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The Role of Blockchain in Enhancing Internal Auditing Quality: An Exploratory Study of the Opinions of a Sample of Accountants and Auditors in Industrial Companies

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Abstract: The research aims to identify the correlation and impact between blockchain technology (independent variable) and internal audit quality (dependent variable) by surveying the opinions of accountants in a number of industrial companies. To achieve this objective, a questionnaire was adopted and distributed to a random sample of 39 auditors in industrial companies. A total of 34 questionnaires were retrieved, of which 3 were found invalid for analysis, resulting in 31 valid responses. The research relied on the descriptive analytical method to test the research hypotheses and reach the conclusions.

The study reached several key findings, the most prominent of which is that blockchain technology enhances the quality of internal auditing by improving data accuracy and increasing stakeholders' confidence in financial records, which leads to enhancing internal audit quality and promoting transparency. The research also presented a set of recommendations, the most important of which is the necessity of adopting blockchain technology to help address and overcome work challenges, enabling auditors to effectively deal with the various difficulties and circumstances they may face in performing their duties through the implementation of blockchain related indicators.

Keywords: Blockchain, Internal Audit Quality.

دور تقنية البلوكتشين في تعزيز جودة التدقيق الداخلي: دراسة استطلاعية لآراء عينة من المحاسبين والمدققين في الشركات الصناعية

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المستخلص: يهدف هذا البحث إلى تحليل طبيعة العلاقة وتأثير تقنية البلوكتشين (المتغير المستقل) في جودة التدقيق الداخلي (المتغير التابع)، وذلك من خلال استقصاء آراء عينة من المحاسبين والمدققين العاملين في عدد من الشركات الصناعية. ولتحقيق أهداف البحث، تم إعداد استبانة وتوزيعها على عينة عشوائية بلغت (39) مدققاً، وقد تم استرجاع (34) استبانة، تبين أن (3) منها غير صالحة للتحليل الإحصائي، ليكون عدد الاستبانات المعتمدة في التحليل (31) استبانة. وقد اعتمد البحث المنهج الوصفي التحليلي في اختبار فرضياته والتوصل إلى النتائج.

وتوصلت الدراسة إلى مجموعة من النتائج المهمة، من أبرزها أن تقنية البلوكشين تسهم بشكل ملموس في تحسين جودة التدقيق الداخلي من خلال رفع مستوى دقة البيانات وتعزيز ثقة أصحاب المصلحة بالمعلومات والسجلات المالية، الأمر الذي يؤدي إلى تقوية الوظيفة التدقيقية وزيادة مستوى الشفافية. كما خلص البحث إلى عدة توصيات، أهمها ضرورة تبني تقنية البلوكشين في بيئات العمل التدقيقي لما لها من دور فاعل في مواجهة التحديات المهنية، وتمكين المدققين من التعامل بكفاءة أعلى مع مختلف الظروف والصعوبات التي قد تواجههم أثناء أداء مهامهم، وذلك عبر تطبيق المؤشرات المرتبطة بتقنية البلوكشين.

الكلمات المفتاحية: تقنية البلوكشين، جودة التدقيق الداخلي.

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Introduction

The world has witnessed significant developments in modern technologies, including blockchain which is one of the most important innovations. Blockchain functions by linking a sequence of blocks; each encrypted and connected to the previous one, ensuring data integrity and transparency. This research aims to highlight the role of blockchain technology in improving the quality of internal auditing, as it helps reduce risks, data manipulation, and enhances transparency. Consequently, auditors can review transactions more efficiently, improving the auditing process by minimizing effort and time. The first section of this study addresses the research methodology, the second section presents the theoretical framework, the third discusses the practical aspects, and the final section concludes with key findings and recommendations.

Section One: Research Methodology

1- Research Problem

The research problem lies in the attempt of industrial companies to adopt blockchain technology due to its direct impact on achieving internal auditing quality. This raises the main research question: Does blockchain technology contribute to achieving the quality of internal auditing among accountants and auditors in industrial companies?

2- Research Importance

The importance of this research can be summarized as follows:

- A. the study integrates two distinct topics, blockchain technology and internal auditing quality, to derive new insights.
- B. It clarifies the importance of blockchain technology in auditing activities and its impact on improving audit quality.
- C. The findings serve as guidance for industrial companies seeking to adopt blockchain as a tool to achieve audit quality.

3- Research Objectives

In light of the identified research problem, the objectives of the research are as follows:

- A. To determine the extent to which blockchain technology contributes to enhancing internal auditing quality.
- B. To explore the theoretical framework of both blockchain technology and internal auditing quality.
- C. To identify the relationship between blockchain technology and audit quality among accountants and auditors in the surveyed organizations.

4- Research Hypotheses and Hypothetical Model

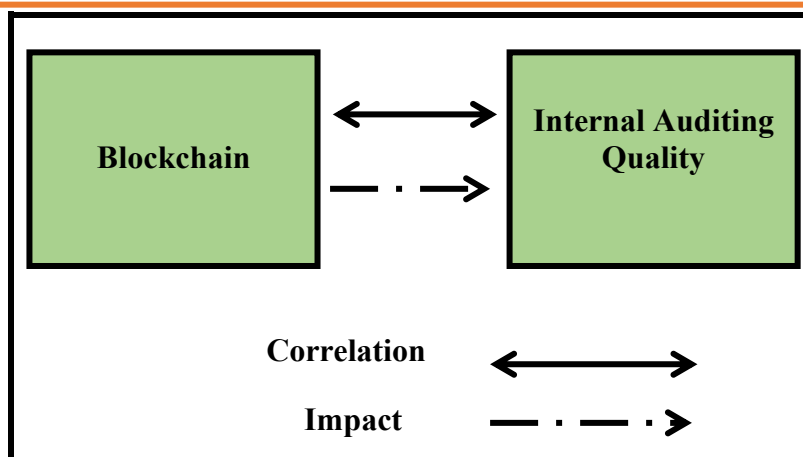


Figure (1): the Hypothetical Model

Source: prepared by the researcher

- **H1:** Blockchain technology is defined according to the responses of the surveyed participants across the industrial companies.
- **H2:** Internal auditing quality is defined according to the responses of the surveyed participants across the industrial companies.
- **H3:** There is a statistically significant correlation between blockchain technology and internal auditing quality.
- **H4:** Blockchain technology has a statistically significant impact on internal auditing quality.

5- Research Method

Given the nature of the studied subject, the researcher adopted a combination of methods to obtain accurate and valid results:

- Descriptive Method: Using Arabic and foreign literature related to the topic.
- Inductive Method: Employing a questionnaire to test the hypotheses and analyze relationships among variables.
- Analytical Method: Processing and analyzing collected data using statistical tools.

6- Data Collection Method

Data were collected using a specially designed questionnaire reviewed by expert evaluators to ensure relevance and accuracy. The questionnaire consists of three sections: (1) demographic data, (2) blockchain technology, and (3) internal auditing quality. A five-point Likert scale (1–5) was used to measure responses. Statistical analysis was conducted using SPSS (version 26).

Section Two: Theoretical Framework

1- Blockchain Technology

A. The Concept of Blockchain Technology

Blockchain is a distributed, decentralized, transparent, and chronologically ordered database. It divides transactions into blocks, each dependent on the previous one. Each node in the network must reach consensus before adding a new block, ensuring legitimacy and authenticity (Inghirami, 2020, p.107). Blockchain serves as a trusted information system that minimizes time, cost, and risk in financial dealings (Brandon, 2016, p.34). According to Dai and Vasarhelyi (2017, p.5), blockchain is a public, decentralized ledger providing a secure infrastructure for transactions between unacquainted parties without a central authority. Fullana (2021, p.66) defines it as a chain of encrypted, interlinked data records allowing decentralized management of transaction histories. Blockchain technology operates by inserting information into a block that is linked to a preceding block within the chain. The consecutive sequence of these blocks ensures both security and traceability, preventing any modification or alteration of stored data. This is achieved through a

protective mechanism known as Proof of Work (POW) which restricts additions or deletions beyond a certain point, thereby making manipulation of the chain highly improbable.

Consistent with the above, blockchain can be defined as a set of interlinked records that are cryptographically connected, sequentially structured, and distributed across the various nodes forming the network. This system relies on several computing technologies, such as distributed ledgers, peer-to-peer (P2P) networking, and encryption algorithms, which collectively ensure its integrity, transparency, and reliability.

B. Evolution of Blockchain Technology

(Al-Saqa & Mahmood, 2019, p. 63; Abdul Hassan et al., 2025, p. 135)

The concept of blockchain emerged in 1999 to address timestamp verification for digital content. In 2009, Satoshi Nakamoto introduced Bitcoin, marking the first use of blockchain for digital currency transactions. Its evolution can be categorized into three generations: The development of blockchain technology can be viewed through three main stages, often referred to as generations of the technology, with each generation marking a qualitative shift in its capabilities and applications.

First Generation: This stage focused on financial transfers, such as salary payments and cross-border remittances, using digital currencies or electronic transfers. The applications were limited to simple and direct financial transactions.

Second Generation: This phase witnessed the emergence of blockchain technology in the form of smart contracts, which are more complex than digital currencies. These contracts represent a variety of financial instruments such as stocks, bonds, real estate mortgages, futures contracts, and smart assets. During this generation, the concept of decentralized interaction among different parties emerged, including clearinghouses, banks, and corporations. Moreover, new services appeared such as peer-to-peer (P2P) lending, crowd funding platforms, stock prediction systems, and automated smart contracting systems that execute transactions, issue invoices, and document them autonomously.

Third Generation: This stage marks the expansion of blockchain applications beyond financial markets to encompass broader economic and social activities, including art, healthcare, governance, education, public goods, culture, and communication. The most promising application of blockchain technology in this generation lies in smart cities and the Internet of Things (IoT), which have become new platforms for e-business. These applications embody concepts such as smart governance, smart mobility, smart living, and intelligent use of natural resources, smart urbanization, and smart economy.

C. Benefits of Blockchain Technology

The main benefits of blockchain include reducing trading costs, accelerating transaction settlement, minimizing fraud risks, enhancing auditability, and increasing control effectiveness. It strengthens transparency, cooperation, and productivity within business organizations.

(Dai & Vasarhelyi, 2017, p.5).

2- Internal Auditing Quality

A. Concept of Internal Auditing Quality

Recent years have seen growing global attention toward enhancing the professional performance of auditors to achieve high-quality auditing. This emphasis emerged following major corporate collapses and financial crises. According to Al-Fadhli and Al-Amiri (2025, p.145), auditors' competence, independence, and objectivity are key determinants of audit quality. The Institute of Internal Auditors (2009) identified four essential components for maintaining audit quality: adherence to ethical standards, compliance with auditing standards, continuous professional development, and ongoing improvement (Jasim, 2025, p.402).

When internal auditors possess the professional competence to detect material errors during the execution of their audit tasks, while maintaining sufficient independence, they gain the

effectiveness necessary to correct these errors and report their findings efficiently. Accordingly, one of the key pillars of audit quality lies in the auditor's competence, qualification, independence, and objectivity when identifying undesirable or improper practices. This enables them to take proactive measures and minimize such occurrences within specialized internal frameworks that are appropriate to the organization's policies and regulatory procedures (Djaddang & Lysandra, 2022: 405).

Internal audit quality has generally been defined from two perspectives. First, the auditor identifies a breach in the client's financial reporting and accounting system. Second, the auditor must independently report the detected violation to the users of financial information (Farhan & Al-Hashimi, 2025: 262). The researcher believes that internal audit quality is an essential element in ensuring the effectiveness of internal control and in providing objective assurances regarding risk management and compliance with policies and procedures.

B. Importance of Internal Auditing Quality

High-quality internal auditing ensures adherence to professional standards, narrows the audit expectation gap, enhances fraud detection, reduces agency conflicts, supports competitive performance, increases transparency, and adds value to the organization (Al-Saray et al., 2023, p.583; Al-Fadhli & Al-Amiri, 2025, p.146).

C. Objectives of Internal Auditing Quality

The objective of increasing audit quality is as follows (Sahib and Ibrahim, 2024, p.275):

- (1) Ensuring a high level of internal audit performance by improving business results and quality.
- (2) Ensuring that internal audit work is carried out more efficiently and effectively and at a lower cost, saving time and reducing expenses.
- (3) Enhancing internal audit's ability to perform its duties while maintaining a high degree of integrity.
- (4) Enhancing internal audit's credibility and enhancing the department's reputation internally and externally.
- (5) Improving training on internal audit skills, in addition to identifying additional training needs to develop the skills of the internal audit team.
- (6) Salih et al. (2025, p.404) add that increasing audit quality also supports internal control implementation and evaluation and adds value to the company.

Section Three: The Empirical Aspect

1- Description and Diagnosis of the Blockchain Technology Variable at the Level of the Surveyed Industrial Companies

The data presented in Table (1) indicate a general consensus among the respondents regarding the blockchain technology variable. The overall agreement rate reached 79.58%, with a mean score of 4.07, a standard deviation of 0.92, a response rate of 81.42%, and a coefficient of variation of 22.87. It is worth noting that this dimension covered a set of sub-items ranging from (X1) to (X9), with the highest contribution recorded for item (X9), which states that "Blockchain facilitates the verification of transactions and financial records in organizations without the need for a third party." The overall agreement rate for this item was 87.10%, indicating that blockchain technology significantly simplifies the process of verifying transactions within the financial records of industrial companies, eliminating the need for third-party verification. This, in turn, enhances transparency, efficiency, and security within organizational operations.

Table (1): Description of the Blockchain Technology Variable

Response scale																	
Block chain technology	Q	Strongly agree		Agree		Neutral		disagree		Strongly disagree		AM	SD	CV%	RR%		
		T	%	T	%	T	%	T	%	T	%						
	X1	14	45.2	12	38.7	3	9.7	1	3.2	1	4.19	4.19	0.98	23.39	83.80		
	X2	11	35.5	5	16.1	8	25.8	6	19.4	1	3.61	3.61	1.26	34.90	72.20		
	X3	15	48.4	11	35.5	5	16.1	0	0	0	4.32	4.32	0.75	17.36	86.40		
	X4	9	29	16	51.6	3	9.7	2	6.5	1	3.97	3.97	0.98	24.69	79.40		
	X5	7	22.6	18	58.1	4	12.9	2	6.5	0	3.95	3.95	0.80	20.25	79		
	X6	16	51.6	11	35.5	2	6.5	2	6.5	0	4.32	4.32	0.87	20.14	86.40		
	X7	9	29	16	51.6	3	9.7	2	6.5	1	3.97	3.97	0.98	24.69	79.40		
	X8	7	22.6	18	58.1	4	12.9	2	6.5	0	3.96	3.96	0.80	20.20	79.20		
	X9	17	54.8	10	32.3	2	6.5	2	6.5	0	4.35	4.35	0.88	20.23	87		
	GA	37.63		41.94		6.80				1.42							
	GA for each dimension	79.58				12.20				8.22				4.07	0.92	22.87	81.42

AM= Arithmetic Mean SD= Standard Deviation CV= Coefficient of Variance
RR= response rate GA = general average

Source: prepared by the researcher based on statistical analysis using spss26

Based on the above results of the analysis and diagnosis of the blockchain technology variable, which confirmed its presence in the surveyed companies at varying levels, the first main research hypothesis can be accepted. This hypothesis asserts that the surveyed companies possess the items representing blockchain technology.

2- Description and Diagnosis of the Internal auditing quality Variable at the Level of the Surveyed Industrial Companies

The data presented in Table (2) indicate a general consensus among the respondents regarding the internal auditing quality variable. The overall agreement rate reached 82.41%, with a mean score of 4.16, a standard deviation of 0.89, a response rate of 83.11%, and a coefficient of variation of 21.75. This dimension covered a set of sub-items ranging from (Y1) to (Y9), with the highest contribution recorded for item (Y7), which emphasized that “Internal auditing quality maintains a balance between providing advisory services and preserving independence and objectivity.” The overall agreement rate for this item was 96.80%, confirming that internal auditing in these organizations balances between offering consultancy and ensuring independence and objectivity, thereby supporting sound decision-making.

Table (2): Description of the internal Auditing Quality Variable

Response scale															
Q	Strongly agree		Agree		Neutral		disagree		Strongly disagree		AM	SD	CV%	RR%	
	T	%	T	%	T	%	T	%	T	%					
Internal auditing quality	y1	10	32.3	15	48.4	3	9.7	2	6.5	1	3.2	4	1	25	80
	y2	7	22.6	18	58.1	4	12.9	2	6.5	0	0	3.96	0.80	20.20	79.20
	y3	17	54.8	10	32.3	2	6.5	2	6.5	0	0	4.35	0.88	20.23	87
	y4	14	45.2	12	38.7	3	9.7	1	3.2	1	3.2	4.19	0.98	23.39	83.80
	y5	10	32.3	6	19.4	8	25.8	6	19.4	1	3.2	3.58	1.23	34.36	71.60
	y6	15	48.4	11	35.5	5	16.6	0	0	0	0	4.32	0.75	17.36	86.40
	y7	7	22.6	23	74.2	1	3.2	0	0	0	0	4.19	0.48	11.46	83.80
	y8	27	87.1	2	6.5	0	0	1	3.2	1	3.2	4.71	0.90	19.11	94.20
	y9	12	38.7	14	45.2	2	6.5	2	6.5	1	3.2	4.1	1.01	24.63	82

GA	42.60	39.81	5.71	1.78				
GA for each dimension	82.41	10.10	7.49	4.16	0.89	21.75	83.11	

AM= Arithmetic Mean SD= Standard Deviation CV = coefficient of variance
RR= response rate GA = general average

Source: prepared by the researcher based on statistical analysis using spss26

Based on the above results of the analysis and diagnosis of the internal auditing quality variable, which confirmed its presence in the surveyed industrial companies at varying levels, the second main research hypothesis can be accepted. This hypothesis asserts that the surveyed companies possess the items representing internal auditing quality.

3- Testing the Nature of the Correlation between the Two Research Variables

This analysis aims to examine the correlation between the two research variables, namely blockchain technology and internal auditing quality, using the Pearson correlation coefficient. The purpose of this analysis is to test the third main research hypothesis, which posits the existence of a statistically significant correlation between blockchain technology and internal auditing quality at the level of the surveyed industrial companies.

Following the data presented in Table (3), a statistically significant correlation between the two variables is evident, with a correlation coefficient of 0.90 at a significance level of 0.05. These results indicate both the significance and strength of the relationship between the two variables, supporting the acceptance of the third main hypothesis. This confirms that blockchain technology has the capability to explain and predict internal auditing quality.

Table (3): Correlation Results between Blockchain Technology and Internal auditing quality

Dependent variable	Independent variable	Blockchain Technology	Sig
Internal auditing quality		0.90**	0.000

Source: prepared by the researcher based on spss26 **P ≤ 0.05 n=31

4- Testing the Nature of the Impact between the Two Research Variables

This analysis examines the impact of blockchain technology on internal auditing quality, addressing the fourth main research hypothesis, which posits the existence of a statistically significant impact of blockchain technology on internal auditing quality at the level of the surveyed industrial companies.

As shown in Table (4), blockchain technology has a significant impact on internal auditing quality, with a significance level of 0.000, which is lower than the study's default significance level of 0.05. The blockchain technology variable explains 82 percent of the total variance in internal auditing quality in the surveyed industrial companies, as indicated by the coefficient of determination ($R^2 = 0.82$). The significance of this impact is further supported by the calculated F value of 136.15, which exceeds the tabulated value of 3.31 at a degree of freedom (1. 29) and a significance level of 0.05.

The remaining 18 percent of the variance is attributed to other variables that are uncontrollable or not included in the study framework. The regression coefficient (Beta) was 0.90, with a t value of 11.66, exceeding the tabulated value of 1.68 at a significance level of 0.05. These results indicate that a one-unit change in blockchain technology leads to a 0.90-unit change in internal auditing quality in the surveyed industrial companies.

These findings support the acceptance of the fourth main research hypothesis, confirming the statistically significant impact of blockchain technology on internal auditing quality at the level of the surveyed industrial companies. Based on these results, it can be noted that the quality of internal auditing is largely derived from the adoption of blockchain technology indicators by the surveyed industrial companies.

Table (4): Impact of Blockchain Technology on Internal Auditing Quality

Independent variable Dependent variable	Analysis parameters R ²	Block chain technology					
		F		T			
		calculated	tabulated	B	B0	calculated	tabulated
Internal auditing quality	0.82	**136.15	3.31	0.85	0.90	**11.66	1.68

Source: prepared by the researcher based on spss26 **P ≤ 0.05 n=31 df=1.29 n=31

Section Four: Conclusions and Recommendations

Conclusions

The study reached the following key conclusions:

1. The researcher concluded that commitment to implementing blockchain technology limits financial statements manipulation and contributes to achieving honest financial statements, thereby enhancing internal auditing quality.
2. Blockchain technology enhances internal auditing quality by improving data accuracy and increasing stakeholders' confidence in financial records, which improves audit quality and transparency.
3. The study results showed that blockchain technology has a significant and positive impact on internal auditing quality in the surveyed industrial companies.
4. The study revealed a correlation between blockchain technology and internal auditing quality at the level of the surveyed industrial companies, with the correlation extending to link blockchain technology indicators with internal auditing quality.
5. The results indicated that the majority of the sample in the surveyed industrial companies generally support the existence of both a correlation and a significant impact between blockchain technology and internal auditing quality, as evidenced by the statistical tests.

Recommendations

Based on the above conclusions, the study recommends the following:

1. Enhancing the ability to achieve high internal auditing quality in companies, particularly the surveyed ones, by adopting indicators that reflect blockchain technology.
2. Providing continuous training for auditors to deepen awareness of the importance of blockchain technology, creating a dynamic and flexible organizational environment capable of responding to external changes accompanied by high uncertainty. Proper application of international accounting standards and adherence to a consistent accounting policy also improves internal auditing quality.
3. Emphasize the critical role of the audit committee in improving internal auditing quality by increasing its membership and the number of meetings.
4. Ensure that blockchain technology is leveraged to address and solve operational challenges, enabling auditors to handle diverse circumstances effectively through adoption of blockchain indicators.
5. Conduct future studies to examine the impact of blockchain technology on internal auditing quality across various sectors, including the financial sector, not limited to the industrial sector as in this study.

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