Enhancing Financial Statement Quality with Blockchain Technology

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Abstract:

This study examines how blockchain can be linked to financial statements, including the income statement, balance sheet, statement of changes in equity, and statement of cash flows. The study sample included banks, financial institutions, and stock exchange intermediaries in Algeria. The results showed that factors such as security, privacy, transparency, auditability, immutability, cost reduction, real-time transactions, and flexibility are likely to influence the adoption of blockchain technology, which can have a positive impact on financial performance and competitive advantage for banks.

Keywords:blockchain, financial statements, audit. Distributed Ledger Technology, Peer-to-Peer Networks

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1. Introduction:

In recent years, there has been a lot of talk about digital transformation and analytics in the accounting and auditing industry. However, what does it mean in practice? Companies have always used data and information to support decision-making and operations management. What is new or distinctive about using modern technology in the field of accounting and auditing? How do companies create value through it?

The collaborative study emphasized the four essential technologies set to revolutionize the field of accounting: Cloud Computing, Artificial Intelligence, Big Data in Accounting, and Mobile. These innovations are anticipated to greatly influence the practices of accountants and financial experts, offering opportunities to enhance data analysis, streamline operations, and facilitate better decision-making.

Blockchain technology represents a fundamental shift away from relying on a single central authority in a decentralized network. It allows for multiple trust sources to come to a consensus based on a trusted algorithm. This technology can address tracking issues for accountants by easily verifying transactions against all other blocks in the chain. Additionally, blockchain can provide solutions for confidentiality, security, authentication, accountability, and immutability, especially for applications that may not be effectively supported by a centralized system. (Brincat, Lombardo, Morabito, Quattropani, 2019).

The banking industry plays a vital role in a nation's economy, with its efficiency and effectiveness directly impacting economic prosperity. Serving as a key hub for savings collection and credit allocation, banks are essential for economic and social progress. Credit activities are central to the banking sector, driving their assets, revenues, and profitability. Assessing the financial performance of commercial banks is crucial for stakeholders, leading to the creation of ratios and indicators to gauge their profits. Bank financial statements are used to strategic for the future.

The research focused on exploring how blockchain technology influences the financial performance and operations of banks. It analyzed the correlation between blockchain technology and different financial indicators such as operational costs, customer deposits, return on assets, return on equity, variations in shareholders equity, and changes in operating cash flows. The goal was to showcase the potential benefits of integrating blockchain technology within the banking industry.

1.1. Research problem: Based on the above, the following problem can be posed:

What role do blockchain and artificial intelligence technologies play in improving the quality of financial reports for banks, financial institutions, and licensed consultants operating at the Algerian Stock Exchange as a result of digital transformation?

The research problem can be broken down into the following sub-problems:

- How blockchain technology is used in accounting profession?

- How can blockchain and artificial intelligence technologies be used to improve the efficiency, transparency, and security of financial reporting?
- What are the challenges of using blockchain and artificial intelligence technologies to improve the quality of financial statements?

1.2. Research hypotheses:

H0: Using blockchain technology does not have a statistically significant impact on the financial statements of banks, financial institutions, and stock exchange intermediaries authorized to conduct consulting activities at the Algerian Stock Exchange at a significance level of $\alpha \leq 0.05$.

To test this hypothesis, several subsidiary hypotheses are listed as follows:

- **H1:**The initial subsidiary hypothesis suggests that the utilization of blockchain technology does not have a statistically significant impact, with a significance level of $\alpha \leq 0.05$, on the financial performance of banks, financial institutions, and authorized stock exchange intermediaries providing consulting services at the Algerian Stock Exchange.
- **H2:**The second subsidiary hypothesis posits that the utilization of blockchain technology does not have a statistically significant impact on the financial statements of authorized banks, financial institutions, and stock exchange intermediaries operating at the Algerian Stock Exchange, at a significance level of $\alpha \leq 0.05$.
- **H3:**The third subsidiary hypothesis posits that the utilization of blockchain technology does not yield a statistically significant effect, with a significance level of $\alpha \leq 0.05$, on the statement of changes in equity for banks, financial institutions, and stock exchange intermediaries authorized to provide consulting services at the Algerian Stock Exchange.
- **H4:**The fourth subsidiary hypothesis suggests that the implementation of blockchain technology does not have a statistically significant impact on the cash flow statements of banks, financial institutions, and authorized stock exchange intermediaries offering consulting services at the Algerian Stock Exchange, with a significance level of $\alpha \leq 0.05$.

1.3.Importance of the study

The importance of this study lies in its ability to produce results that can be used to develop plans for implementing blockchain technology and incorporating the necessary tools across different sectors to achieve full digital transformation. This not only emphasizes its significance but also empowers decision-makers and influencers to address any shortcomings in its implementation. Furthermore, the study could assist in examining the application of blockchain technology in emerging markets to prevent its regression.

1.4 Research Objectives:

Blockchain technology provides a permanent and immutable record of a transaction that is difficult for any source, whether trusted or not, to change or modify. Therefore, this study is interested in defining the conceptual framework of digital transformation, highlighting its importance, advantages, risks, challenges, and obstacles. We aim also through this research to study the relationship and impact between the quality of financial statements and digital transformation.

1.5. Previous studies:

- Vasarhelyi's 2012 research highlighted the importance of accounting information systems in meeting user expectations amidst fast technological progress. The study pinpointed three crucial factors: the accounting measurement environment, software-based accounting information standards, and the delivery of coherent and valuable information. Likewise, Kevin and Miklos' 2014 study explored the influence of digital data on potential accounting measurements, such as the capability to offer real-time transaction data and segment financial statements by departments or products, potentially requiring different accounting standards.

-The study conducted by John and William in 2015 emphasized the importance of accounting keeping pace with the growing volume of digital data and its impact on accounting standards. It highlighted how the vast amount of quantitative and descriptive data, as well as data from diverse sources, can be leveraged to develop more robust accounting standards. By shifting the focus to data, its generation processes, and analysis, rather than just presentation, the accounting profession can add value and significance. This approach also empowers end users and enhances the efficiency of capital markets.

-Donald and his team discovered in their 2015 research that integrating digital information into accounting procedures can result in substantial benefits. This encompasses the capacity to utilize various forms of data like video, audio, and text to create control mechanisms, enhance financial reporting, increase transparency with stakeholders, and impact accounting regulations.

1.4. Research components:

To address the research problem and cover all aspects of the study, we have decided to divide this study into the following sectionsBlockchain technologies.

- Financial statements of commercial banks.
- Application of blockchain technologies in banks.

2. Literaturereview:

2.1. Blockchain technologies:

Blockchain technology defined as a decentralized ledger system developed by an individual or individuals working under the pseudonym Satoshi Nakamoto in October 2008 to facilitate the trading of Bitcoin. Nakamoto

designed Blockchain to solve the double-spending problem in electronic currencies, to enable exchanges in a low-trust environment without a third party, to create a distributed ledger of transactions that is robust against failure, and to provide an immutable audit trail. It has also been speculated that Nakamoto proposed Blockchain as a response to the 2008 global financial crisis, which threatened banks through their ability as a third-party intermediary.

2.1.1. Definition of blockchain technologies:

- Blockchain technology has been defined as a system that restricts the operations that are done with Bitcoin and other cryptocurrencies and is stored across a number of computers connected in a peer-to-peer network. (A llen, 2018)
- Gwyneth , 2020 defined blockchain as a secure peer-to-peer distributed ledger or transaction log, also known as DLT, used to record transactions across many computers. The contents of the ledger can only be updated by adding another block that is linked to the previous block. It can also be imagined as a peer-to-peer network that runs on top of the internet.

Blockchain is a cutting-edge technology that leverages distributed computing within a secure network to store data blocks in decentralized databases across peer-to-peer networks. These interconnected blocks offer protection against unauthorized modifications and facilitate clear monitoring of all alterations. Functioning as a Distributed Ledger Technology (DLT), blockchain securely stores and oversees transaction data on the devices of network participants, eliminating the need for a central server. (Global., 2019)

(Brincat, 2019)Blockchain technology provides a variety of essential characteristics including decentralization, immutability, consensus-based reliability in untrusted environments, security, cost-effectiveness, flexibility, absence of middlemen, transparency, efficiency, and scalability. Security is guaranteed by the collective ownership of data by multiple parties to prevent hacking. The use of open-source software and cost reductions in system development, maintenance, database operations, and security enhance economic efficiency. Decentralization is preserved by storing and monitoring transaction records on distributed computers to prevent fraud and unauthorized access.(Feng Bingchun, 2020)

Facilitating direct transactions between individuals eliminates the need for validation from a specific third party, achieving non-intermediation. This streamlines the process by removing intermediaries and their fees. Transparency is enhanced by offering unrestricted access to information, increasing trust. Additionally, scalability is guaranteed by customizing the blockchain system to meet diverse requirements. The blockchain system can be easily reconfigured and utilized for different purposes by leveraging open sources.

Public, private, and consortium are the three primary categories of blockchains, each distinguished by their distinct features, purposes, and architectures. (Daniel, 2019)

-**Public blockchain:**A decentralized network known as a public blockchain enables multiple participants to share and validate transaction data without the need for a central authority. This type of blockchain allows for anonymous participation and offers unlimited control. Public blockchains, such as the one utilized in Bitcoin, are being explored in the finance sector for applications like cryptocurrencies and global money transfers. They are also being considered for use in crowdfunding and transportation, as they provide verification without relying on a trusted third party. (Engle, 1987)

-**Private blockchain**: A private blockchain, also referred to as a centralized blockchain, leverages blockchain technology in a centralized structure to enhance security and transaction speed. Operated by a single entity, only validated nodes are permitted to engage in this particular blockchain. Accredited and authenticated organizations possess restricted entry to transactions, empowering them to create, verify, and approve transactions. (Lee, 2018)

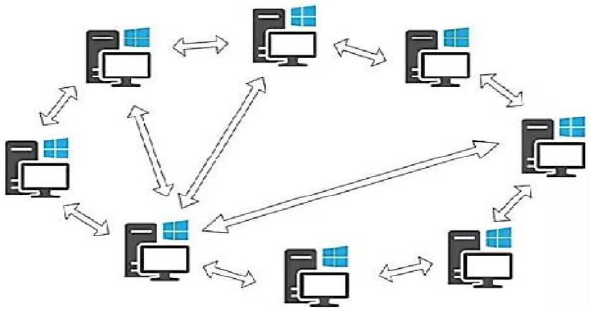
-**Consortium blockchain**: Participation in a consortium blockchain is limited to approved users, like businesses or groups, who are given different levels of access, such as viewing transactions or adding blocks.(Lee, A study on blockchain networking for internet of things., 2018)

2.1.2. Key Features of Blockchain Technology:

Blockchain technology stands out for its utilization of peer-to-peer networks, distributed ledger technology, cryptography, hashing, and hash functions. In essence, blockchain consists of a chain of blocks, each containing information such as block number, data, hash value of previous blocks, hash value of current blocks, and nonce. These key components are derived from studies and applied in the realms of accounting and auditing.

-Peer-to-peer (P2P) Networks and Blockchain Technology: Blockchain technology, with its peer-to-peer networks and distributed ledger technology, is defined by cryptography, hashing, and hash functions. Essentially, it consists of a chain of blocks, each containing specific fields like block number, data, hash value of the previous block, hash value of the current block, and nonce. These essential characteristics are drawn from research and utilized in the fields of accounting and auditing.

Fig N° 1: P2P networks



Source: Daniel Coetsee, University of Johannesburg, Blockchain Technology and Implications for Accounting Practice, available on https://www.abacademies.org/articles/blockchain-technology-and-implications-for-accounting-practice-12338.html

-Distributed Ledger Technology (DLT): Blockchain leverages Distributed Ledger Technology (DLT), where transactions are recorded and processed through distributed ledgers on multiple computers, rather than a conventional ledger on a single organization's computer or server. Through blockchain-based DLT, the distributed ledger is consistently updated across all computers in the network, allowing all participants to access up-to-date transaction details.

- How blockchain technology works: Blockchain technology is an open-source, programmable technology that operates through automated steps and cannot be controlled or manipulated. Users must subscribe to the network and open an account through a digital currency trading platform to participate. When a transaction is requested, the system creates a new block containing data on the blockchain network, which is processed by the basic nodes.(Dhillon V., 2021).

The block is shared with all nodes in the blockchain network for verification. Once formed, it is circulated among nodes until validation is complete. Nodes confirm the block's integrity and prevent any tampering. Once verified, each node includes the block in their version of the blockchain. All copies of the chain remain consistent as nodes can differentiate between valid and altered blocks through hash matching.

- Bank accounting standards: Bank Accounting provides financial information that is useful for decision-making by investors, creditors, and other stakeholders. This information can be used to assess the financial performance and condition of a bank, and to make informed investment and lending decisions. (Ab Abonwara, 2021)

2.1.3. Bank accounting standards definition:

The accounting system is defined as a set of documents, records, ledgers, and reports that are coordinated in a systematic way to prepare the basic data that helps manage financial institutions and identify the extent to which these objectives are achieved. (Beest, 2009)

Bank accounting system is a set of rules and procedures through which banking accounting operations are processed (Das, 2012), or a set of tools and procedures that enable us to manage banking institutions through the collection, processing, reporting of data, and extracting the results of operations.

2.1.4. Elements of the bank accounting system:

To achieve the objectives of the banking accounting system, a set of elements must be available, which we mention below:

-**The documentary group**: is the foundation of the banking accounting system. It provides the evidence that is needed to record, classify, and report financial transactions. The documentary group can be divided into two sections: internal and external. (Baig, 2016)

- **Book group:** It is considered one of the tools that are used to organize the detailed data of the different transactions. It is a safe place to store data for a long time as a source for preparing reports. One of the most common methods in the field of banking accounting is the English method and the French method.

- **Accounts guide:** also known as the account code is a list that includes the codes or numbers of the accounts used in banking institutions. (Dechow, 2010) It is classified in a way that is easy to use and follow, and through which the accounts and the changes that occur in them can be tracked when needed.

- **Periodic accounting reports:** Bank reports can be classified into two types: internal and external. Internal reports are used by bank management for decision-making, while external reports are used by regulators, investors, and other stakeholders. (Elleuch, 2015)

❖ **Internal reports:**

-Management reports: (Guermazi, 2020) These reports are used by bank management to track the bank's performance and make decisions.

-Operational reports: These reports provide information about the bank's operations, such as deposits, loans, and expenses.

-Strategic reports: These reports provide information about the bank's strategic goals and objectives.

❖ **External reports:**

- **Financial statements:** These reports provide a summary of the bank's financial position and performance.
- **Regulatory reports:** These reports are required by law and are submitted to regulators.
- **Investor reports:** These reports are designed to provide investors with information about the bank. (Guillaume, 2016)

2.1.5. Accounting treatment of banking transactions:

Article 2 of Order 09-04, dated January 23, 2009 obliges banks and financial institutions to record their accounting transactions in accordance with the accounting plan approved by the order. (Order No. 02-01 dated March 3, 2001)

The accounting work is distributed over each department of the bank in such a way that each department has its own documents, which it organizes, records the entries, and transfers them to the special accounts, which are sent to the accounting department, which is responsible for.(Order No. 02-01 dated March 3, 2001)

Financial instruments are classified into trading financial instruments, available-for-sale financial instruments, equity securities, held-to-maturity financial instruments, and other financial instruments. Financial liabilities are classified into held-to-maturity financial liabilities.

2.1.6. Importance of quality financial reporting:

Quality financial reporting is important for a number of reasons. First, it helps users to make informed decisions about their investments, lending, and other financial activities. Second, it helps to protect investors from fraud and other financial misconduct. Third, it helps to promote fair and efficient markets.

Previous Research studies have used different methods and measures to assess the quality of financial reporting. For example, a study by Barth (2006) used earnings management as a measure of the overall quality of accounting. Another study by Callao, Pena, and Jean-Jean (2008) used both earnings management and conservatism as measures of the quality of accounting. A study by Chen, Dechow, and Schrand (2008) used earnings management, conservatism, and the timeliness of reporting as measures of the quality of accounting. And a study by Irwandi, Suharsono, and Sulistio (2020) also used earnings management as a measure of the quality of financial reporting. (Yurisandi, 2015)

Although the consensus among research studies is that earnings management has a negative impact on financial decisions, some studies have found that earnings management can be beneficial. Another study by Rahman et al. (2013) found that earnings management can help managers make better decisions about corporate investment and acquisition. The study found that earnings management can help managers to achieve desired financial results and improve comparability with other companies. However, earnings management can also be used for illegal purposes. Managers may engage in earnings management through accounting fraud or by taking advantage of accounting loopholes. (Trabelsi, 2016)

2.1.6. International Financial Reporting Standards:

"standard" definition refers to "the measure of what something should be, or what it should be like," the concept of accounting standard is generally understood as "the measure of what something should be." (Yurisandi, 2015)

In the context of financial accounting, accounting standards are often defined as "a set of rules and principles that govern the preparation of financial statements.", Martinez-Diaz (2005) defines accounting standards as "a set of rules and principles that address a particular accounting issue." Nelson (2003, p. 1) defines accounting standards as "the requirements that entities must follow in order to comply with accounting policies, both current and non-current, and disclosures." Halligan and Hassan (2012, p. 123) define accounting standards as "models or general agreements that lead to the harmonization and improvement of accounting practices." (Suharsono, 2020)

The primary objective of the IASB is to establish and release International Financial Reporting Standards (IFRS), which are universally recognized accounting standards of exceptional quality. The aim is to develop a unified set of accounting standards that enhance transparency, comparability, and dependability in financial

reporting, empowering investors and other interested parties to make well-informed decisions in the worldwide financial markets.

The adoption of IFRS would likely lead to higher disclosure requirements and improved financial reporting quality, which would tend to reduce the potential for earnings management and managerial discretion. With less subjectivity, there would be fewer opportunities to influence reported earnings and bonuses, or mislead investors. (Zehri, 2013)

2.2. Potential Applications of blockchain technology in Bank Accounting Applications:

The use of blockchain technologies, such as distributed ledgers and smart contracts, can enhance the reliability of bank services like deposits and loans. These technologies can also revolutionize foreign exchange businesses by enabling faster and more cost-effective international remittances, as well as the issuance of letters of credit and trade management. Ripple coin (XRP) is particularly noteworthy for its impact on blockchain technology.

Blockchain technology allows for triple-entry accounting by cryptographically verifying and recording each transaction in an unchangeable block(Yermack, 2017). This process reveals details about the buyer and seller while safeguarding their identities with public keys.(Rosikah, 2018).

The conventionalbanking system relies on individual bank accounts and statements for transaction tracking, whereas a blockchain triple-entry accounting system introduces a secure third entry through consensus, eliminating the need for potentiallycompromisedthird parties.

Hence, thereis no indication that the current financial reporting system will transition from double-entry to prepared financial statements. A blockchain essentially functions as a secure real-time transaction recording system. However, it is conceivable, as explored in more detail in the discussion of other technologies, that accounting data could be interpreted and displayed in new ways through the utilization of data analyticsmethods.

In this regard, (Liu, 2019)itis worth noting that the double-entry system remains unchanged in the era of computers and digital technology, making it susceptible to traditional inefficiencies and risks. The blockchain system, on the other hand, offers the advantage of recording transactions in a secure and unchangeableledger, enhancingsecurity and accuracy. mutableledgerthatimprovessecurity and validity. (Kwilinski, 2019).

The consensus in the literatureisthat blockchain technology's autonomy and security have the potential to enhance the trustworthiness of financial reports (Sahu, 2021), This pertains to an autonomous accounting environment that promptly delivers information to various parties. Nonetheless, it is noted that the current state of blockchain advancement may not be adequate for handling the verification of multiple transactions and accurate recording.

2.2.1. Block chain's optimization of accounting information quality:

-Improve the trustworthiness of accounting data: The trustworthiness of accounting data lies in its ability to accurately represent all relevant information in accordance with recognition and measurement standards, ensuring the reliability and completeness of its content. Recent studies have concentrated on the security, precision, and comprehensibility of blockchain technology in accounting data, highlighting its positive impact on enhancing the trustworthiness of accounting information. (Kim, 2018).

-Improve the timeliness of accounting data: According to(Allen, 2019) academia generally believes that the consensus algorithm and smart contract mechanism in blockchain technology can establish accounting records based on algorithmic rules. By adhering to economic behavior trigger rules and process conditions on the blockchain's application layer, the financial ledger on the blockchain can automate bookkeeping processes and share updated records with all nodes in the network through a consensus protocol. This not only enhances transaction speed and streamlines business processes but also boosts the timeliness of accounting information.(Chen Yilong, 2020)

-Improve the protection of accounting data: Blockchain's information security assurance mechanism focuses on two key aspects. Firstly, identity verification is done through cryptography, granting different users specific access rights. Secondly, the decentralized network system significantly raises the difficulty of system breaches. (J. Marshall McComb., 2018)

3. Research data:

To test the hypotheses of the study, the researcher relies on banks, financial institutions, and stock exchange intermediaries authorized to carry out consulting activities at the Algerian Stock Exchange. The data were collected for the period from **2012 to 2022**. We collected 60 observations for the following banks: Bank of Agriculture and Rural Development, Local Development Bank, External Bank of Algeria, National Bank of Algeria, BNP Paribas Algeria, Savings and Reserve Bank, Algerian Popular Credit, RMG Consulting Limited Liability Company.

3.1. Study variables:

The study variables were measured through financial information extracted from the published financial statements for the study sample and divided into three main parts as follows:

-Independentvariables: The main independent variable represents the dummy variable Block Chain Technology (DUM), and its associated financial dimensions related to the subject of the study represent the dependent independent changes as follows:

- Logarithm of other operating expenses (LOG(X1))
- Logarithm of total customer deposits (LOG(X2))

- Return on assets (ROA)

-Dependent variables:

- Statement of comprehensive income, represented by return on assets (ROA)
- Statement of financial position, represented by return on equity (ROE)
- Statement of owners' equity, represented by the change in total shareholders' equity (∂(Y))
- Statement of cash flows, represented by the change in operating cash flows (∂ (CF))

The study model was designed as follows, which answers each sub-hypothesis in turn:

- ROAt = f (LOG(X1) t, DUMt) ..... (1)
- ROEt = f (LOG(X2) t, DUMt) ..... (2)
- ∂ (Y)t = f (ROAt, DUMt) ..... (3)
- ∂ (CF)t = f ((ROA*DUM) t, DUMt) .....(4)

Accordingly, four multiple linear regression equations representing the previous models were estimated as follows:

- Regression equation for the first sub-hypothesis, H1; ROEt = β0 + β1 LOG(X1t) + DUM + μt
- Regression equation for the first sub-hypothesis, H2; ROEt = β0 + β1 LOG(X2t) + DUM + μt
- Regression equation for the first sub-hypothesis, H3: ∂(Y) = β0 + β1 ROA + DUM+ μt
- Regression equation for the first sub-hypothesis, H4: ∂ (CF)t = β0 + β1 (ROA*DUM) t + DUM + μt

Whereas:

- ROA: return on assets.
- (X1): Other operating expenses.
- ROE: Return on equity.
- ∂ (Y): Change in total shareholders' equity.
- (X2): Total customer deposits.
- ∂ (CF): Change in operating cash flows.
- DUM: dummy variable.
- LOG: logarithmic formula.
- 'sβ: estimated parameters.
- β□: constant term.
- μt: Random error term.
- t: time period.

- **H_1:** The first subsidiary hypothesis: There is no statistically significant effect at the significance level of a≤0.05 of using blockchain technology on the income statement of banks, financial institutions, and stock exchange intermediaries authorized to carry out consulting activities at the Algerian Stock Exchange.

To test this hypothesis, the following standard model was used:

$$ROAt = \beta 0 + \beta 1\ LOG(X1t) + DUM + \mu t$$

Table N°1:Estimation results of Model 1 equation using FMOLS method

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Log(X1)	0.842	0.182	5.214	0.0012
DUM	-1.418	0.099	-24.230	0.0000
C	-7.023	3.580	-2.239	0.0601
R-squared	0.892			
Adjusted R-squared	0.754			

Source : Prepared by the researcher based on the statistical analysis program E-views 12

From Table No. 01, the equation can be written:

ROA=-7.023+0.842*LOG(X1) -1.418*DUM

The data in Table No. 1 indicates that all independent variables (logarithm of other operating expenses and Blockchain dummy variable) are statistically significant at the 1% level. The regression determination coefficient squared is 89.2%, suggesting that the independent variables can explain 89.2% of the variance in the dependent variable return on assets. The adjusted coefficient of determination (Adjusted-Rsquared) is 75.4%, a strong value indicating a good fit.

The results of testing the first sub-hypothesis can be interpreted as follows:

-**Logarithm of other operating expenses (LOG(X1)):** The results indicated the presence of a positive relationship and a statistically significant effect of other expenses on the return on assets in the sample Algerian banks at a significance level of 1%. Thus, the null hypothesis is rejected and the alternative value is accepted, as increasing other expenses by one percent will lead to an increase in the return on assets by (0.842) units on average, with other factors remaining constant.

-**The dummy variable DUM (blockchain):** The results indicated the presence of an inverse relationship and an effect of the DUM variable on the return on assets that is statistically significant in the sample of Algerian banks at a significance level of 1%. Thus, the null hypothesis is rejected and the alternative hypothesis is accepted. Increasing the use of the blockchain by one unit will lead to an increase in the return on assets by (-1.418). In the opposite direction, on average with other factors constant, the coefficient of the dummy variable -1.418 is interpreted as the difference between years of using and not using the blockchain in Algerian banks. The variable DUM (blockchain) showed a significant inverse relationship with return on assets in Algerian banks, with a

coefficient of -1.418. This indicates that increasing blockchain usage by one unit is associated with a decrease in return on assets. The null hypothesis was rejected in favor of the alternative hypothesis.

- **H2:** The second subsidiary hypothesis: There is no statistically significant effect at the significance level of a≤0.05 of using blockchain technology on the balance sheet of banks, financial institutions, and stock exchange intermediaries authorized to carry out consulting activities at the Algerian Stock Exchange.

To test this hypothesis, the following standard model was used:

$$ROE_t=Q_0+Q_1LOG(X2_t)+DUM+\mu_t$$

Table N°2: Estimation results of Model 1 equation using FMOLS method

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Log(X2)	24	12.318	266	0.0321
DUM	-302	2.144	-996	0.0000
C	-613	296	-239	0.0477
R-squared	0.811			
Adjusted R-squared	0.761			

Source: Prepared by the researcher based on the statistical analysis program E-views 12.

From Table No. 02, the equation can be written:

$$ROE=-613+24*LOG(X1)\ -302*DUM$$

The data in Table No. 02 indicates that all independent variable parameters were statistically significant at the 5% level. The R-Squared value of 81.1% suggests that the independent variables can explain 81.1% of the variance in the dependent variable, return on equity. The Adjusted-Required coefficient of determination at 76.1% is also considered to be relatively high.

The results of testing the second sub-hypothesis can be interpreted as follows:

-The findings show a strong correlation between the logarithm of total customer deposits and the return on equity in Algerian banks. This relationship is statistically significant at a 5% significance level, leading to the rejection of the null hypothesis in favor of the alternative hypothesis. Specifically, a one percent increase in the logarithm of total customer deposits results in an average increase of 24 units in the return on equity, holding all other factors constant.

-The dummy variable (blockchain) showed a significant inverse relationship with a notable impact on the return on equity in Algerian banks. The statistical analysis revealed a rejection of the null hypothesis and acceptance of the alternative hypothesis at a significance level of 1%. This suggests that increasing blockchain utilization by one unit is associated with an average increase in return on equity by (-302), holding other factors constant. The coefficient of -302 for the dummy variable represents the difference in return on equity between using and not using blockchain in Algerian banks.

- **H3:** The third subsidiary hypothesis: There is no statistically significant effect at the significance level of a≤0.05 of using blockchain technology on the statement of changes in equity of banks, financial institutions, and stock exchange intermediaries authorized to carry out consulting activities at the Algerian Stock Exchange.

To test this hypothesis, the following standard model was used:

$$\Delta(Y)t=Q0+Q1ROAt+DUM+\mu t$$

Table N°3:Estimation results of Model 1 equation using FMOLS method

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROA	-118	144	-935	0.0000
DUM	-265	372	-762	0.0001
C	138	155	993	0.0000
R-squared	0.692			
Adjusted R-squared	0.614			

Source: Prepared by the researcher based on the statistical analysis program E-views 12.

From Table No. 03, the equation can be written:

$$\Delta(Y)=138-118*ROA-265*DUM$$

The data in Table No. (03) indicates that all independent variables (return on assets and blockchain DUM variable) are statistically significant at the 1% level. The regression determination coefficient, R-Squared (69.2%), suggests that 69.2% of the variance in the dependent variable (change in total shareholders' equity) can be explained by the independent variables. The Adjusted-Rsquared coefficient (61.4%) is also noteworthy as it is relatively average.

The results of testing the third sub-hypothesis can be interpreted as follows:

- The study found a significant inverse relationship between return on assets and the change in total shareholders' equity in Algerian banks. The null hypothesis was rejected in favor of the alternative hypothesis, indicating that a one-unit increase in return on assets results in a 118-unit increase in total shareholders' equity, all else being equal.
- The variable DUM (blockchain) in Algerian commercial banks has a significant impact on the return on the change in total shareholders equity. The null hypothesis is rejected, and the alternative hypothesis is accepted, indicating an inverse relationship. A one-unit increase in blockchain usage results in a decrease of -265 in the change in total shareholders equity, holding other factors constant. This coefficient represents the difference in years of using blockchain compared to not using it in Algerian banks.
- **H4**: The fourth subsidiary hypothesis: There is no statistically significant effect at the significance level of a≤0.05 of using blockchain technology on the statement of cash flows of banks, financial institutions, and stock exchange intermediaries authorized to carry out consulting activities at the Algerian Stock Exchange.

To test this hypothesis, the following standard model was used:

$$\Delta(CF)t=\beta 0+\beta 1\ (ROA*DUM)t+DUM+\mu t$$

Table N°1: Estimation results of Model 1 equation using FMOLS method

Variable	Coefficient	Std. Error	t-Statistic	Prob.
(ROA)*(DUM)	-198	395	-537	0.0010
DUM	169	335	559	0.0001
C	-438	176	-249	0.0416
R-squared	0.223			
Adjusted R-squared	0.071			

Source: Prepared by the researcher based on the statistical analysis program E-views 12.

From Table No. 04, the equation can be written:

$$\Delta(CF)= -438-212*ROA*DUM+188*DUM$$

The data in Table No. 4 indicates that all independent variable parameters (return on assets multiplied by the DUM variable blockchain, and the DUM variable blockchain) are statistically significant at the 1% level. The R-Squared value of 22.3% suggests that the independent variables can explain 22.3% of the variance in the dependent variable, operating cash flows. However, the low Adjusted-Rsquared value of 7.1% indicates that the model is weak.

The results of testing the four sub-hypotheses can be interpreted as follows:

- Return on assets multiplied by the dummy variable: The results indicated an inverse relationship and a statistically significant effect of the return on assets multiplied by the dummy variable Block Chain on the change in operating cash flows in a sample of Algerian banks when the significance level is 1%. Thus, the null hypothesis is rejected and the alternative model is accepted. Increasing the return on assets multiplied by the dummy variable by one unit will lead to an increase in the change in operating cash flows by -198, on average, with other factors held constant.

-The variable DUM (blockchain) in Algerian commercial banks shows a direct and statistically significant impact on the change in operating cash flows, with a coefficient of 169 indicating that increasing blockchain use by one unit leads to a 169-unit increase in cash flows on average. This rejects the null hypothesis and supports the alternative value, highlighting the difference in cash flows between using and not using blockchain in the sample.

Based on the results of testing the sub-hypotheses, we conclude that based on testing the previous sub-hypotheses, the test results have been approved and it turns out that there is a statistically significant effect at the significance level ($a \leq 0.05$) of using Blockchain on the financial statements in Algerian banks.

4. Results and discussion:

Description of the DUM variable (Blockchain technology): The results of the study show that there is a positive correlation between the DUM variable and the independent variables (other operating expenses, total customer deposits) at a significance level of 1% per unit with the other factors remaining constant, an inverse correlation with the independent variable (return on assets) at a significance level of 5% per unit with the other factors remaining constant, and an inverse correlation with the dependent variables (income statement represented by return on assets, balance sheet represented by return on equity, and statement of shareholders' equity represented by the change in total shareholders' equity), and the existence of a positive correlation of the dummy variable on the dependent variable (statement of cash flows represented by the change in operating cash flows) at a significance level of 1% per unit with the other factors remaining constant. This reflects the extent of the correlation of the study variables with each other in the long term.

5. Conclusion:

The main focus of the article is to explore the potential impacts of blockchain on accounting procedures. It delves into inquiries such as the accountant's ability to trust the blockchain system's reliability through updated governance and control mechanisms, as well as the accountant's ability to verify the legitimacy of the recorded accounting information.

The immediate validation and permanence of data using cryptographic functions ensure data integrity and reliability, eliminating the need for intermediaries and reducing costs. However, the proof of work verification can be expensive due to high computer power requirements and limited data storage, leading to potential challenges in compensating miners with cryptocurrencies. Businesses relying on blockchain technology for accounting may need more affordable validation methods to maintain stakeholder trust, though this could raise concerns about data confidentiality. Accountants and auditors evaluating blockchain systems should take into account these connectivity and trust issues.

Real-time data capture can lead to quicker access to information for decision-making, potentially enhancing the efficiency of information reporting and auditing processes. Utilizing artificial technology for data analysis could further improve information capabilities, but may also involve collaboration with other disciplines. The question remains whether the complexity of various accounting transactions can be accurately captured in a blockchain system. It is possible that existing accounting systems will remain separate from blockchain systems in the near future, with blockchain technology being used for specific functions within organizations. The future integration of blockchains into accounting systems will depend on the advancement of integrated accounting systems.

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