

Blockchain adoption in financial auditing: A global perspective on the top public companies worldwide

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Abstract: The persistent risks of data manipulation and operational inefficiencies within traditional, centralized audit systems pose a significant threat to the integrity of financial reporting. This study examines how the adoption of blockchain technology can address these limitations by improving three critical aspects of the audit process. Through a comprehensive empirical analysis, we demonstrate that blockchain integration significantly enhances audit quality by providing an immutable, transparent, and auditable ledger that mitigates the risk of human error and fraudulent activity. The automation of data collection and near-instantaneous verification simultaneously contribute to greater audit timeliness. Furthermore, the verifiable and cryptographic nature of blockchain-supported records establishes a trusted, single source of truth, which improves the quality of reported earnings by minimizing estimation bias and earnings management. These findings establish a clear case for blockchain as a foundational technology in modern auditing. This study offers crucial insights into how blockchain can benefit auditors and regulators, laying the groundwork for more robust and sustainable financial reporting practices.

Keywords: Blockchain, Financial audit, Audit quality, Audit timeline, Earnings quality.

1. Introduction

Financial auditing plays a critical and indispensable role in maintaining the accuracy, reliability, and fairness of an organization's financial statements. Through systematic examination and verification of financial records, auditing not only ensures compliance with applicable accounting standards and regulations but also serves as a safeguard for stakeholders. The assurance provided by auditing is fundamental in sustaining stakeholder trust and upholding confidence in the integrity of the broader financial system.

However, conventional auditing practices often encounter substantial limitations [1]. These include an overreliance on manual and time-consuming procedures, which can lead to inefficiencies, inconsistencies, and bottlenecks in audit execution [2]. Furthermore, the opacity in how financial data is collected, stored, and processed reduces overall transparency, making it difficult for auditors to trace transactions or detect irregularities in real time [3]. The dependence on human judgment further increases the risk of oversight, errors, or even fraudulent manipulation, all of which may undermine the accuracy and reliability of audit outcomes. In extreme cases, undetected misstatements or fraudulent activities can lead to significant financial losses, legal exposure, and reputational damage for the audited entity, shareholders, and may also ripple throughout the financial ecosystem [4] highlighting the urgent need for innovation and modernization in auditing practices to ensure continued relevance and resilience in a rapidly evolving economic landscape.

Blockchain technology offers a transformative solution to the limitations of traditional auditing by enhancing transparency, accuracy, and trust in financial transactions through its decentralized and immutable structure. By recording transactions in a secure, tamper-resistant ledger, blockchain enables

full traceability and independent verification, thereby reducing the risk of fraud, manipulation, and human error [5]. Each transaction is cryptographically time-stamped and linked to the previous one, forming an auditable chain that makes unauthorized alterations highly detectable. This level of transparency provides auditors with near real-time access to financial data, streamlining audit procedures and significantly improving the reliability and efficiency of the audit process. This study explores how adopting blockchain technology can address ongoing challenges in conventional financial auditing. Blockchain technology offers enhanced security, immutability, and real-time transparency, which can substantially improve the reliability and trustworthiness of financial statements. Blockchain ensures that all recorded transactions are secure and immutable, reducing the risk of manipulation or error and ultimately increasing confidence in the accuracy of financial reporting [6].

Failure to incorporate technology in auditing can result in numerous escalating issues such as inefficient manual processes causing delays, additional costs, and errors, leading to diminished audit quality [7]. Incomplete or inaccurate data can distort financial reports, negatively impacting stakeholder decision-making and investor trust. Conventional audits are often limited in terms of the transparency and accuracy of the obtained data and manual process often results in inaccurate or incomplete data. This can create opportunities for fraud, data manipulation, or significant recording errors [1]. Furthermore, inaccurate information can result in substantial losses for the company and undermine the investor confidence necessary for its survival and development. Furthermore, without implementing more advanced technology, these problems will only continue to worsen. The fast-paced, connected business world demands efficient, accurate audit systems. If the existing system continues to rely on conventional methods, problems such as delays, errors, and inaccurate data will hinder progress even more. In the long run, this could lead to a decline in trust in conventional audit systems and, in turn, risk undermining market stability and overall corporate integrity.

Clearly, technological change and adoption in the audit process is no longer just an option, but an urgent necessity to ensure the process continues to run smoothly and provide maximum benefits to companies, investors, and all involved parties. Embracing modern technology within audits can alleviate these challenges, enhancing efficiency, precision, and overall audit quality, ultimately safeguarding investor confidence, and supporting a company's development and sustainability [8]. This study aims to investigate how implementing blockchain technology can enhance the quality of financial audits, particularly focusing on Audit Quality, Audit Timeline, and Earnings Quality. Blockchain is considered a promising alternative to conventional audit methods, addressing limitations in data integrity and information disclosure. The study will examine the Audit Quality, Audit Timeline, and Earnings Quality before and after blockchain adoption within the companies. By analyzing changes in Audit Quality, Audit Timeline, and Earnings Quality over time, the study seeks to evaluate the tangible impact of blockchain implementation. This before and after comparison will help determine whether blockchain adoption leads to measurable improvements in the reliability and timeliness of financial reporting, ultimately offering valuable insights into how technology can reshape and modernize the audit process.

2. Literature Review

2.1. Theory

Theories that can explain the adoption of blockchain in financial audits include agency theory, Technology-Organization-Environment (TOE) Framework, and institutional theory. Agency theory explains the relationship between principals (owners) and agents (management), as well as the problem of asymmetric information, which can impact decision-making and performance. In the context of auditing, blockchain technology can improve audit quality, thereby reducing potential conflicts of interest between principals and agents [9]. Based on this understanding, it can be concluded that the application of blockchain technology has the potential to strengthen the supervisory mechanism in the relationship between principals and agents. This conclusion is supported by the characteristics of

blockchain that allow real-time data recording, are permanent, and can be accessed by all interested parties.

The Technology-Organization-Environment (TOE) framework identifies three dimensions that influence technology adoption: technology, organization, and environment. In the context of blockchain, TOE can be used to analyze the technical, regulatory, and operational challenges faced in the adoption of this technology in financial auditing [10]. Audit has the potential to be a strategic tool in facilitating the adoption of blockchain technology more effectively, by mitigating technical risks, navigating complex regulations, and improving operational processes [11].

In addition to Agency theory and TOE framework, Institutional Theory can also be a basic assumption in explaining blockchain adoption in financial audit. Institutional theory emphasizes how norms, regulations, and institutional pressures affect technology adoption in organizations. In the context of blockchain, this theory can explain how regulations and industry standards affect the adoption of this technology in financial auditing [12]. Financial auditing can potentially mitigate technical, regulatory, and operational challenges by providing recommendations, evaluating systems, and increasing compliance with applicable norms, allowing for more effective and targeted adoption of blockchain technology.

2.2. Previous Studies and Hypothesis Development

The adoption of blockchain technology in various sectors has experienced rapid development, one of which is in the field of auditing, accounting, and finance. Blockchain offers a decentralized, secure, and transparent platform that increases trust and efficiency. This literature review explores the relationship between blockchain technology and audit and accounting functions, and its impact on audit quality, internal control, and risk management. This literature review incorporates findings from various studies conducted between 2020 and 2025, using diverse methodologies, ranging from empirical analysis, simulations, experiments, to literature reviews.

2.3. Blockchain and Audit Quality

Audit quality reflects the auditor's ability to identify errors or irregularities in the financial statements. The higher the detection rate of irregularities, the better the audit quality is considered in increasing the trust of users of financial statements [13]. Theory explains that the agent and principal have different interests so that supervision from outside parties such as auditors is needed to ensure that management runs the company honestly and in accordance with the interests of the owner. A quality audit is one way to reduce conflicts of interest [14]. With a blockchain system, transactions are recorded sequentially and interconnected through the hash code of the previous block. When changes occur, all copies of the data will be updated automatically and synchronously. This mechanism makes it easier for auditors to identify irregularities or indications of fraud [8].

Blockchain technology has been shown to have a positive effect on audit quality, especially in the banking sector. The study showed a significant relationship between blockchain and audit quality, with an R-value of 70.9% at a significance level below 5%. In addition, blockchain allows auditors to work more efficiently, expand audit coverage from just a sample to the entire data population, and implement a continuous audit process. These capabilities make audits not only faster, but also more thorough and strategically valuable [15]. This makes it easier for auditors to obtain reliable evidence, improve the efficiency of the audit process, and support the quality of audit results that are more accurate and reliable [16]. Therefore, the adoption of Blockchain can increase efficiency in the audit process, especially in obtaining transparent and reliable audit evidence [17].

The conflict of interest between principals and agents will decrease because auditors can more easily verify financial information independently. They can also more effectively detect errors or fraud and increase principals' confidence in the reported information. According to the TOE framework, the adoption of blockchain technology is influenced by technological readiness, internal organizational capabilities, and external pressures, such as regulations and competition. Organizations are encouraged

to adopt blockchain technology in response to normative and regulatory pressures to maintain legitimacy, follow industry best practices, and improve overall audit quality. Thus, the hypothesis of this study is as follows:

H₁: Blockchain adoption has a positive effect on audit quality.

2.4. Blockchain and Audit Timeline

The timeliness of audit reports has a close relationship with the quality and reliability of the company's financial statements. In this case, many financial reports are issued later than they should be [18]. In response to this in 2002, the SEC established rule changes to accelerate quarterly and annual reporting, which had an impact on accelerating the audit completion date. In response, auditors began to utilize new technologies, including blockchain, to adjust to the shortened audit timeline [19]. Recent studies have shown that the use of blockchain technology can speed up and simplify the audit process [20]. The application of blockchain technology in auditing has a direct impact on time efficiency, thus speeding up the overall audit timeline [21]. Blockchain can help reduce auditors' workload and make the audit process faster [22]. Blockchain can help auditors save time and develop efficiencies in their audit process. This capability has a direct impact on the speed of time and overall audit execution. With real-time access to data that has been permanently recorded and encrypted in the blockchain system, auditors can reduce reliance on time-consuming manual verification and document collection processes and potentially shorten audit timelines [15]. In the context of agency theory, blockchain will accelerate the audit timeline because it reduces information asymmetry between principals and agents because financial information can be monitored on an ongoing basis (not just at the time of reporting). Thus, the hypothesis in this study is as follows:

H₂: Blockchain adoption has a positive effect on audit timeline.

2.5. Blockchain and Earnings Quality

The concept of earnings quality varies because each user of financial statements has different views and information needs related to earnings, so the assessment of its quality is not evenly distributed [23]. As of 20% of public companies significantly utilize discretion in GAAP to intentionally present misleading earnings [24]. According to the Agency Theory perspective, the use of blockchain technology can help reduce potential conflicts between company owners and management. This happens because blockchain allows financial information to be presented openly and is difficult to manipulate. With information that is more transparent and equal for all parties, the possibility of manipulating financial statements is smaller, so the quality of the resulting profit becomes more reliable [14]. Occurring profits indicate that the company can maintain its performance consistently. Therefore, practitioners generally assess the quality of earnings from how stable and reliable the earnings are in reflecting the company's financial condition in the future [25].

Previous research has shown that implementing blockchain technology suppresses real earnings management practices in publicly listed Chinese companies. This effect is stronger when institutional investors and independent directors are involved in corporate supervision. The reduction in earnings manipulation is more pronounced in non-state-owned companies, companies in cities with advanced internet infrastructure, and companies undergoing digital transformation. These mixed findings suggest that blockchain's effect on earnings quality depends heavily on each company's situation and conditions [26]. Implementing blockchain in accounting systems helps improve the quality of financial reports by making data more transparent, difficult to manipulate, and available in real-time [27]. According to Marselita [27] this technology can also reduce recording errors and increase accountability.

Blockchain technology can reduce conflicts of interest between principals and agents because it limits the ability of agents to present misleading financial information. Using blockchain to improve earnings quality reflects an organization's response to institutional pressures, including normative and regulatory practices that are widely accepted, to maintain legitimacy and increase stakeholder trust. Thus, the hypothesis of this study is as follows:

H₃: Blockchain adoption has a positive effect on earnings quality.
 From the hypothesis above, the research framework can be illustrated as Figure 1 below.

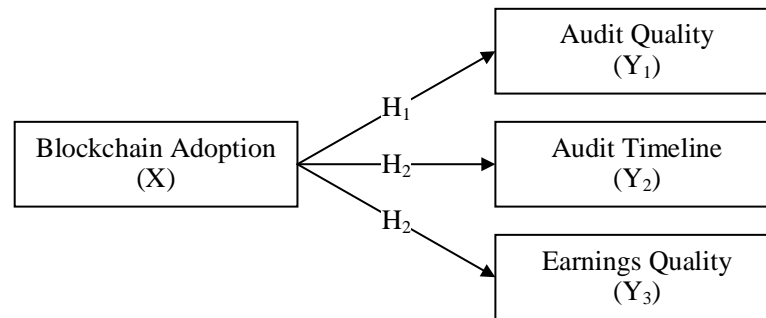


Figure 1.
 Research Framework.

3. Research Method

This study uses a mixed-methods approach, employing quantitative and qualitative methods and comparative analysis to evaluate the impact of implementing blockchain technology in financial auditing on audit quality and turnaround time, as well as earnings quality on financial statements. Comparative analysis includes both quantitative and qualitative comparison methods and is often used to identify differences and similarities between objects of study [28]. Furthermore, comparative studies aim to understand a phenomenon by unifying and comparing key elements, resulting in a deeper understanding of the relationships that exist [29].

The quantitative approach was selected to obtain objective measurements of the variables under study and to compare significant differences between companies that have adopted blockchain technology and those that have not. A qualitative approach was also used to gain deeper insights into data transparency and the challenges associated with implementing blockchain in the financial audit process. The combination of these two approaches is expected to result in a more comprehensive and balanced representation, both in terms of numerical and narrative data.

This study focuses on the top 100 public companies around the world that had public financial audit reports in 2021. Given its global scope, the study aims to provide a broader understanding of blockchain technology's application in financial auditing. The study uses a non-probability sampling method with a purposive sampling technique, which involves selecting a sample based on specific criteria according to the research objectives [30]. This technique was chosen to select companies that have not adopted blockchain; therefore, the sample must be selected based on available information, such as annual reports, official company publications, and related financial articles. We utilized data from Blockdata research in 2021, consisting of 81 companies from the top 100 public companies that have adopted blockchain technology [31]. This study conducts a comparative analysis of company performance over an eight-year timeframe, segmented into two distinct periods: the four years preceding and the four years following the adoption of blockchain technology. This approach allows us to assess the immediate impact of blockchain adoption on areas such as audit quality, audit timeline, and earnings quality.

Table 1.
Blockchain Adoption Years of Top Public Companies Worldwide (Blockdata Research).

Company	Blockchain Adoption Years
PayPal Holdings Inc	2014
Walt Disney Co	2014
Goldman Sachs Group Inc	2015
Intel Corp	2015
Royal Bank of Canada	2015
Shell PLC	2015
Visa Inc	2015
AbbVie Inc	2016
Accenture PLC	2016
AIA Group Ltd	2016
Alibaba Group Holding Ltd	2016
Alphabet Inc	2016
BHP Group Ltd	2016
Citigroup Inc	2016
Industrial and Commercial Bank of China Ltd	2016
Samsung Electronics Co Ltd	2016
Toyota Motor Corp	2016
Walmart Inc	2016
Apple Inc	2017
China Construction Bank Corp	2017
Comcast Holdings Corp	2017
Eli Lilly and Co	2017
Intuit Inc	2017
JPMorgan Chase & Co	2017
Mastercard Inc	2017
Meta Platforms Inc	2017
Microsoft Corp	2017
Oracle Corp	2017
Pfizer Inc	2017
Qualcomm Inc	2017
Tencent Holdings Ltd	2017
United Parcel Service Inc	2017
Adobe Inc	2018
Amazon.com Inc	2018
AT&T Inc	2018
China Merchants Bank Co Ltd	2018
Honeywell International Inc	2018
Kweichow Moutai Co Ltd	2018
Linde PLC	2018
Medtronic PLC	2018
Novartis AG	2018
Reliance Industries Ltd	2018
Roche Holding AG	2018
SAP SE	2018
Shopify Inc	2018
T-Mobile US Inc	2018
Union Pacific Corp	2018
UnitedHealth Group Inc	2018

Bank of America Corp	2019
Bank of China Ltd	2019
Charter Communications Inc	2019
Chevron Corp	2019
Cisco Systems Inc	2019
Coca-Cola Co	2019
Contemporary Amperex Technology Co Ltd	2019
Exxon Mobil Corp	2019
Home Depot Inc	2019
L'Oreal SA	2019
LVMH Moët Hennessy Louis Vuitton SE	2019
McDonald's Corp	2019
Merck & Co Inc	2019
Nestle SA	2019
NVIDIA Corp	2019
PepsiCo Inc	2019
Philip Morris International Inc	2019
Ping An Insurance Group Co of China Ltd	2019
Salesforce Inc	2019
Starbucks Corp	2019
Tata Consultancy Services Ltd	2019
Wells Fargo & Co	2019
Nike Inc	2020
Novo Nordisk A/S	2020
Saudi Arabian Oil Co	2020
Tesla Inc	2020
Verizon Communications Inc	2020
BlackRock Inc	2021
Hermes International SCA	2021
Johnson & Johnson	2021
Lowe's Companies Inc	2021
Moderna Inc	2021
Procter & Gamble Co	2021

The data used is secondary data obtained from LSEG Workspace (formerly Refinitiv), U.S. Securities and Exchange Commission (SEC), and various other sources in the form of external audit reports, financial report, annual reports, financial journals, and case studies of related companies. To test the first hypothesis regarding the effect of blockchain adoption on audit quality, data was collected through the identification of restatements in annual reports as a proxy for audit quality. The second hypothesis, which evaluates the effect of blockchain on audit timeline, is analyzed using information from document date (book closure date) to filing date (audit report reporting date) in financial statements available at LSEG Workspace, SEC, and various other sources. Meanwhile, the third hypothesis test regarding its impact on earnings quality was conducted using earnings quality scores available in the LSEG Workspace, which consist of Accruals, Cash Flow, Operating Efficiency, and Exclusions.

In this study, the independent variable is Blockchain Adoption (X), which focusing in assessing its potential influence on various aspects of the auditing process. The implementation of blockchain technology is examined about its transformative capabilities within audit practices. Meanwhile, the dependent variables are represented by three key performance indicators: Audit Quality (Y1), Audit Timeline (Y2), and Earnings Quality (Y3). These variables are strategically selected to reflect critical

dimensions of audit performance. Audit Quality (Y1) captures the accuracy, reliability, and integrity of audit results, Audit Timeline (Y2) measures the efficiency and speed of audit completion, and Earnings Quality (Y3) evaluates the credibility and consistency of reported financial outcomes. By analyzing the relationship between blockchain adoption and these three dependent variables, the study aims to provide empirical evidence on how emerging technologies can reshape conventional auditing practices and enhance overall financial audit.

Data analysis and hypothesis testing were conducted using Stata software to determine the influence and relationship between blockchain adoption and audit quality, audit timeliness, and earnings quality. The statistical methods used included a normality test to assess the distribution of data, descriptive statistics to provide an overview of the variables under study, as well as the F-test and t-test to test the significance of mean differences between groups. In addition, non-parametric test like Wilcoxon Signed-Rank Test were used as alternatives when the data did not meet the normality assumption [32, 33]. This approach was chosen because it can provide a more comprehensive understanding of the relationship between variables, as well as support the validity of the findings to achieve the main objectives of the study.

4. Research Finding and Discussion

4.1. Research Finding

In this study, we use the following abbreviations for the variables:

Table 2.
Variable Code.

Variable Code	Variable Name
AQB	Audit Quality Before Blockchain Adoption
AQA	Audit Quality After Blockchain Adoption
TLB	Timeline Before Blockchain Adoption
TLA	Timeline After Blockchain Adoption
EQB	Earnings Quality Before Blockchain Adoption
EQA	Earnings Quality After Blockchain Adoption

4.2. Descriptive Statistics

Table 3.
Descriptive Statistics for Audit Quality.

Audit Quality Before		Audit Quality After	
Mean	0.065	Mean	0.031
Standard Error	0.014	Standard Error	0.010
Median	0	Median	0
Mode	0	Mode	0
Standard Deviation	0.247	Standard Deviation	0.173
Sample Variance	0.061	Sample Variance	0.030
Kurtosis	10.680	Kurtosis	27.879
Skewness	3.552	Skewness	5.450
Range	1	Range	1
Minimum	0	Minimum	0
Maximum	1	Maximum	1
Sum	21	Sum	10
Count	324	Count	324
Confidence Level(95.0%)	0.027	Confidence Level(95.0%)	0.019

Table 4.
Descriptive Statistics for Audit Timeline.

Timeline Before		Timeline After	
Mean	61.679	Mean	55.009
Standard Error	2.911	Standard Error	1.467
Median	53	Median	52
Mode	53	Mode	56
Standard Deviation	50.833	Standard Deviation	26.165
Sample Variance	2584.041	Sample Variance	684.584
Kurtosis	48.208	Kurtosis	5.551
Skewness	6.119	Skewness	1.948
Range	524	Range	168
Minimum	0	Minimum	11
Maximum	524	Maximum	179
Sum	18812	Sum	17493
Count	305	Count	318
Confidence Level(95.0%)	5.728	Confidence Level(95.0%)	2.887

Table 5.
Descriptive Statistics for Earnings Quality.

Earnings Quality Before		Earnings Quality After	
Mean	67.404	Mean	65.802
Standard Error	1.405	Standard Error	1.417
Median	73	Median	70
Mode	81	Mode	94
Standard Deviation	24.610	Standard Deviation	25.462
Sample Variance	605.640	Sample Variance	648.327
Kurtosis	-0.507	Kurtosis	-0.548
Skewness	-0.665	Skewness	-0.638
Range	99	Range	98
Minimum	1	Minimum	2
Maximum	100	Maximum	100
Sum	20693	Sum	21254
Count	307	Count	323
Confidence Level(95.0%)	2.764	Confidence Level(95.0%)	2.787

Following the adoption of blockchain technology, this study observed shifts in audit quality, audit timeline, and earnings quality. Audit quality saw a decrease in its average value from 0.065 to 0.031, accompanied by a reduction in data variation, though its distribution remained non-normal. The audit timeline significantly improved, with the average audit completion time falling from 61.679 to 55.009, reflecting enhanced efficiency and reduced variability in audit durations; this data also exhibited a non-normal distribution. Meanwhile, earnings quality generally improved after blockchain adoption, with its mean increasing from 55.009 to 67.404, despite a slight increase in data variation. Unlike the other two variables, earnings quality data showed a tendency toward a more symmetrical and normal distribution. In summary, the descriptive analysis suggests that blockchain adoption may lead to a more efficient audit process and improved financial reporting, even as audit quality itself showed a decrease in this specific measurement.

4.1.1. Normality Test

Table 6.
Normality Test.

Variable	Obs.	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob > chi2
AQB	324	0.0000	0.0000	.	0.0000
AQA	324	0.0000	0.0000	.	0.0000
TLB	305	0.0000	0.0000	.	0.0000
TLA	318	0.0000	0.0000	.	0.0000
EQB	307	0.0000	0.0185	20.88	0.0000
EQA	323	0.0000	0.0068	21.90	0.0000

Based on the results of the Skewness/Kurtosis test, all variables demonstrate a significant departure from a normal distribution (p-values well below 0.05). This confirmed non-normality, coupled with the paired and ordinal nature of the data, strongly supports the application of non-parametric methods, such as the Wilcoxon Signed-Rank Test, to assess differences observed before and after blockchain adoption [32, 33].

4.1.2. Hypothesis Test

4.1.2.1. Wilcoxon Signed-Rank Test

Table 7.
Wilcoxon Signed-Rank Test for Audit Quality.

Sign	Obs.	Sum Ranks	Expected
Positive	14	4424	2686
Negative	3	948	2686
Zero	307	47278	47278
All	324	52650	52650
Unadjusted variance		2847487.50	
Adjustment for ties		-102.00	
Adjustment for zeros		-2.42e+06	
Adjusted variance		424388.00	
H ₀ : AQB = AQA			
	z =	2.668	
	Prob > z =	0.0076	

Table 8.
Wilcoxon Signed-Rank Test for Audit Timeline.

Sign	Obs.	Sum Ranks	Expected
Positive	161	31895	23017.5
Negative	109	14140	23017.5
Zero	35	630	630
All	305	46665	46665
Unadjusted variance		23760026.25	
Adjustment for ties		-6469.88	
Adjustment for zeros		-3727.50	
Adjusted variance		2365828.88	
H ₀ : TLB = TLA			
	z =	5.772	
	Prob > z =	0.0000	

A series of Wilcoxon Signed-Rank Tests were conducted to assess the impact of blockchain technology in the audit process. For audit quality, a z-value of 2.668 and a significance level of 0.0076 (below 0.05) indicate a significant difference before and after blockchain adoption, even though most data (307 out of 324 observations) showed no change. Similarly, the audit timeline test (z-value of 5.772,

p-value of 0.0000) also revealed a significant difference, with 161 observations showing an accelerated timeline post-implementation. However, the test for blockchain quantitative effectiveness (z-value of 1.341, p-value of 0.1800) found no statistically significant difference. These findings suggest that while blockchain adoption significantly impacts audit quality and audit timeline, its effect on quantitative effectiveness is not yet consistently or statistically significant. This provides a more comprehensive view of blockchain's influence on the audit process, highlighting its clearer impact on quality and time efficiency compared to its quantitative effectiveness.

Table 9.
Wilcoxon Signed-Rank Test for Earnings Quality.

Sign.	Obs.	Sum Ranks	Expected
Positive	158	25692.5	23606
Negative	138	21519.5	23606
Zero	11	66	66
All	307	47278	47278
Unadjusted variance		2422997.50	
Adjustment for ties		-650.00	
Adjustment for zeros		-126.50	
Adjusted variance		2422221.00	
Ho: EQB = EQA			
z =		1.341	
Prob > z =		0.1800	

4.2. Discussions

4.2.1. Effect of Blockchain Adoption on Audit Quality

The analysis in this study reveals that the adoption of blockchain technology significantly enhances audit quality. This result is consistent with a literature review that highlights blockchain's potential to enhance the integrity and dependability of audit processes. For instance, a study on auditors' perceptions in Indonesia, notably concluded that implementing blockchain exerts a significant positive impact on audit quality [8]. This perspective is largely underpinned by the argument that blockchain's inherently transparent and immutable shared ledger fundamentally curtails the risk of financial information manipulation, thereby considerably strengthening the reliability of audit evidence. In addition, blockchain will fundamentally transform the auditor's professional landscape, empowering them to concentrate on more intricate and value-added analysis due to the availability of cleaner, more trustworthy data [17]. In line with these observations, there is a recent empirical work from Turkey also provides evidence that the strategic utilization of blockchain positively influences audit quality by aiding both the core audit procedures and the detection of fraud [16]. The evidence suggests that blockchain enhances both efficiency and the integrity of audit outcomes, helping to raise the bar for audit quality.

4.2.2. Effect of Blockchain Adoption on Audit Timeline

Our study revealed a clear and statistically significant reduction in the audit timeline when blockchain technology is implemented. This aligns with prior research that consistently points to blockchain's potential to improve audit efficiency. For example, several studies that explore the role of blockchain in auditing have highlighted its promise in streamlining audit operations and reducing time-intensive tasks [21]. In particular, the technology's core features such as transparency and decentralization are seen as catalysts for transforming traditional audit procedures, allowing audits to progress more quickly and effectively [22].

Although some researchers have argued that blockchain may offer limited benefits for substantive testing, and that these could be offset by added complexity in control testing, our findings suggest otherwise. The ability to access real-time data and automate verification processes appears to have a

stronger impact, leading to noticeable gains in speed across the audit cycle [19]. In the end, this improved ability to validate information quickly and minimize manual work plays a crucial role in accelerating audit completion and supporting more timely financial reporting for an essential aspect of high-quality auditing.

4.2.3. *Effect of Blockchain Adoption on Earnings Quality*

This study examines the influence of blockchain technology on earnings quality and finds no statistically significant effect within the observed context. This outcome implies that, during the initial phases of blockchain implementation, the technology may not yet play a substantial role in shaping managerial decisions related to earnings quality. This finding diverges from several prior studies. Some have reported that blockchain adoption can lead to improved earnings quality by limiting opportunities for earnings management. In contrast, other research has identified more complex dynamics, such as an increase in yield management behavior by suppliers following the integration of blockchain systems [26, 34]. Another study has found a negative association between blockchain adoption and firm performance among Chinese listed companies [35].

5. Conclusion

This study aims to analyze the impact of blockchain adoption on three key aspects of the audit process, namely audit quality, audit timeline, and earnings quality. The empirical findings of this research indicate that blockchain has significant potential to enhance audit efficiency and impact the distribution of audit outcomes. Blockchain technology, with its main characteristics such as decentralization, transparency, and immutability, provides auditors with the opportunity to access and verify data in real-time without relying on third parties. This can directly accelerate audit procedures, reduce the risk of human error, and enhance the integrity and traceability of the audit trail. Additionally, automation features enabled by smart contracts can help reduce administrative burdens in the audit process and enhance objectivity in decision-making.

With its ability to record transactions instantly and permanently, blockchain supports the creation of a more responsive and efficient audit system. This aligns with the evolving direction of the audit industry, which is increasingly moving toward digitalization and automation to meet demands for transparency, speed, and accuracy.

However, a key finding of this study is that blockchain adoption has not yet shown a significant impact on firms' earnings quality. In other words, while the audit process may become more efficient, this improvement is not yet directly reflected in the quality of reported earnings information. Earnings quality is an important indicator of financial reporting integrity and is often used as a proxy to assess how well financial statements reflect a company's actual economic performance.

In this study's context, the relationship between blockchain and earnings quality is not yet strong or consistent enough to draw conclusive evidence.

This may be due to several factors. First, earnings quality is a highly complex variable influenced by many aspects beyond the audit itself, such as earnings management practices, stakeholder pressure, incentive structures, and the regulatory or industry environment. Second, blockchain adoption in accounting and auditing is still relatively new, so its impact on fundamental aspects such as earnings quality may require a longer time horizon to fully materialize. Third, the implementation of blockchain has not yet been evenly adopted across all companies or industries, and this variation may also affect the strength of the observed relationship.

The regression model used in this study also shows limited predictive power. This suggests that blockchain as a single independent variable is not sufficient to significantly explain changes in earnings quality. These results emphasize the need for a more holistic and interdisciplinary approach in examining the influence of technology on accounting and financial reporting.

From a practical perspective, the findings of this study provide insights for regulators, auditors, and corporate management that adopting new technologies such as blockchain does offer added value in terms of audit efficiency and accountability.

However, the expectation that this technology will immediately enhance earnings quality should be approached with caution and contextual understanding. Strategic planning, training, and infrastructure development are necessary to ensure that blockchain's potential is maximized not only in the audit process but also in improving the overall quality of financial reporting.

In conclusion, this study shows that while blockchain has strong potential to transform audit processes through improved efficiency, transparency, and automation, its impact on earnings quality has not yet been empirically proven in the current context. The role of blockchain in the world of auditing and financial reporting is still in the development and exploratory stage.

Based on the findings of this study, it is recommended that future research focuses on the empirical assessment of blockchain's effectiveness and scalability in a broader context. Specifically, longitudinal case studies and large-scale pilot programs are needed to fully evaluate the long-term impacts of this technology on audit quality, timeliness, and earnings quality.

From a practical standpoint, a concerted, multi-stakeholder approach is essential. This research recommends that auditing firms, industry leaders, and regulatory bodies actively collaborate to establish standardized protocols for integrating blockchain into financial reporting frameworks. Furthermore, policymakers are urged to develop clear legal and regulatory guidelines to facilitate the secure and ethical adoption of this transformative technology. Only through such a comprehensive and collaborative effort can the full potential of blockchain in strengthening corporate accountability be truly realized.

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The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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