of qualified auditors with a strong internal control system will result in a much more effective supervision mechanism. Based on the entire discussion, the research framework is designed as follows:

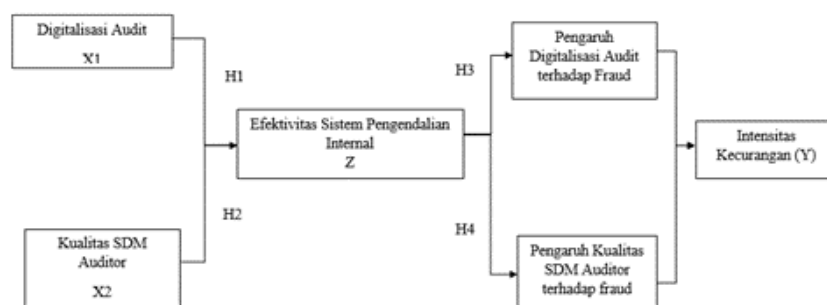


Figure 7. Framework of Thinking

Based on the theoretical foundation, previous research results, and the problem formulation that has been established, this study formulates four hypotheses that represent causal relationships between variables: audit digitalization, auditor human resource quality, internal control system effectiveness, and fraud intensity. The explanation of each hypothesis is formulated as follows.

The Influence of Audit Digitalization on the Effectiveness of Internal Control Systems

Audit digitalization facilitates a faster, more accurate, and easily traceable examination process through the automation of procedures, data integration, and digital system-based analytical capabilities. Modern audit technology enables real-time detection of irregularities, strengthens monitoring activities, and improves the quality of documentation. Husna's research (2025) proves that the digitalization of financial reporting can enhance the effectiveness of the internal control system through increased accuracy and document traceability. Lastianti's findings (2024) also confirm that audit digitalization contributes to improving audit quality, which ultimately strengthens the effectiveness of the internal control system.

H1: The digitalization of audits has a positive effect on the effectiveness of the internal control system.

1. The Influence of Auditor Human Resource Quality on the Effectiveness of Internal Control Systems

The quality of auditors' human resources, which includes technical competence, analytical skills, professional experience, and understanding of technology-based audit systems, is an important component in strengthening internal control systems. Competent auditors are able to identify control weaknesses, assess risks accurately, and provide effective improvement recommendations. Research by Wahtan (2025) and Djatmiko (2020) shows that auditor competence significantly affects the effectiveness of internal control systems. Novatiani et al. (2024) also assert that auditor competence influences audit quality and the effectiveness of internal control.

H2: Auditor Human Resource Quality has a positive effect on the effectiveness of internal control systems.

2. Moderation of the internal control system on the Influence of Audit Digitalization on Fraud Intensity

The digitization of audits provides deeper analytical capabilities through the use of algorithms, big data analytics, and test automation, which can enhance the detection of suspicious transaction patterns and reduce the intensity of fraud. However, the benefits of digitization will be more optimal if supported by a strong internal control system. Lastianti (2024) states that digitization improves audit quality, which implies a reduction in fraud potential. Meanwhile, Umar (2022) adds that audit technology strengthens the ability to classify fraud risk. Thus, an effective internal control system acts as a reinforcement for the relationship between audit digitization and the reduction of fraud intensity.

H3: Internal Control System strengthens the positive influence of Audit Digitalization on fraud intensity.

3. Moderation of the Internal Control System on the Influence of Auditor Human Resource Quality on the Intensity of Fraud

Auditors with high competence are able to improve audit effectiveness, identify early signs of fraud, and recommend mitigation strategies that narrow the opportunities for fraud. However, this ability will be more effective if supported by a well-designed internal control system. Yanti & Hidayah (2023) demonstrated that auditor competence is an important factor in preventing fraud in the banking sector. Febrianti (2024) also showed that professional auditor

competence is closely related to the effectiveness of internal audits in reducing fraud risk. Thus, the internal control system functions to strengthen the influence of auditor competence on the reduction of fraud intensity.

H4: Internal Control System strengthens the positive influence of auditor HR Quality on fraud intensity.

METHODS

This study uses a quantitative approach with a causality and explanatory research design. Its aim is to analyze the influence of audit digitalization and the quality of auditor human resources on the effectiveness of the Internal Control System (SPI), as well as to examine the role of SPI in moderating the effect of audit digitalization and the quality of auditor human resources on fraud intensity. The study population consists of internal auditors at the Micro Capital Service Units (ULaMM) of PT Permodalan Nasional Madani. A sample of 70 respondents was determined through purposive sampling technique.

Primary data were obtained through structured questionnaires, while secondary data came from literature and supporting documents. Data analysis was conducted using SPSS version 30 through validity and reliability tests, classical assumption tests, multiple linear regression, and Moderated Regression Analysis (MRA). Provide a clear and concise version of your method for conducting research, population and sample, and data analysis tools.

RESULTS

Characteristics of Respondents

Table 1. Characteristics of Respondents

Characteristics	Category	Frequency	Percentage (%)
Age	31-35 years	6	8,6
	36-40 years	14	20,0
	41-45 years	25	35,7
	45-50 years	21	30,0
	> 50 years	4	5,7
Gender	Male	58	82,9
	Female	12	17,1
last education	D3	12	17,1
	S1	56	80,0
	S2	2	2,9
long time working	< 1 years	4	5,7
	1-3 years	13	18,6
	4-6 years	23	32,9
	> 6 years	30	42,9
Audit Certificate	Does Not Have	44	62,9
	On Process	21	30,0
	Have it	5	7,1

Based on the table of respondent characteristics by age, it can be seen that the majority of respondents are in the 41-45 age group, totaling 25 people (35.7%). The next age group is 45-50 years with 21 people (30.0%), followed by 36-40

years with 14 people (20.0%), 31–35 years with 6 people (8.6%), and the least represented are respondents over 50 years old, totaling 4 people (5.7%). This indicates that most respondents are in the middle-aged adult group, who generally already have work experience, emotional stability, and maturity in carrying out job responsibilities. This condition can contribute to the quality of decision-making, adaptability to the work environment, and a better understanding of the tasks and professional roles being performed.

In terms of gender, the respondents were dominated by males, totaling 58 people (82.9%), while females were only 12 people (17.1%). This composition shows that the structure of respondents in this study is mostly filled by male workers, which may reflect the characteristics of the field of work being studied.

Based on the last level of education, the majority of respondents have a bachelor's degree background with 56 people (80.0%), followed by an associate degree with 12 people (17.1%), and a master's degree with 2 people (2.9%). This shows that most respondents have an academic qualification at the bachelor's level, which theoretically supports conceptual and technical understanding in their field of work.

Viewed from the length of service, the majority of respondents have more than 6 years of work experience, totaling 30 people (42.9%), followed by those with 4–6 years of service, totaling 23 people (32.9%). This data shows that most respondents are classified as experienced workers, and therefore professionally have a deep understanding of the systems and work procedures in the agency or organization where they work.

Regarding audit certificate ownership, the majority of respondents do not have an audit certificate (62.9%), while 30.0% are in the process, and only 7.1% already have a certificate. This condition indicates that the level of professional certification among respondents is still relatively low, although there is a tendency for increase through the ongoing certification process.

Multiple Linear Regression Analysis Results

Table 2. Regression Model Results

Variable	B	Std. Error	Beta	t	Sig.
(Constant)	-3,862	2,446	-	-1,579	0,119
Digitalisasi Audit (X1)	0,929	0,148	0,675	6,292	0,000
Kualitas SDM Auditor (X2)	0,323	0,145	0,238	2,220	0,030

Dependent Variable: Effectiveness of the internal control system

- a. The regression results show that Audit Digitalization has a positive and significant effect on the effectiveness of the internal control system (Sig. $0.000 < 0.05$). Likewise, Auditor HR Quality has a positive and significant effect on the effectiveness of the internal control system (Sig. $0.030 < 0.05$). The positive coefficient indicates that the higher the level of audit digitalization and the quality of auditor HR, the greater the effectiveness of the internal control system. Thus, H1 and H2 are accepted.

b. Modernization test

Table 3. Regression Results of the Moderation Model

Variable	B	Std. Error	Beta	t	Sig.
(Constant)	31,680	0,528	-	59,981	0,000
X1C	0,306	0,327	0,249	0,935	0,353
X2C	0,232	0,275	0,192	0,844	0,402
ZC	0,336	0,223	0,377	1,507	0,137
X1M (X1×Z)	0,161	0,054	0,866	3,013	0,004
X2M (X2×Z)	0,117	0,047	0,724	2,467	0,016

Dependent Variable: Fraud Intensity

The interaction variable X1M has a significance value of 0.004 (< 0.05) with a positive coefficient of 0.161. This indicates that the effectiveness of the internal control system significantly moderates the relationship between Audit Digitalization and Fraud Intensity. The positive direction of the coefficient indicates that the effectiveness of the internal control system strengthens this relationship. Since the ZC variable is not directly significant (Sig. 0.137 > 0.05) but the interaction is significant, the effectiveness of the internal control system acts as a pure moderator in this relationship.

The interaction variable X2M has a significance value of 0.016 (< 0.05) with a positive coefficient of 0.117. This result indicates that the effectiveness of the internal control system also significantly moderates the relationship between Auditor Human Resource Quality and Fraud Intensity. The positive coefficient indicates that the effectiveness of the internal control system strengthens this effect. As in Model 2, the effectiveness of the internal control system acts as a pure moderating variable because it does not have a direct effect but is significant in the interaction.

DISCUSSION

a. The Influence of Audit Digitalization on the Effectiveness of Internal Control Systems

Based on the results of multiple linear regression analysis, the Audit Digitalization variable shows a positive and significant effect on the effectiveness of the internal control system, with a regression coefficient value of 0.929 and a significance level of 0.000 (< 0.05). Statistically, the significance value being far below the $\alpha = 0.05$ threshold indicates that the probability of making an error in concluding that there is an effect is very small, so the causal relationship identified in the model can be considered strong and convincing. Meanwhile, the regression coefficient of 0.929 indicates that each one-unit increase in the level of audit digitalization will increase the effectiveness of the internal control system by 0.929 units, assuming other variables in the model remain constant (*ceteris paribus*). This value is relatively large compared to other independent variables, so analytically it can be concluded that audit digitalization is the dominant

determinant in explaining the variation in the effectiveness of the internal control system in this research model.

Conceptually, audit digitalization represents the transformation of the audit process from a manual and physical document-based approach to an integrated information technology-based system. This transformation includes the use of audit applications based on Enterprise Resource Planning (ERP), the utilization of data analytics for substantive testing and control testing, the implementation of continuous auditing, as well as the automation of examination procedures through algorithm-based systems. The implementation of this technology allows auditors to access data in real time, improve the timeliness of information, and expand the scope of testing without being limited to conventional sampling techniques.

From the perspective of internal control theory, the effectiveness of an internal control system is greatly influenced by five main components, namely the control environment, risk assessment, control activities, information and communication, and monitoring activities. Audit digitalization directly contributes to strengthening the information and communication component through an integrated and electronically documented reporting system, thereby improving the accuracy, transparency, and traceability of transactions. In addition, digitalization also enhances monitoring activities through a system-based oversight dashboard that allows management to perform continuous monitoring. This reduces the risk of delayed detection of deviations and increases the organization's responsiveness to potential risks.

Furthermore, the implementation of modern audit technology significantly minimizes the risk of human error that often occurs in manual recording, reconciliation, and data processing. The automation of control procedures reduces the possibility of data manipulation, narrows the scope for override control, and increases the consistency of policy implementation. With a digitized system, the audit trail can be easily traced, thereby strengthening accountability and enhancing the integrity of control processes. From a corporate governance perspective, this condition contributes to increased transparency and stakeholder trust in the organization's management system.

Empirical findings in this study are in line with the results of Husna's (2025) research, which states that the digitalization of financial reporting can improve accuracy, speed of information access, and document traceability, which ultimately strengthens the internal control system. In addition, Lastianti's (2024) research also emphasizes that audit digitalization enhances audit quality through the expansion of analytical procedures and the optimization of technology use, which impacts the improvement of internal control effectiveness. The consistency of these results strengthens the external validity of the research and indicates a stable pattern of the relationship between audit digital transformation and the effectiveness of internal control systems in various organizational contexts.

Overall, the results of this study confirm that audit digitalization is not merely a tool for operational efficiency or administrative modernization, but rather a strategic instrument in strengthening internal control systems structurally and systematically. The integration of technology into the audit

process can improve the quality of information, strengthen monitoring mechanisms, and minimize the risk of errors and deviations. Therefore, both empirically and theoretically, it can be concluded that the higher the level of audit digitalization implementation in an organization, the higher the effectiveness of the resulting internal control system, so the first hypothesis in this study is declared accepted significantly and substantially.

b. The Influence of Auditor Human Resource Quality on the Effectiveness of the Internal Control System

Based on the results of multiple linear regression testing, the Auditor's HR Quality variable has been proven to have a positive and significant effect on the Effectiveness of the Internal Control System, with a regression coefficient of 0.323 and a significance level of 0.030 (< 0.05). Statistically, a significance value below the threshold $\alpha = 0.05$ indicates that the relationship between the auditor's HR quality and the effectiveness of the internal control system has an adequate level of confidence and is unlikely to occur by chance. A regression coefficient of 0.323 indicates that every one-unit increase in the quality of the auditor's HR will increase the effectiveness of the internal control system by 0.323 units, assuming other variables in the model remain constant. Although the coefficient magnitude is not as large as the audit digitalization variable, this result still shows a meaningful and substantive contribution in strengthening the organization's internal control system.

Analytically, these findings confirm that human factors (human capital) are a central element in the successful implementation of internal control. Systems and procedures designed formally will not operate optimally if they are not supported by individuals with adequate competence, integrity, and professionalism. The quality of auditors' human resources in this study represents a combination of technical competence, professional experience, understanding of audit standards and regulations, as well as analytical skills in identifying and evaluating risks. These competencies enable auditors to assess the effectiveness of the design and implementation of controls, as well as ensure that established procedures are actually carried out in accordance with the provisions.

In practice, high-quality auditors have the capacity to identify control deficiencies, detect potential deviations from an early stage, and provide improvement recommendations based on comprehensive and risk-based analysis. Competent auditors are also able to perform substantive testing and control testing more accurately, using professional judgment in evaluating materiality and risk levels, and maintaining independence in the audit process. Thus, the effectiveness of an internal control system is not only determined by the completeness of documents or the existence of formal procedures, but by the extent to which auditors are able to operationalize and supervise the system consistently and objectively.

From the perspective of agency theory, the presence of a high-quality internal auditor functions as a monitoring mechanism that reduces information asymmetry between management (agent) and owners or stakeholders (principal). High auditor quality increases the credibility of reports and reduces the likelihood of moral hazard and information manipulation. Meanwhile,

within the framework of internal control theory, the quality of auditor HR strengthens the components of control activities and monitoring activities, because auditors play a direct role in evaluating the effectiveness of procedures, testing compliance, and ensuring follow-up on audit findings. In other words, auditors not only act as examiners but also as agents for continuously strengthening the control system.

The results of this study are consistent with the findings of Wahtan (2025) and Djatmiko (2020), which state that auditor competence has a significant effect on the effectiveness of the internal control system, where improvements in the quality of audit human resources are directly proportional to improvements in the quality of internal oversight. In addition, Novatiani et al. (2024) emphasize that the quality of auditors contributes to the enhancement of audit quality, which ultimately strengthens an organization's internal control system. The consistency of these results indicates that the relationship between the quality of auditor human resources and the effectiveness of the internal control system has a strong empirical basis and is repeatedly observed in various research contexts. Overall, the results of this study show that the success of an internal control system is not solely determined by the sophistication of technology systems or the completeness of formal procedures, but is greatly influenced by the quality of the individuals who design, implement, and evaluate the system. Competent, integrous, and professional auditors are able to ensure that each control component operates effectively and functions according to the organization's objectives. Therefore, both empirically and theoretically, it can be concluded that the higher the quality of human resources among auditors in an organization, the higher the level of effectiveness of the internal control system produced, thus the second hypothesis in this study is stated as significantly accepted and conceptually strong.

c. The Role of Internal Control System Moderation on the Influence of Audit Digitalization on the Intensity of Fraud

Based on the results of the Moderated Regression Analysis (MRA), the interaction variable between Audit Digitalization and Internal Control System shows a significance value of 0.004 (< 0.05) with a positive regression coefficient of 0.161. Statistically, a significance value smaller than the $\alpha = 0.05$ level indicates that the interaction effect is empirically significant and has a high level of confidence. The positive coefficient of 0.161 indicates that the presence of an increasingly effective internal control system will strengthen the relationship between audit digitalization and fraud intensity. In other words, changes in fraud intensity as a consequence of audit digitalization become stronger when the internal control system is at a high level of effectiveness.

Analytically, these results indicate that the effectiveness of the internal control system acts as a pure moderator variable, because in the regression model the effectiveness of the internal control system does not have a direct significant effect on the intensity of fraud ($p\text{-value} > 0.05$), but is significant in interaction with the audit digitization variable. From a methodological perspective, this condition indicates that the internal control system does not act as an independent predictor, but rather as a contextual variable that determines the

strength or weakness of the relationship between audit digitization and the intensity of fraud. In other words, the effectiveness of audit digitization in influencing the level of fraud is not absolute, but is highly influenced by the quality of the internal control structure that surrounds it.

Conceptually, audit digitalization provides various technology-based instruments capable of enhancing the capacity for fraud detection and prevention, such as the use of data analytics to identify transaction anomalies, the implementation of continuous auditing for ongoing oversight, and automated fraud detection systems that utilize algorithms to detect irregular patterns. However, the success of these technologies is not only determined by their sophistication but also by the internal control system that regulates how the technology is integrated into the organization's operational procedures. Without a clear control structure such as segregation of duties, layered authorization, digitalized documentation, and consistent supervisory mechanisms, audit technology has the potential not to be utilized optimally.

From the perspective of internal control theory, the internal control system functions as a normative and procedural framework that ensures every supervisory activity is carried out systematically and documented. Audit digitalization can produce extensive data and information, but the effectiveness of the internal control system ensures that this information is analyzed, followed up, and used as a basis for control decision-making. Thus, the effectiveness of the internal control system strengthens the effectiveness of audit digitalization through procedural and institutional integration. The positive interaction found in this study indicates that the stronger the effectiveness of the internal control system, the greater the impact of audit digitalization in influencing the dynamics of fraud intensity.

These findings are consistent with Lastianti's (2024) research, which states that audit digitalization improves audit quality and impacts the reduction of potential fraud through increased transparency and traceability of transactions. Furthermore, Umar (2022) emphasizes that the utilization of modern audit technology strengthens the ability to classify risks and detect early indications of fraud. The results of this study expand on these findings by showing that the effectiveness of audit technology does not stand alone, but is reinforced by an effective internal control system.

- a) Overall, these results confirm that the effectiveness of the internal control system acts as an enhancing variable that optimizes the function of audit digitalization in the context of fraud risk control. Audit digitalization provides technical tools, while the internal control system provides institutional structures and mechanisms that ensure these tools work effectively. Therefore, both empirically and theoretically, it can be concluded that the Internal Control System significantly moderates the effect of audit digitalization on fraud intensity, and in this research model, it is categorized as a pure moderating variable, thus the third hypothesis is considered accepted.

d. The Role of Internal Control System Moderation on the Influence of Auditor HR Quality on Fraud Intensity

Based on the results of the Moderated Regression Analysis (MRA), the interaction variable between Auditor HR Quality and Internal Control System

(ICS) shows a significance value of 0.016 (< 0.05) with a positive regression coefficient of 0.117. Statistically, this significance value indicates that the interaction effect between auditor quality and ICS on fraud intensity is proven to be significant. The positive coefficient of 0.117 indicates that the more effective the Internal Control System, the stronger the relationship between auditor HR quality and fraud intensity becomes. In other words, the effectiveness of the auditor's contribution in influencing fraud dynamics is greatly affected by the strength or weakness of the internal control system in place within the organization.

Analytically, these results confirm that the SPI acts as a pure moderator variable, because directly the SPI does not have a significant effect on the intensity of fraud, but becomes significant when interacting with the quality of auditors' human resources. This condition indicates that the existence of an internal control system is not merely an independent factor, but a contextual factor that determines the effectiveness of auditors in carrying out supervisory functions and preventing fraud. Thus, auditors' competence does not operate in a vacuum, but functions within a system framework that can strengthen or weaken its impact on fraud control.

Conceptually, the quality of human resources of auditors reflects the level of technical competence, professional experience, analytical ability, independence, and integrity in carrying out audit tasks. Competent auditors are able to identify red flags, conduct comprehensive risk assessments, and evaluate the effectiveness of the design and implementation of controls. However, without the support of a strong internal control system such as follow-up procedures on audit findings, clear reporting mechanisms, clear separation of functions, and management's commitment to compliance, the auditors' work results may not have an optimal impact on reducing the intensity of fraud.

Within the framework of agency theory, internal auditors function as a monitoring mechanism to reduce information asymmetry and potential moral hazard between management and owners. However, the effectiveness of this monitoring heavily depends on the internal control structure, which provides authority, information access, and institutional support to the auditor. In this context, the internal control system functions as an institutional framework that ensures audit findings do not stop at the problem identification stage but are implemented in the form of procedural improvements and control strengthening. Thus, the internal control system acts as a catalyst that integrates the individual auditor's capacity into the organization's control system as a whole.

The findings of this study are in line with Yanti & Hidayah (2023) who stated that auditor competence is a key factor in fraud prevention, as professional auditors are able to detect indications of irregularities early. In addition, Febrianti (2024) emphasized that the professional competence of auditors contributes to the effectiveness of internal audits in mitigating fraud risk through improved quality of evaluations and control recommendations. This study extends these findings by showing that the contribution of auditor quality will be increasingly optimal when supported by an effective internal control system.

Overall, the results of this study indicate that fraud risk control is the result of the interaction between individual factors (auditor human resource quality) and systemic factors (Internal Control System). Competent auditors are capable of producing quality recommendations and evaluations, while the ICS ensures that these recommendations are implemented consistently and structurally. Therefore, empirically and theoretically, it can be concluded that the Internal Control System significantly moderates the effect of auditor human resource quality on fraud intensity, and in this research model, it is categorized as a pure moderating variable, thus the fourth hypothesis is declared accepted.

CONCLUSIONS AND RECOMMENDATIONS

- a. Audit digitalization has been proven to have a positive and significant effect on the effectiveness of the Internal Control System (ICS). The high regression coefficient value and the level of significance below the $\alpha = 0.05$ threshold indicate that the implementation of technology in the audit process, such as the use of application-based systems, integration of digital data, and utilization of technology-based analysis, can improve supervision quality, information accuracy, and the precision of control procedures. Therefore, the first research objective to analyze the effect of audit digitalization on ICS effectiveness has been achieved, and the proposed hypothesis is accepted.
- b. The quality of human resources of auditors is also proven to have a positive and significant effect on the effectiveness of the Internal Control System. This shows that technical competence, professional experience, understanding of audit standards, as well as the analytical ability of auditors are determining factors in ensuring that the control system operates optimally. Although the organization has implemented a digital system, the human factor still plays a strategic role in identifying risks, evaluating control weaknesses, and providing improvement recommendations. Thus, the second research objective has been achieved and the second hypothesis is declared accepted.
- c. The results of the moderation test show that the Internal Control System significantly moderates the effect of audit digitalization on fraud intensity. The significant interaction effect indicates that the success of audit digitalization in influencing fraud intensity is highly dependent on the strength or weakness of the internal control system implemented. In this model, the ICS acts as a pure moderator variable, because it does not have a direct effect on fraud intensity, yet is significant in the interaction. Thus, the third research objective has been achieved and the third hypothesis is declared accepted.
- d. The Internal Control System has also been proven to significantly moderate the effect of auditor human resource quality on fraud intensity. This means that an auditor's competence in detecting and preventing fraud will be more effective if supported by a strong and structured internal control system. In this context, the ICS serves as an institutional framework that strengthens the contribution of auditor quality in fraud control. Therefore, the fourth research objective has been achieved, and the fourth hypothesis is declared accepted.

RECOMMENDATION

a. For Researchers

It is recommended to expand the research objects, add other variables such as organizational culture, management commitment, or risk management systems, and use more comprehensive analysis methods in order to obtain a deeper insight.

b. For the Company (especially the Kendari Branch)

The company is advised to continue increasing investment in the development of digital-based audit systems in order to accelerate the inspection process and improve the accuracy of audit results. In addition, improving the quality of auditor human resources through continuous training, professional certification, and strengthening information technology competence needs to become a strategic priority.

c. For Readers and Academics

The results of this study can serve as an empirical reference and a source of inspiration for future researchers to develop research with different variables, approaches, or sectors.

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