BLOCKCHAIN AND THE FUTURE OF AUDITING: EXAMINING AUDITORS' AWARENESS AND UNDERSTANDING IN GHANA

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ABSTRACT

Blockchain and smart contracts are increasingly viewed as transformative technologies with the potential to enhance transparency, automation, and data integrity in auditing. However, their effective integration into audit practice depends largely on auditors' awareness and understanding of these technologies. This study investigates auditors' awareness and understanding of blockchain and smart contracts and examines how these cognitive factors influence perceived relevance and organizational readiness for blockchain-enabled auditing in Ghana. Using a quantitative cross-sectional survey of 110 professional auditors, the study applies descriptive statistics and multiple regression analysis to test the proposed relationships. The results show that auditors demonstrate moderate awareness but relatively limited technical understanding of blockchain technologies. Awareness is found to significantly enhance auditors' understanding, while understanding positively influences perceptions of organizational readiness and institutional support. Unexpectedly, deeper understanding is negatively associated with perceived relevance, suggesting that more knowledgeable auditors may adopt a more critical perspective regarding the practical implementation of blockchain in auditing. The findings

highlight the importance of professional training, technological literacy, and institutional readiness in preparing auditors for digital transformation in audit practice.

KEYWORDS: - Blockchain technology; Smart Contracts; Auditing; Technology Adoption; Digital Transformation.

1.0 INTRODUCTION

Digital transformation is increasingly reshaping the foundations of accounting and auditing as organizations adopt advanced technologies to record, execute, and verify economic transactions. Among these technologies, blockchain and smart contracts have attracted considerable scholarly and professional attention due to their potential to transform how financial information is generated, stored, and audited. Blockchain technology operates as a decentralized distributed ledger that records transactions across peer-to-peer networks while ensuring transparency, traceability, and tamper resistance through cryptographic verification mechanisms (Putritama et al., 2024).

The emergence of blockchain has significant implications for auditing because it changes how audit evidence is generated, validated, and accessed. Blockchain records are replicated across network nodes and secured using cryptographic protocols, which enhances the reliability and integrity of financial data and provides a stronger foundation for audit verification (Guo et al., 2024). These characteristics allow auditors to access more transparent and reliable data sources, potentially enabling continuous auditing and real-time monitoring of transactions. Empirical evidence further suggests that blockchain and related technologies can enhance audit quality by improving fraud detection, strengthening financial reporting, and increasing stakeholder confidence in financial information (Qader & Cek, 2024).

Smart contracts extend the implications of blockchain for auditing by embedding automated control logic directly into transaction execution. Smart contracts are programmable protocols that automatically execute predefined conditions when specific triggers are met, thereby enabling automated compliance verification and transaction validation(Guo et al., 2024)). By embedding control rules into blockchain systems, smart contracts can assist auditors in identifying suspicious transactions and monitoring compliance in near real time. As a result, auditing in blockchain-based environments increasingly requires auditors to evaluate system logic, automated controls, and digital infrastructure rather than relying solely on traditional substantive testing procedures.

Despite these opportunities, literature also highlights the complexity of blockchain adoption in auditing. While blockchain technology improves transparency, traceability, and efficiency in

financial reporting, it also introduces new risks related to system security, governance structures, and regulatory frameworks(Zhang et al., 2025). Systematic reviews of blockchain adoption in auditing further indicate that although academic interest in blockchain auditing has grown rapidly, much of the existing literature remains conceptual, with relatively limited empirical research examining how auditors engage with and adopt these technologies in practice(Ziemba et al., 2025). These findings suggest that technological adoption in auditing depends not only on the availability of digital infrastructure but also on auditors' ability to understand and interpret emerging technologies.

From a theoretical perspective, research on technology adoption provides a useful framework for understanding auditors' engagement with blockchain technologies. The Unified Theory of Acceptance and Use of Technology (UTAUT) proposes that individuals' intention to adopt new technologies is influenced by factors such as perceived usefulness, effort expectancy, social influence, and facilitating conditions(Venkatesh et al., 2016). Recent empirical studies applying technology acceptance perspectives to blockchain adoption in auditing confirm that auditors are more likely to adopt blockchain technologies when they perceive them as useful and easy to use in professional tasks(Hamadeh et al., 2025). These findings indicate that auditors' awareness and conceptual understanding of blockchain technologies are critical prerequisites for meaningful technological adoption in audit practice.

Despite the rapid expansion of blockchain-related research in accounting and auditing, empirical studies examining auditors' technological preparedness remain limited, particularly in emerging economies. Literature reviews indicate that blockchain research in accounting is still in its early stages and that further empirical investigation is required to understand how professionals interpret and implement blockchain technologies in practice (Putritama et al., 2024). This gap is particularly relevant in developing economies where institutional capacity, professional training systems, and technological infrastructure may significantly influence auditors' readiness to engage with emerging technologies.

This issue is especially relevant in emerging economies such as Ghana, where the auditing profession continues to evolve alongside broader efforts to strengthen financial reporting systems and professional capacity. Although blockchain adoption in Ghana remains at an early stage, its applications are expanding into fintech platforms, digital payments, supply-chain systems, and selected public-sector initiatives. As organizations increasingly explore blockchain-based systems, auditors are more likely to encounter transactions and internal controls operating within blockchain environments. However, there remains limited empirical evidence regarding whether auditors in Ghana possess sufficient awareness and understanding of blockchain and smart contracts as emerging audit technologies.

Against this backdrop, the objective of this study is to examine auditors' awareness and understanding of blockchain and smart contracts within the Ghanaian auditing context. By addressing this objective, the study contributes to auditing literature in several ways. First, it provides empirical evidence on auditors' cognitive preparedness for blockchain-enabled audit environments in an under-explored emerging economy. Second, it extends technology adoption research by examining how awareness and understanding influence auditors' engagement with blockchain technologies. Finally, the study offers practical insights for professional bodies, regulators, and audit firms seeking to strengthen technological competence and prepare the auditing profession for continued digital transformation.

2.0 LITERATURE REVIEW

The growing interest in blockchain within accounting and auditing research reflects long-standing concerns about trust, transparency, and information asymmetry in financial reporting systems. Traditional double-entry accounting relies heavily on internally controlled records, which create a structural dependence on ex post audits to establish credibility. Cai (2021)argues that blockchain-enabled triple-entry accounting fundamentally alters this arrangement by introducing a shared, cryptographically secured ledger that independently records transactions for all parties. This structure reduces reliance on unilateral record keeping and reframes the auditor's role from verifying internally produced records to evaluating the integrity, governance, and design of shared accounting infrastructures.

Empirical studies build on this conceptual shift by examining how blockchain's technical characteristics translate into practical accounting and auditing outcomes. Survey-based and structural modeling evidence from developing and emerging economies suggests that blockchain adoption is associated with improvements in transparency, traceability, and audit efficiency, while also revealing persistent challenges related to regulatory uncertainty, skills gaps, and system integration(Saheb et al., 2025). These findings indicate that blockchain's benefits are conditional on organizational readiness and professional competence rather than automatic consequences of implementation.

An important extension of blockchain's accounting implications arises through the use of smart contracts. Smart contracts automate the execution of predefined rules and controls, embedding governance mechanisms directly into code. Taherdoost (2023) emphasizes that while this programmability can enhance efficiency and consistency, it also introduces new risks related to code immutability, security vulnerabilities, and limited flexibility once contracts are deployed. From an audit perspective, this shifts professional judgment toward assessing whether coded logic accurately reflects contractual intent and whether appropriate safeguards exist for exceptions, updates, and failures.

Evidence from applied domains reinforces the relevance of smart contracts for assurance. Omar et al., (2020)demonstrate how blockchain-based smart contracts can enforce protocol compliance and data integrity in clinical trials by restricting actions to authorized participants and ensuring tamper-resistant records. Although situated outside traditional financial reporting, this study illustrates how automated, rule-based execution can support real-time assurance in regulated environments, offering insights transferable to auditing contexts where compliance and traceability are critical.

Recent reviews highlight blockchain's potential to strengthen oversight mechanisms and audit quality. Ogedengbe&Adelowotan, (2025) synthesizes empirical and conceptual evidence showing that blockchain features such as immutability, traceability, and smart contracts can reduce agency conflicts, enhance monitoring, and improve corporate governance outcomes. However, the review also identifies unresolved challenges, including regulatory ambiguity, ethical considerations, and uneven technical capacity, underscoring the continued need for informed auditor judgment in blockchain-enabled environments.

A recurring theme across literature is that technological potential does not automatically translate into professional adoption. Studies grounded in behavioral and adoption theories consistently show that auditors' awareness, understanding, and perceptions significantly influence their willingness to engage with emerging technologies. Gkekas et al., (2025), applying an extended Theory of Planned Behavior, find that attitudes, perceived behavioral control, and moral norms play a central role in shaping blockchain adoption intentions among accounting and auditing professionals. Their findings suggest that ethical considerations and professional identity interact with technical knowledge in determining adoption outcomes.

Research from internal auditing research shows that even established technologies face resistance when auditors lack sufficient training, trust, or organizational support. Almgrashi et al., (2023) demonstrate that effort expectancy, facilitating conditions, and trust significantly influence auditors' intentions to use computer-assisted audit techniques. This suggests that awareness alone is insufficient; deeper understanding and supportive institutional environments are required for effective technological use, a conclusion that is even more relevant for complex technologies such as blockchain and smart contracts.

Systematic reviews of blockchain adoption across developing and emerging economies reveal consistent barriers that shape professional readiness. Al-Sulami et al., (2024) show that although blockchain is widely perceived as beneficial across industries, adoption is constrained by shortages of skilled personnel, infrastructural limitations, and regulatory uncertainty. These

constraints are particularly salient for auditing, where assurance quality depends on practitioners' ability to interpret and evaluate technologically complex systems.

Studies from the banking and financial services sector further support this contextual view. Al-Shanti et al. (2023) find that digital transformation toward blockchain adoption improves accounting information quality and corporate governance outcomes, but only when supported by organizational readiness and professional capability. Their results emphasize the importance of targeted capacity building for auditors and financial professionals to ensure that technological transformation translates into improved assurance rather than increased risk.

Blockchain and smart contracts hold significant potential to reshape accounting and auditing by enhancing transparency, automation, and trust. However, their effectiveness depends critically on auditors' awareness and understanding of the underlying technologies. Studies consistently show that without sufficient conceptual and practical knowledge, auditors may struggle to evaluate blockchain-based systems, potentially undermining audit quality rather than enhancing it. This insight highlights the importance of examining auditors' awareness and understanding as foundational conditions for the successful integration of blockchain and smart contracts into audit practice, particularly in developing and emerging economy contexts.

2.1 Conceptual Framework and Hypothesis Development

Recent open-access research consistently emphasizes that blockchain and smart contracts should be understood as socio-technical systems whose adoption in auditing depends on auditors' cognitive readiness and institutional context rather than on technological availability alone. Empirical and review evidence shows that auditors' engagement with blockchain technologies develops through identifiable stages, beginning with awareness and progressing toward deeper understanding, perceived relevance, and readiness for practice(Al-Sulami et al., 2024; Saheb et al., 2025).

Auditors' awareness reflects basic familiarity with blockchain and smart contracts, including knowledge of their existence and general purpose in financial reporting and auditing. However, empirical evidence demonstrates that awareness alone is insufficient to generate meaningful adoption outcomes. In their study of blockchain adoption in financial reporting and auditing, Shaiku et al. (2025) find that although awareness levels among accounting professionals are relatively high, adoption intentions and perceived benefits are significantly stronger among respondents who understand how blockchain architecture, immutability, and smart-contract automation affect audit trails, internal controls, and reporting reliability. Similarly, systematic reviews of blockchain adoption in developing and emerging economies show that awareness functions primarily as an entry condition, while deeper understanding enables professionals to

evaluate applicability, risks, and assurance implications within their institutional environments (Al-Sulami et al., 2024).This suggests that awareness facilitates, but does not guarantee, the development of understanding.

H1: Auditors' awareness of blockchain and smart contracts is positively associated with their understanding of these technologies.

Beyond awareness and understanding, literature highlights perceived relevance to audit tasks as a key mechanism through which technological knowledge translates into professional acceptance. Blockchain-enabled systems alter traditional audit processes by enabling immutable transaction records, real-time verification, and automated control execution through smart contracts. Empirical findings indicate that auditors who understand these technical features are more likely to perceive blockchain as relevant for improving audit quality, reducing fraud risk, and enhancing transparency (Shaiku et al., 2025).

Governance-focused blockchain research further supports this relationship. Ogedengbe (2025) shows that professionals who comprehend the operational logic of blockchain are better able to link its technical attributes to audit objectives such as assurance, accountability, and continuous monitoring. In contrast, limited understanding constrains auditors' ability to recognize blockchain's audit value, even when general awareness exists.

H2: Auditors' understanding of blockchain and smart contracts is positively associated with their perceived relevance of these technologies for audit practice.

Literature also positions audit readiness as a downstream outcome of understanding and perceived relevance. Audit readiness reflects auditors' perceived capability and confidence to audit blockchain-enabled systems, including their ability to evaluate automated controls, interpret blockchain-based evidence, and adapt audit procedures. Empirical evidence shows that insufficient understanding increases perceived audit risk and uncertainty, whereas stronger understanding enhances auditors' confidence in engaging with technology-driven audit environments (Gai et al., 2022).Consistent with this view, Shaiku et al. (2025) report that professionals who understand smart contracts and distributed ledger mechanisms are more likely to express readiness to engage in continuous auditing and technology-assisted assurance. This suggests that understanding plays a central role in shaping auditors' readiness to audit blockchain-enabled organizations.

H3: Auditors' understanding of blockchain and smart contracts is positively associated with their perceived readiness to audit blockchain-enabled systems.

Finally, the reviewed literature emphasizes that auditors' cognitive development occurs within broader institutional and organizational contexts. Systematic reviews of blockchain adoption across developing and emerging economies consistently identify training availability, regulatory clarity, technological infrastructure, and organizational support as critical enabling conditions (Al-Sulami et al., 2024). Where such facilitating conditions exist, auditors are better positioned to translate awareness into meaningful understanding. Governance-oriented blockchain studies further show that institutional support moderates how professionals interpret and apply blockchain technologies, particularly in environments characterized by regulatory uncertainty and resource constraints (Ogedengbe, 2025). This indicates that professional and institutional support strengthens the relationship between awareness and understanding.

H4: Professional and institutional support factors positively moderate the relationship between auditors' awareness and their understanding of blockchain and smart contracts.

3.0 MATERIALS AND METHODS

This study adopts a quantitative, cross-sectional survey design to examine auditors' awareness and understanding of blockchain and smart contracts, and how these cognitive factors shape perceived relevance and readiness for audit practice. A survey approach is appropriate because the study focuses on professional perceptions, knowledge levels, and self-assessed preparedness rather than direct system usage. Prior methodological research shows that surveys are particularly effective for studying emerging technologies, where adoption is uneven and professionals' cognitive readiness plays a central role (Boateng et al., 2018; Duah et al., 2025).

The empirical setting is Ghana, an emerging economy where digital transformation is progressing, but the integration of advanced technologies such as blockchain into audit practice remains at an early stage. Context-specific evidence is therefore essential, as institutional conditions, training availability, and professional exposure can significantly shape auditors' responses to technological change.

3.1 Population and Sample

The target population consists of professional auditors, including external auditors, internal auditors, and audit managers actively involved in assurance and control functions. This group is particularly relevant because auditors are directly responsible for evaluating audit evidence, assessing internal controls, and adapting audit procedures in response to new technologies. A purposive sampling strategy is used to ensure that respondents possess sufficient professional experience to provide informed responses. Only auditors with a minimum of one year of audit experience are included in the study. This approach is consistent with best practices in

professional survey research, where domain knowledge is necessary to ensure meaningful and reliable responses (Boateng et al., 2018; Yeboah, Duah, et al., 2026).

3.2 Data Collection Procedure

Data was collected using a structured, self-administered online questionnaire. Online survey administration offers several advantages in professional research, including wider geographic reach, reduced administrative cost, and enhanced respondent anonymity. Methodological studies highlight that online questionnaires are particularly suitable for collecting perception-based data from professionals while minimizing social desirability bias (Vortia et al., 2025; Regmi et al., 2016;).The questionnaire begins with a brief explanation of the study's purpose and a consent statement assuring respondents that participation is voluntary and that responses will remain confidential. No personally identifiable information is collected. This approach aligns with established ethical standards for online survey research and helps foster honest and unbiased responses.

3.3 Measurement of Constructs

All study constructs are measured using multi-item Likert-scale questions, with response options ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Likert scales are widely used in social science and technology adoption research because they allow respondents to express degrees of agreement and capture subtle variations in perception (Daniel Duah et al., 2025; Joshi et al., 2015)).

3.3.1 Awareness of Blockchain and Smart Contracts

Awareness is measured by items capturing auditors' familiarity with blockchain concepts, terminology, and general applications in accounting and auditing. Methodological research distinguishes awareness as a preliminary cognitive condition reflecting exposure rather than operational competence.

3.3.2 Understanding of Blockchain and Smart Contracts

Understanding reflects auditors perceived comprehension of how blockchain systems function, including immutability, transaction validation, and the role of smart contracts in automating controls. This construct captures deeper cognitive engagement beyond basic familiarity.

3.3.3 Perceived Relevance to Audit Practice

Perceived relevance measures the extent to which auditors believe blockchain and smart contracts can enhance audit quality, transparency, efficiency, and risk assessment.

3.3.4 Audit Readiness

Audit readiness reflects auditors' confidence in their ability to audit blockchain-enabled systems, including evaluating automated controls and interpreting blockchain-based audit evidence.

3.3.5 Professional and Institutional Support

This construct captures auditors' perceptions of training availability, organizational support, regulatory clarity, and technological infrastructure related to blockchain adoption. Control variables such as years of audit experience, audit role, and organizational type are included to account for professional heterogeneity.

3.4 Data Analysis Techniques

Data analysis was conducted in a series of sequential and interrelated stages using Python-based statistical tools. Prior to formal analysis, the dataset was screened for completeness, consistency, and coding accuracy. Survey responses were inspected for missing values and outliers, and all Likert-scale items were converted to numeric form to ensure analytical compatibility.

First, descriptive statistics were computed to summarize respondents' perceptions across the study constructs and to provide an overview of central tendencies and dispersion patterns within the dataset. These statistics offered preliminary insights into auditors' levels of awareness, understanding, perceived relevance, and organizational readiness. Second, internal consistency reliability was assessed using Cronbach's alpha to evaluate the stability and coherence of the measurement scales. In line with established methodological guidelines, alpha coefficients of 0.70 and above were considered indicative of acceptable reliability (Tavakol& Dennick, 2011; Yeboah, Kobi, et al., 2026). Third, exploratory factor analysis (EFA) was employed to examine the underlying dimensional structure of the measurement items and to assess construct validity. The suitability of the data for factor analysis was evaluated using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity. Due to the presence of highly correlated indicators, redundant items were identified and removed to ensure matrix stability. Furthermore, items measuring audit readiness and institutional support were found to load on a common factor and were subsequently combined to form a composite construct labelled Organizational Readiness and Support. This refinement enhanced the conceptual clarity and empirical robustness of the measurement model (Gie Yong & Pearce, 2013).

Following construct validation, composite scores were computed for each latent variable by averaging their respective indicators. These scores were used in subsequent inferential analyses. Finally, hypothesis testing was conducted using multiple regression analysis with heteroskedasticity-consistent (HC3) robust standard errors. This approach enabled the estimation of direct relationships among the study variables and facilitated the examination of moderation

effects through interaction terms. Prior to moderation analysis, predictor variables were mean centered to reduce multicollinearity. The application of robust standard errors ensured reliable parameter estimates in the presence of potential heteroskedasticity commonly associated with survey-based data (Kline, 2016).

3.5 Ethical Considerations

The study adheres to established ethical standards for social science research. Participation is voluntary, informed consent is obtained from all respondents, and responses are anonymized prior to analysis. Ethical safeguards related to online data collection and participant privacy follow accepted guidance for internet-based research (Buchanan & Zimmer, 2012).

4.0 RESULTS

This section presents the empirical findings of the study based on data collected from professional auditors in Ghana. The results are organized in line with the study objectives and analytical procedures. First, descriptive statistics are reported to summarize respondents' perceptions across the main study constructs. Second, internal consistency reliability is assessed using Cronbach's alpha to evaluate the adequacy of the measurement scales. Finally, multiple regression analyses with robust standard errors are conducted to test the proposed hypotheses and examine the relationships among the study variables, including the moderating effect of organizational readiness and support.

4.1 Descriptive Statistics

Table 1 provides descriptive statistics of the dataset

Table 1: Descriptive Statistics

Construct	N	Mean	SD	Min	25%	Median	75%	Max
AW	110	3.53	1.10	1.00	3.67	4.00	4.00	5.00
UN	110	2.97	1.22	1.00	2.00	3.00	4.00	4.67
PR	110	4.73	0.47	3.67	4.67	5.00	5.00	5.00
ORS	110	2.30	1.23	1.00	1.50	1.75	3.50	4.75
H4	AW×ORS → UN			-0.10	0.02		<0.001	0.69

Note: AW = Awareness, UN = Understanding, PR = Perceived Relevance,
ORS = Organizational Readiness and Support.

Table 1 presents the descriptive statistics for the main study constructs, including auditors' awareness, understanding, perceived relevance, and organizational readiness and support. The analysis is based on 110 valid responses. Auditors' awareness of blockchain and smart contracts recorded a relatively high mean score (M = 3.53, SD = 1.10), suggesting that respondents generally possessed moderate to high familiarity with these emerging technologies. The

distribution indicates that while some auditors reported limited awareness, a substantial proportion demonstrated strong knowledge of blockchain-related concepts. In contrast, auditors' understanding of blockchain and smart contracts was comparatively lower (M = 2.97, SD = 1.22), reflecting moderate levels of technical and practical comprehension. This finding suggests that although awareness is relatively widespread, deeper operational understanding remains limited among many respondents. Perceived relevance of blockchain and smart contracts for audit practice exhibited the highest mean score among the constructs (M = 4.73, SD = 0.47). This indicates strong agreement among auditors regarding the importance and potential value of these technologies in enhancing audit processes. The relatively low standard deviation further suggests a high degree of consensus on their professional relevance. The merged construct of organizational readiness and institutional support recorded a comparatively low mean score (M = 2.30, SD = 1.23), indicating that respondents perceived limited infrastructural, institutional, and professional support for blockchain-enabled auditing. The wide dispersion of responses reflects considerable variation in organizational preparedness across audit firms. The descriptive results reveal a notable disparity between auditors' high perceived relevance of blockchain technologies and their relatively low levels of understanding and organizational support. This pattern highlights a potential gap between technological expectations and institutional capacity within the Ghanaian audit environment.

4.2 Reliability and Validity

The internal consistency reliability of the measurement scales was assessed using Cronbach's alpha, and the results are presented in Table 2.

Table 2: Cronbach' Alpha

Construct	Cronbach's Alpha (α)
AW	0.855
UN	0.993
PR	0.903
ORS	0.981

All constructs in table 2 demonstrate strong reliability, with alpha coefficients exceeding the recommended threshold of 0.70. Auditors' awareness of blockchain and smart contracts exhibit high internal consistency (α = 0.86), indicating stable and coherent measurement of respondents' familiarity with emerging audit technologies. Similarly, the understanding constructed an exceptionally high reliability coefficient (α = 0.99), reflecting strong consistency among items measuring auditors' technical and conceptual comprehension. Perceived relevance also demonstrates strong reliability (α = 0.90), suggesting that the associated indicators consistently captured respondents' evaluations of blockchain's importance in audit practice. The merged

construction of organizational readiness and institutional support showed excellent internal consistency (α = 0.98), confirming the appropriateness of combining audit readiness and professional support indicators based on exploratory factor analysis. The reliability and validity assessments confirm that the measurement model is both internally consistent and empirically robust, supporting its suitability for subsequent hypothesis testing.

4.3 Hypothesis Testing

Table 3 presents the results of the regression analyses conducted to examine the relationships among auditors' awareness, understanding, perceived relevance, and organizational readiness and support in relation to blockchain and smart contracts (Hypotheses H1–H4). Reported values include standardized coefficients (β), standard errors (SE), p-values, and R^2 values. N = 110.

Table 3: Regression Results for Hypothesis Testing

Hypothesis	Predictor→ Outcome	β	SE	p-value	R^2
H1	AW → UN	0.82	0.03	<0.001	0.55
H2	UN → PR	-0.11	0.02	<0.001	0.08
H3	UN → ORS	0.71	0.06	<0.001	0.49

Note: Robust standard errors (HC3) were used in all models.

The results indicate a strong and statistically significant positive relationship between auditors' awareness and their understanding of blockchain and smart contracts (β = 0.82, SE = 0.03, p < 0.001). This finding supports Hypothesis 1 and suggests that increased exposure to blockchain-related information and concepts substantially enhances auditors' technical and conceptual comprehension. The model explains 55% of the variance in understanding (R^2 = 0.55), highlighting awareness as a central driver of learning in this context.

Contrary to expectations, auditors' understanding of blockchain and smart contracts was found to be negatively associated with their perceived relevance of these technologies for audit practice (β = −0.11, SE = 0.02, p < 0.001). This result does not support Hypothesis 2. The explanatory power of this model is relatively modest (R^2 = 0.08), indicating that understanding accounts for only a small proportion of variation in relevance perceptions. This finding suggests that more knowledgeable auditors may develop more critical and realistic assessments of the practical, regulatory, and infrastructural challenges associated with blockchain adoption.

The analysis further reveals a strong positive relationship between auditors' understanding and organizational readiness and institutional support (β = 0.71, SE = 0.06, p < 0.001), thereby supporting Hypothesis 3. Approximately 49% of the variance in organizational readiness and

support is explained by auditors' understanding ($R^2 = 0.49$). This result indicates that enhanced technical competence among auditors is closely linked to greater institutional commitment, infrastructural investment, and professional support for blockchain-enabled auditing.

Hypothesis 4 examined whether organizational readiness and institutional support moderate the relationship between auditors' awareness and understanding. The interaction effect between awareness and organizational support was negative and statistically significant ($\beta = -0.10$, SE = 0.02, $p < 0.001$), providing support for Hypothesis 4. The moderation model exhibits strong explanatory power ($R^2 = 0.69$), indicating that nearly 70% of the variation in auditors' understanding is accounted for by the combined effects of awareness, organizational support, and their interaction. The negative interaction suggests that as organizational readiness and support increase, the influence of individual awareness on understanding becomes weaker. This implies that well-resourced audit environments reduce reliance on personal exposure by providing structured training, technological infrastructure, and institutional learning mechanisms.

5.0 DISCUSSION

The findings of this study provide empirical insight into auditors' cognitive preparedness for blockchain-enabled auditing environments. By examining the relationships among auditors' awareness, understanding, perceived relevance, and organizational readiness, the results contribute to the emerging literature examining how technological innovations reshape auditing practice. Blockchain technology has been widely recognized as one of the most transformative developments affecting accounting and auditing because it introduces decentralized, immutable, and transparent ledger systems capable of fundamentally altering how financial transactions are recorded and verified. Blockchain systems operate through distributed consensus mechanisms that allow transactions to be validated across networks without the need for centralized intermediaries, thereby enhancing the reliability and integrity of financial data (Liu et al., 2019) These characteristics create significant opportunities for auditing because they provide tamper-resistant audit trails, facilitate real-time verification of transactions, and reduce the risk of data manipulation within financial reporting systems.

Prior research consistently suggests that blockchain technologies may transform auditing by enabling continuous assurance and automated verification processes. For example, studies examining blockchain-based assurance systems argue that the technology strengthens audit reliability by creating immutable records that can be independently verified across distributed networks (Ilori et al., 2020). Similarly, research on the digital transformation of auditing indicates that emerging technologies such as blockchain, artificial intelligence, and data analytics collectively enable new forms of real-time monitoring and automated analytical procedures that improve audit efficiency and transparency (Nnenna, 2023). Despite these technological

advantages, scholars also emphasize that blockchain adoption remains at an early stage and requires significant institutional investment, professional training, and regulatory adaptation before it can be fully integrated into audit practice (Smith, 2018). The empirical results of this study support this broader perspective by demonstrating that although auditors perceive blockchain technologies as highly relevant for auditing, important gaps remain in terms of technical understanding and organizational readiness.

One of the most significant findings of the study is the strong positive relationship between auditors' awareness of blockchain technologies and their level of understanding. This result confirms that exposure to emerging technologies plays a crucial role in developing auditors' conceptual comprehension of digital audio systems. The finding aligns closely with the assumptions of Technology Acceptance Theory (TAM), which proposes that individuals must first become familiar with a technology before they can develop meaningful perceptions of its usefulness and applicability. Similarly, Innovation Diffusion Theory (IDT) identifies awareness as the initial stage in the adoption process, where individuals acquire knowledge about a technological innovation before forming attitudes toward its potential adoption. Empirical research on auditing technologies provides strong support for this interpretation. Sastry et al., (2021) for instance, demonstrates that auditors increasingly recognize the importance of blockchain and data analytics in improving audit procedures such as fraud detection, evidence collection, and professional judgment. Their findings suggest that awareness of emerging technologies encourages auditors to engage with new analytical tools and develop the technical competencies necessary to evaluate digital financial systems. In a similar vein, Liu et al. (2019) highlights that blockchain architectures introduce entirely new operational mechanisms that require auditors to understand distributed consensus protocols, cryptographic verification, and decentralized transaction processing systems. Consequently, the strong association between awareness and understanding observed in this study reinforces the view that technological exposure serves as a critical foundation for professional learning in technology-enabled audit environments.

While the positive relationship between awareness and understanding aligns with theoretical expectations, the study also reveals an unexpected negative relationship between auditors' understanding of blockchain and their perceived relevance of the technology for audit practice. This finding contrasts with predictions derived from Technology Acceptance Theory, which suggests that greater knowledge of technology typically increases perceptions of its usefulness. However, the result can be interpreted as reflecting a more critical evaluation of blockchain adoption among auditors who possess deeper technical knowledge. As auditors become more familiar with the complexities of blockchain systems, they may develop a more realistic understanding of the practical challenges associated with implementing these technologies within

existing audit frameworks. Several studies support this interpretation. Research examining blockchain-based assurance systems highlights that although blockchain enhances transparency and data integrity, it also introduces challenges related to technological complexity, interoperability with existing accounting systems, and evolving regulatory requirements (Ilori et al., 2020). Similarly, (Brender et al., 2019) argue that blockchain has the potential to disrupt traditional auditing activities by embedding verification processes directly into transaction systems, which could reduce the need for certain audit procedures while simultaneously requiring auditors to develop new competencies in evaluating information systems and governance structures. Smith (2018.) further suggests that blockchain may shift the focus of auditing from verifying individual transactions toward assessing the integrity of digital systems, algorithmic controls, and data governance mechanisms. From this perspective, auditors with greater understanding of blockchain technologies may perceive both the opportunities and the structural challenges associated with their adoption, leading to more cautious evaluations of the technology's immediate relevance to audit practice.

The study also finds a strong positive relationship between auditors' understanding of blockchain technologies and perceptions of organizational readiness and institutional support. This result indicates that technological competence among auditors is closely linked to broader institutional capacity for adopting blockchain-enabled auditing systems. Innovation Diffusion Theory emphasizes that the adoption of technological innovations is strongly influenced by organizational context, including the availability of technological infrastructure, training programs, and institutional support mechanisms. Empirical evidence from the auditing literature similarly highlights the importance of organizational readiness in facilitating digital transformation. Blockchain technologies enable continuous auditing by providing real-time access to financial data and automated verification mechanisms that improve audit efficiency and reduce audit lag (Ilori et al., 2020). (Nnenna, 2023) likewise demonstrates that digital technologies such as blockchain and advanced analytics enhance audit transparency and effectiveness when organizations possess the necessary technological infrastructure and professional expertise. These findings are consistent with (Jackson, 2018) argument that the future of auditing will increasingly require professionals with strong technological and analytical skills capable of evaluating complex digital financial systems. The strong association between technological understanding and organizational readiness observed in this study therefore suggests that auditors' knowledge development may act as an important catalyst for institutional investment in blockchain-enabled auditing systems.

Another important contribution of the study is the finding that organizational readiness and institutional support moderate the relationship between awareness and understanding. Specifically, the influence of individual awareness on technological understanding becomes

weaker when organizational support is strong. This result highlights the critical role of institutional structures in shaping professional learning within technologically evolving environments. Innovation Diffusion Theory suggests that the adoption of innovations is not solely driven by individual knowledge but also by organizational mechanisms that facilitate knowledge transfer and skill development. When organizations provide structured training programs, digital infrastructure, and institutional support, auditors can develop technological competencies through formal learning processes rather than relying exclusively on individual exposure to new technologies. Prior research on blockchain adoption reinforces this perspective by emphasizing that successful integration of blockchain technologies requires coordinated investments in infrastructure, regulatory frameworks, and professional training initiatives (Ilori et al., 2020). Brender et al. (2019) similarly argue that the transformation of auditing through blockchain technologies will require collaborative adaptation by audit firms, regulators, and professional bodies to establish new governance frameworks and professional standards. The moderating effect identified in this study therefore underscores the importance of institutional capacity in supporting the diffusion of blockchain technologies across the auditing profession.

The findings reveal a complex interplay between technological awareness, professional understanding, and organizational readiness in shaping auditors' preparedness for blockchain-enabled audit environments. Although auditors generally recognize the potential benefits of blockchain technologies for improving transparency, data integrity, and audit efficiency, the relatively lower levels of technical understanding and institutional support indicate that the auditing profession remains in the early stages of technological adaptation. These results align with the broader literature suggesting that blockchain technologies are more likely to augment rather than replace traditional auditing practices. Instead, they are expected to reshape the competencies required of audit professionals, shifting the focus toward evaluating digital systems, automated controls, and data governance structures within increasingly technology-driven financial ecosystems.

6.0 CONCLUSION

This study examined auditors' awareness and understanding of blockchain and smart contract technologies and analyzed how these factors influence perceptions of relevance and organizational readiness for blockchain-enabled auditing. As digital technologies continue to reshape financial reporting systems, understanding how auditors respond to emerging innovations such as blockchain is increasingly important for the future development of the auditing profession.

The findings reveal that auditors' awareness of blockchain technologies significantly enhances their technological understanding, highlighting the importance of exposure and professional

education in developing digital competencies among audit professionals. At the same time, the study shows that greater technological understanding does not necessarily translate into stronger perceptions of relevance. Instead, auditors with deeper knowledge of blockchain appear to adopt a more cautious perspective regarding its immediate applicability within existing audit frameworks. This suggests that professional familiarity with blockchain may reveal both its potential benefits and its practical implementation challenges. The results also demonstrate that auditors' technological understanding is positively associated with perceptions of organizational readiness and institutional support. This indicates that technological competence among auditors plays an important role in shaping the perceived capacity of organizations to adopt blockchain-enabled audit systems. Furthermore, the moderating effect of organizational readiness suggests that institutional support mechanisms such as training programs and technological infrastructure can significantly influence how auditors develop their understanding of emerging technologies.

The findings suggest that while blockchain technologies are widely recognized as having the potential to improve transparency, data integrity, and audit efficiency, the auditing profession remains in an early stage of adapting to these innovations. Successful integration of blockchain into audit practice will therefore depend not only on technological advancement but also on the development of professional competencies and institutional readiness within audit organizations.

This study contributes to the literature by providing empirical evidence on how auditors' awareness, understanding, and organizational support interact in shaping perceptions of blockchain technologies within the auditing profession. By linking these cognitive and institutional factors to established technology adoption theories, the study offers a deeper understanding of the mechanisms influencing technological transformation in auditing.

From a practical perspective, the findings highlight the need for audit firms, professional bodies, and educational institutions to strengthen training initiatives focused on emerging digital technologies. Developing auditors' technological literacy will be essential for ensuring that the profession can effectively evaluate blockchain-enabled financial systems and maintain its role in providing reliable assurance in increasingly digital financial environments.

Despite these contributions, the study has several limitations. The findings are based on a specific sample of auditors and may therefore not fully capture the perspectives of auditors operating in different regulatory or institutional environments. In addition, the cross-sectional nature of the study limits the ability to observe how perceptions of blockchain technologies may evolve over time. Future research could address these limitations by conducting longitudinal studies or comparative analyses across different countries and institutional contexts. Further research could also explore how regulatory frameworks, technological infrastructure, and

professional training initiatives influence the adoption of blockchain technologies within the auditing profession.

REFERENCES

Almgrashi, A., Mujalli, A., Khan, T., & Attia, O. (2023). Factors determining internal auditors' behavioral intention to use computer-assisted auditing techniques: an extension of the UTAUT model and an empirical study. Future Business Journal, 9(1). https://doi.org/10.1186/s43093-023-00231-2

Al-Sulami, Z. A., Ali, N., Ramli, R., & Lu, S. (2024). Towards a comprehensive understanding of blockchain technology adoption in various industries in developing and emerging economies: a systematic review. Cogent Business & Management, 11(1). https://doi.org/10.1080/23311975.2023.2294875

Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best Practices for Developing and Validating Scales for Health, Social, and Behavioral Research: A Primer. In Frontiers in Public Health (Vol. 6). Frontiers Media S.A. https://doi.org/10.3389/fpubh.2018.00149

Cai, C. W. (2021). Triple-entry accounting with blockchain: How far have we come? Accounting and Finance, 61(1), 71–93. https://doi.org/10.1111/acfi.12556

Daniel Duah, Bismark Kofi Owusu Sarfo, William Vortia, Prosper Appiah-Bediako, & Richard Owusu. (2025). Bridging the Digital Finance Gap in the United States: Analyzing the Socioeconomic and Behavioral Determinants of Cryptocurrency Adoption. Magna Scientia Advanced Research and Reviews, 15(1), 001–013. https://doi.org/10.30574/msarr.2025.15.1.0098

Duah, D., Sarfo, B. K. O., Boakye, C., & Duku, D. (2025). PHISH OR LEGIT? QUANTIFYING WEB-BASED THREAT SIGNALS THROUGH PREDICTIVE ANALYTICS AND FEATURE ATTRIBUTION. International Journal of Professional Business Review, 10(5), e05472. https://doi.org/10.26668/businessreview/2025.v10i5.5472

Gie Yong, A., & Pearce, S. (2013). A Beginner's Guide to Factor Analysis: Focusing on Exploratory Factor Analysis. In Tutorials in Quantitative Methods for Psychology (Vol. 9, Number 2).

Gkekas, N., Ireiotis, N., &Kounadeas, T. (2025). Drivers of Blockchain Adoption in Accounting and Auditing Services: Leveraging Theory of Planned Behavior with Identity and Moral Norms. Journal of Risk and Financial Management, 18(10). https://doi.org/10.3390/jrfm18100573

Ogedengbe, F. A., &Adelowotan, M. O. (2025). Revolutionising corporate governance: blockchain's transformative impact and potential. In Frontiers in Blockchain (Vol. 8). Frontiers Media SA. https://doi.org/10.3389/fbloc.2025.1654633

Omar, I. A., Jayaraman, R., Salah, K., Simsekler, M. C. E., Yaqoob, I., &Ellahham, S. (2020). Ensuring protocol compliance and data transparency in clinical trials using Blockchain smart contracts. BMC Medical Research Methodology, 20(1). https://doi.org/10.1186/s12874-020-01109-5

Saheb, S. S., Chinnapareddy, V. K. R., Devalla, D., Charugulla, S., Chakka, N. B., & Raja Sekhar, K. (2025). Factors leading to the adoption of blockchain technology in financial reporting. Frontiers in Blockchain, 8. https://doi.org/10.3389/fbloc.2025.1491609

Taherdoost, H. (2023). Smart Contracts in Blockchain Technology: A Critical Review. In Information (Switzerland) (Vol. 14, Number 2). MDPI. https://doi.org/10.3390/info14020117

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. In International journal of medical education (Vol. 2, pp. 53–55). https://doi.org/10.5116/ijme.4dfb.8dfd

Vortia, W., Duah, D., & Owusu, R. (2025). Reimagining School Leadership for Equity: A Study of Transformational Leadership Practices in Underserved Urban and Rural Schools in the United States. International Journal of Emerging Knowledge Studies, 4(6), 878–897. https://doi.org/10.70333/ijeks-04-08-016

Yeboah, E. K., Duah, D., Kobi, J., &Kokroko, B. Y. (2026). Blockchain Technology Adoption in Corporate Treasury Management Systems Across Multinational Corporations. International Journal of Innovative Science and Research Technology, 1465. https://doi.org/10.38124/ijisrt/26jan591

Yeboah, E. K., Kobi, J., Duah, D., &Kokroko, B. Y. (2026). Cryptocurrency Integration in Corporate Investment Portfolios and Associated Risk Management Strategies. International Journal of Innovative Science and Research Technology, 1533. https://doi.org/10.38124/ijisrt/26jan590