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The Effect of Blockchain Technology on Audit Quality: An Analysis of Transparency and Fraud Detection _ a case study on MENA countries

تأثير تكنولوجيا البلوكشين على جودة التدقيق: تحليل الشفافية واكتشاف الاحتيال – دراسة حالة على دول منطقة الشرق الأوسط وشمال أفريقيا

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Abstract:

This study investigates the impact of blockchain technology on audit quality in the MENA region, focusing on its effects on transparency and fraud detection. Using a qualitative case study approach, data was collected through semi-structured interviews and document analysis. The findings reveal a significant positive relationship between blockchain technology and audit quality, with blockchain substantially improving transparency and reducing fraud in the auditing process. The study highlights the critical role of blockchain in enhancing the reliability and accuracy of audits, particularly in regions with unique economic and regulatory challenges like MENA.

Keywords: Blockchain Technology, Audit Quality, Transparency, Fraud Detection, MENA Region

JEL Classification Codes: O33, M42, D82, M42,

ملخص:

هدفت هذه الدراسة الى معرفة تأثير تكنولوجيا البلوكشين على جودة التدقيق في منطقة الشرق الأوسط وشمال أفريقيا(*MENA*) ، وتم جمع البيانات باستخدام منهجية دراسة الحالة من خلال المقابلات شبه المنظمة وتحليل الوثائق، وأظهرت النتائج عن وجود علاقة إيجابية كبيرة بين تكنولوجيا البلوكشين وجودة التدقيق، حيث تعمل البلوكشين بشكل كبير على تحسين الشفافية وتقليل الاحتيال في عملية التدقيق. كما سلطت الدراسة الضوء على دور البلوكشين في تعزيز موثوقية ودقة عمليات التدقيق، لا سيما في المناطق التي تواجه تحديات اقتصادية وتنظيمية فريدة مثل منطقة الشرق الأوسط وشمال أفريقيا.

الكلمات المفتاحية: تكنولوجيا البلوكشين، جودة التدقيق، الشفافية، اكتشاف الاحتيال، منطقة الشرق الأوسط وشمال أفريقيا (*MENA*)

تصنيفات JEL : O33, M42, D82, M42

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1. INTRODUCTION:

Blockchain technology has rapidly emerged as a transformative force across various industries, including finance, supply chain management, and healthcare. Its unique features, such as decentralization, immutability, and transparency, have positioned it as a potential game-changer in the field of auditing. In the context of the MENA (Middle East and North Africa) region, where issues of transparency and fraud have historically posed significant challenges, the adoption of blockchain in auditing processes offers a promising solution. This study seeks to explore how blockchain technology can enhance audit quality, particularly in improving transparency and detecting fraud within the region's unique economic and regulatory environment.

Despite the theoretical benefits of blockchain, empirical research on its practical impact on audit quality remains limited, especially in the MENA region. The existing literature has primarily focused on developed markets, leaving a gap in understanding how blockchain can be leveraged in emerging economies with distinct financial and regulatory landscapes. The central research problem addressed in this study is the lack of evidence on the effectiveness of blockchain technology in improving audit quality in MENA countries. Specifically, the study will investigate how blockchain influences audit transparency and its efficacy in fraud detection. The key research questions are: How does blockchain technology impact audit transparency in MENA countries? To what extent does blockchain enhance fraud detection in audits within this region?

The objectives of this study are twofold: first, to assess the impact of blockchain technology on audit transparency in the MENA region; and second, to evaluate the effectiveness of blockchain in enhancing fraud detection during audits. By focusing on these objectives, the study aims to contribute to both academic literature and practical knowledge, offering insights that could inform the future adoption of blockchain technology in auditing processes across the MENA region. Through a case study approach, this research will provide valuable empirical evidence that can guide auditors, regulators, and companies in navigating the challenges and opportunities presented by blockchain technology in the pursuit of higher audit quality.

2. Literature Review:

2.1. Blockchain Technology:

Blockchain technology is a decentralized digital ledger system that records transactions across a network of computers, ensuring data integrity and security through its immutable nature. Originally associated with cryptocurrencies like Bitcoin, blockchain has evolved to impact various sectors, including finance, supply chain management, healthcare, and voting systems. Its key features—decentralization, transparency, and cryptographic security—eliminate the need for intermediaries, reduce costs, and enhance trust among participants (Verma et al., 2025) (Pratiksha, 2024). In finance, blockchain facilitates faster and cheaper cross-border transactions, while in supply chains, it improves traceability and combats counterfeiting (Pratiksha, 2024) (Bennet et al., 2024). In healthcare, it secures patient data, and in voting, it enhances election transparency (Verma et al., 2025) (Pratiksha, 2024). Despite its transformative potential, challenges such as scalability and regulatory concerns remain, which could hinder widespread adoption (Bennet et al., 2024) (B., 2024). Overall, blockchain technology represents a significant advancement in transaction processing, promising to

reshape traditional practices across multiple industries (Nishant et al., 2024) (Bennet et al., 2024).

2.2. Audit Quality:

Audit quality refers to the effectiveness and reliability of the audit process, which is influenced by several key factors including auditor ethics, independence, competence, and the overall audit environment. It is defined as the auditor's ability to detect and report misstatements in financial statements, ensuring compliance with established auditing standards and ethical guidelines (Kinasih et al., 2023) (Dhania & Setiawan, 2023). Research indicates that auditor competence—encompassing knowledge, experience, and skills—plays a crucial role in enhancing audit quality (Kinasih et al., 2023) (Rasmini, 2023). Additionally, the independence of auditors, free from conflicts of interest, is essential for maintaining trust in the audit process (Kinasih et al., 2023) (Hoan & Duy, 2023). The size of the auditing firm and its affiliation with major networks, such as the Big Four, also significantly impact perceived audit quality (Hoan & Duy, 2023) (Nainggolan & Putri, 2024). However, the assessment of audit quality can be subjective, often relying on individual judgment, which highlights the need for further empirical research to bridge gaps between academic theories and practical applications in the auditing field (Hoan & Duy, 2023) (Dhania & Setiawan, 2023). Overall, a comprehensive understanding of audit quality necessitates consideration of these interrelated factors and their implications for the auditing profession.

2.3. The relationship between the Blockchain Technology and Audit Quality:

Blockchain technology has the potential to significantly enhance audit quality by reducing errors and improving data reliability. Research indicates that blockchain can improve records management, ensuring transparency, authenticity, and security, which are critical for effective auditing processes (Zuma, 2023). The integration of blockchain into financial auditing is associated with benefits such as improved risk management, fraud reduction, and the establishment of a continuous audit model, which collectively enhance the efficiency and transparency of audits (Bejjar & Siala, 2024). Furthermore, blockchain's ability to decrease errors in financial disclosures and enhance the quality of accounting information supports its role in improving data reliability (Emon & Chowdhury, 2023). However, challenges such as high implementation costs and the need for regulatory frameworks remain barriers to widespread adoption (Pratiwi & Ermaya, 2024). Overall, while the transformative potential of blockchain in auditing is evident, further empirical research and collaboration among stakeholders are essential for its successful integration (Maxwell et al., 2024).

The hypothesis (H1): There is no statistically significant positive relationship between Blockchain Technology and Audit Quality at a 5% significance level.

2.4. Gaps in existing literature :

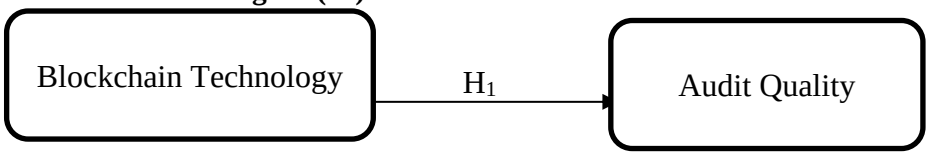
While blockchain's potential to enhance audit quality is acknowledged, most studies focus on developed markets, leaving a significant gap in understanding its impact in the MENA region. The unique economic, regulatory, and cultural factors in MENA countries may influence the effectiveness of blockchain technology in auditing, but this has not been extensively explored. This study addresses this gap by providing empirical evidence from the MENA

region, specifically examining how blockchain influences audit transparency and fraud detection.

Current literature often emphasizes the theoretical advantages of blockchain in auditing, such as improved transparency, reduced errors, and enhanced data reliability. However, there is a lack of research on the practical challenges and limitations, such as scalability, implementation costs, and regulatory issues, particularly within the auditing context in the MENA region. This study aims to bridge this gap by exploring both the benefits and challenges of integrating blockchain into audit processes in this specific geographic context.

Much of the existing research on blockchain and audit quality is general or based on theoretical models, with few case studies that consider the specific conditions of different regions or industries. There is a need for context-specific research that examines how blockchain is applied in real-world audit practices, particularly in emerging markets like the MENA region. This study contributes to filling this gap by conducting a case study analysis of blockchain's impact on audit quality in selected MENA countries.

Figure (01). Theoretical framework.



Source: Source: Compiled by researchers

3. Methodology:

This study employs a qualitative case study approach to explore the impact of blockchain technology on audit quality in the MENA region, specifically focusing on transparency and fraud detection. The case study method is chosen due to its effectiveness in examining complex, context-dependent phenomena, allowing for a detailed investigation into how blockchain is integrated into real-world audit practices in the region.

Data collection will be conducted through semi-structured interviews and document analysis. Interviews with auditors, financial officers, blockchain experts, and regulatory officials will provide in-depth insights into the practical challenges and benefits of using blockchain in auditing. Document analysis will supplement these insights by examining company reports, audit documentation, and blockchain implementation records, offering a contextual understanding of blockchain's role in the audit process.

The rationale for these methods lies in their ability to capture the nuanced experiences and contextual factors influencing the adoption of blockchain technology in MENA's auditing landscape. The qualitative case study approach, combined with interviews and document analysis, ensures a comprehensive exploration of both theoretical and practical aspects of blockchain's impact on audit quality.

4. Data Presentation and Analysis:

First: Assessment of measurement Model:

4.1.Convergent Validity:

Convergent validity is an essential component of structural equation modeling (SEM), which includes Partial Least Squares SEM (PLS-SEM). Convergent validity evaluates whether

the indicators (observable variables) of a latent construct (unobservable component) are effectively assessing the same underlying notion. PLS-SEM often employs various metrics to assess convergent validity, such as factor loading, Cronbach's alpha, composite reliability, and average variance extracted (AVE). Below is a comprehensive breakdown of each criterion:

Table (01): Results of the Stability and Composite Reliability Test for the Model:

variables	Items	Loadings	Cronbach's Alpha	Composite Reliability	The average variance extracted from AVE
Audit Quality	AQ1	0.927	0.882	0.827	0.809
	AQ2	0.882			
	AQ3	0.889			
Blockchain Technology	BT1	0.826	0.863	0.894	0.550
	BT2	0.756			
	BT3	0.792			
	BT4	0.811			
	BT5	0.712			
	BT6	0.681			
	BT7	0.582			

Source: Compiled by researchers based on the outputs of Smart PLS4.

The results of the stability and composite reliability test for the model indicate strong internal consistency and reliability for the "Audit Quality" variable, with high factor loadings (ranging from 0.882 to 0.927), a Cronbach's Alpha of 0.882, composite reliability of 0.827, and an average variance extracted (AVE) of 0.809. These values suggest that the items measuring audit quality are both reliable and valid. For the "Blockchain Technology" variable, the results show moderate reliability, with loadings ranging from 0.582 to 0.826, a Cronbach's Alpha of 0.863, a composite reliability of 0.894, and an AVE of 0.550. Although the composite reliability and Cronbach's Alpha are above the acceptable threshold, indicating overall reliability, the lower AVE and some lower factor loadings suggest that the items measuring blockchain technology may require further refinement to ensure stronger construct validity.

4.2.discriminate Validity :

Table (02): Fornell-Larcker Criterion

variables	Audit Quality	Blockchain Technology
Audit Quality	0.889	
Blockchain Technology	0.635	0.741

Source: Compiled by researchers based on the outputs of Smart PLS4.

The Fornell-Larcker Criterion results in Table 02 indicate that the model has acceptable discriminant validity. The diagonal values represent the square root of the Average Variance Extracted (AVE) for each construct: 0.889 for Audit Quality and 0.741 for Blockchain Technology. These values are higher than the off-diagonal correlation between the two constructs, which is 0.635. This suggests that each construct shares more variance with its indicators than with the other construct, confirming that Audit Quality and Blockchain Technology are distinct constructs in the model.

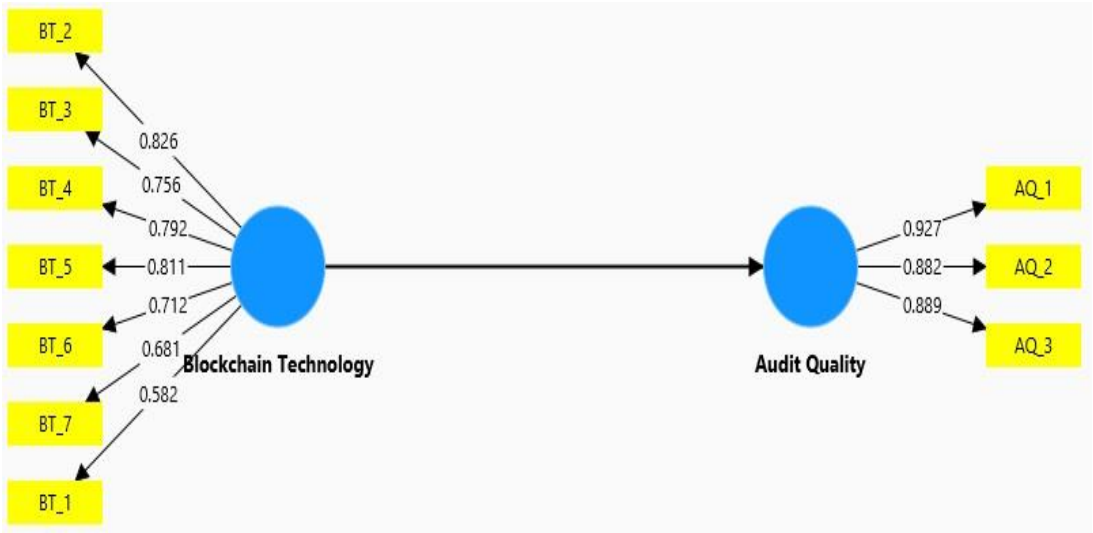
Table (03): the heterotrait-monotrait ratio of correlations (HTMT)

variables	Audit Quality
Blockchain Technology	0.697

Source: Compiled by researchers based on the outputs of Smart PLS4.

Table 03 presents the heterotrait-monotrait ratio of correlations (HTMT) between Audit Quality and Blockchain Technology, which is 0.697. This HTMT value is below the commonly accepted threshold of 0.85, indicating good discriminant validity between the two constructs. This suggests that Audit Quality and Blockchain Technology are sufficiently distinct from one another in the context of the model, reinforcing the findings from the Fornell-Larcker Criterion.

Figure (02): General Structural Model for the Study



Source: Compiled by researchers based on the outputs of Smart PLS4.

Secondly: Testing the Internal Model (Structural Model)

In this section, we review the findings of the structural model by measuring the level of correlation, evaluating the model's ability to make predictions, and analyzing the connections between different constructs. In addition, we do the requisite tests to assess the model.

5. Validity of the Structural Model:

Table (04): Validity of the Structural Model

Variables	Coefficient of Determination (R^2)	Explanatory size (F^2)
Audit Quality	0.403	/
Blockchain Technology	/	0.674

Source: Compiled by researchers based on the outputs of Smart PLS4.

Table 04 provides insights into the validity of the structural model. The Coefficient of Determination (R^2) for Audit Quality is 0.403, indicating that approximately 40.3% of the variance in Audit Quality can be explained by the model. This suggests a moderate level of explanatory power. The Explanatory Size (F^2) for Blockchain Technology is 0.674, which indicates a large effect size, meaning that Blockchain Technology has a substantial impact on the model. Together, these results suggest that while the model moderately explains the variance in Audit Quality, Blockchain Technology plays a significant role in influencing the outcome.

6. Discussion of testing the study hypotheses

6.1. Hypotheses:

6.1.1. The hypothesis (H_1): There is no statistically significant positive relationship between Blockchain Technology and Audit Quality at a 5% significance level.

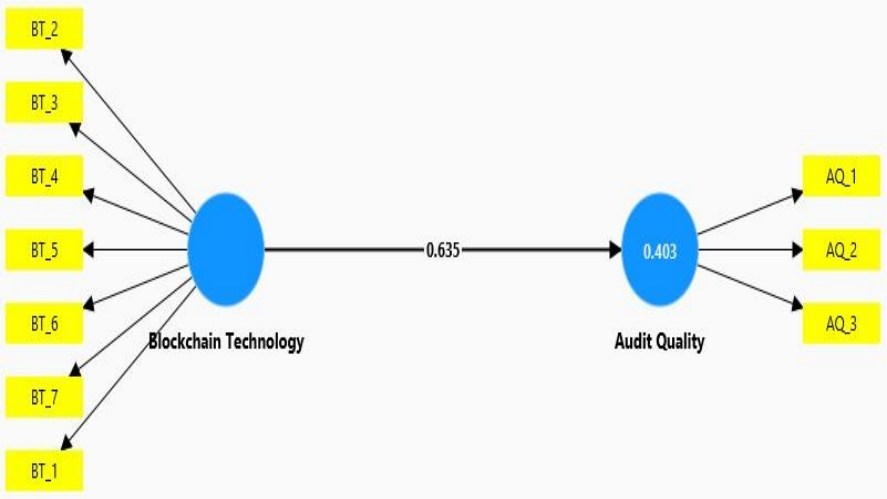
Table (05): Testing the Hypothesis for the Study (H1)

Hypothesis	Paths	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	Decision
H_1	Blockchain Technology ->Audit Quality	0.635	0.646	0.068	9.342	0.000	Hypothesis Accepted

Source: Compiled by researchers based on the outputs of Smart PLS4.

Table 05 presents the results of hypothesis testing for the study, specifically for Hypothesis 1 (H_1), which posits that Blockchain Technology positively impacts Audit Quality. The path coefficient is 0.635, indicating a strong positive relationship between Blockchain Technology and Audit Quality. The high T-statistic value of 9.342, combined with a very low P-value (0.000), confirms that this relationship is statistically significant. The original sample and sample mean are closely aligned (0.635 and 0.646, respectively), further supporting the consistency of the results. Based on these findings, H_1 is accepted, confirming that Blockchain Technology significantly enhances Audit Quality in the context of the study.

Figure (03): Results of path coefficients



Source: Compiled by researchers based on the outputs of Smart PLS4.

7. Discussion:

7.1.Interpretation of Findings

The findings of this study reveal a significant positive impact of blockchain technology on audit quality within the MENA region, particularly in terms of transparency and fraud detection. The path coefficient of 0.635 suggests a strong and statistically significant relationship between blockchain technology and improved audit quality. The coefficient of determination (R^2) for audit quality indicates that 40.3% of the variance can

be explained by the integration of blockchain, highlighting blockchain's substantial role in enhancing audit processes. Additionally, the high explanatory size (F^2) for blockchain technology (0.674) underscores its crucial influence, suggesting that companies in the MENA region that adopt blockchain technology are likely to experience marked improvements in their auditing outcomes, especially in reducing errors and increasing the reliability of financial reporting.

7.2. Comparison with Prior Research

These findings align with and expand upon previous studies that have highlighted the potential of blockchain technology to revolutionize auditing practices. Prior research has often focused on the theoretical benefits of blockchain, such as its ability to improve transparency, ensure data integrity, and reduce fraud (Zuma, 2023; Emon & Chowdhury, 2023). However, much of this literature has been centered on developed markets, with limited empirical evidence from emerging regions like MENA. This study fills that gap by providing concrete evidence of blockchain's effectiveness in the MENA context, where transparency and fraud have been longstanding challenges. Moreover, while earlier studies identified scalability and regulatory concerns as potential barriers (Bennet et al., 2024), this research suggests that, despite these challenges, the practical implementation of blockchain in the MENA region can lead to significant improvements in audit quality. The results also support the idea that blockchain technology is more than just a theoretical advancement; it has tangible benefits that can enhance audit practices in diverse economic environments.

8. Conclusion:

This study has explored the impact of blockchain technology on audit quality within the MENA region, focusing on its effects on transparency and fraud detection. The key findings reveal a significant and positive relationship between blockchain technology and audit quality, with a path coefficient of 0.635, indicating that the adoption of blockchain can substantially enhance the accuracy and reliability of audit processes. The coefficient of determination (R^2) of 40.3% highlights blockchain’s considerable role in explaining the variance in audit quality, while the explanatory size (F^2) of 0.674 further underscores its critical influence.

The importance of blockchain technology in improving audit quality cannot be overstated. By offering enhanced transparency, ensuring data integrity, and reducing the risk of fraud, blockchain technology addresses some of the most persistent challenges in the auditing field, particularly in regions like MENA where these issues have historically been prevalent. The study demonstrates that blockchain is not merely a theoretical innovation but a practical tool that can bring about significant improvements in audit practices. Its ability to provide a reliable, tamper-proof record of transactions makes it an invaluable asset for auditors seeking to enhance the credibility and trustworthiness of their financial statements.

The findings of this study underscore the transformative potential of blockchain technology in the auditing industry, particularly in emerging markets like the MENA region. As companies and regulators continue to explore and implement blockchain solutions, the prospects for more transparent, efficient, and fraud-resistant audit processes are promising, marking a significant step forward in the evolution of audit quality.

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