World Journal of Advanced Engineering Technology and Sciences
eISSN: 2582-8266
Cross Ref DOI: 10.30574/wjaets
Journal homepage: https://wjaets.com/

(REVIEW ARTICLE)

Check for updates

Revolutionary applications of trending block chain innovation in accounting and auditing

Abdullahi Giza Abubakar [1,*] and Safiyanu Giza Abubakar [2]

[1] *Lancashire Business School, University of Central Lancashire, United Kingdom.*
[2] *Salford School of Engineering and Technology, University of Salford, Manchester, United Kingdom.*

World Journal of Advanced Engineering Technology and Sciences, 2023, 10(01), 040–053

Publication history: Received on 22 July 2023; revised on 31 August 2023; accepted on 03 September 2023

Article DOI: https://doi.org/10.30574/wjaets.2023.10.1.0245

Abstract

The primary objective of this study is to provide a rationale for adopting Blockchain technology in the realm of accounting and auditing. The key findings of the study highlight the potential benefits of utilizing Blockchain technology in the recording of financial transactions and the auditing process in the organizations. The incorporation of Blockchain in transaction accounting can result in decreased penalties linked to accounting mistakes and facilitate quicker identification and rectification of errors without extra financial outlay. Furthermore, Blockchain technology has the capability to practically eliminate the loss and misuse of financial data by malicious individuals. The research findings underscore the importance of integrating Blockchain into the structural and technological frameworks of transaction accounting within organizations, as well as in the broader domains of accounting and auditing. The adoption of this technology can optimize accounting procedures, elevate the precision and dependability of financial data, enhance oversight, and lower risks for economic entities. This highlights the potential advantages of using Blockchain as a comprehensive optimization solution in the accounting field. The findings stress that there is need for further exploration and application of Blockchain to enhance the quality of financial accounting, ensure trustworthiness, and alleviate risks within the field.

Keywords: Blockchain; Accounting; Auditing; Innovation; Technology

1. Introduction

Amongst the prevailing issues within the field of accounting is the absence of automated and digitalized processes, potentially resulting in errors and wasted time on repetitive tasks. Moreover, there exists a challenge pertaining to inadequate data privacy, data security and confidentiality, with the potential for data loss or unauthorized access by either the outsider or even the insider [1,2]. Addressing these systemic problems in accounting is facilitated by the incorporation of cutting-edge technology and contemporary solutions. The adoption of digital resources like cloud technology, distributed databases, and automated accounting systems has the capacity to decrease routine workloads and mitigate the likelihood of errors occurrence. Achieving more precise and efficient accounting practices becomes feasible through the integration of advanced technologies like machine learning, artificial intelligence, data analysis etc. [3].

The assimilation of blockchain technology has emerged as a seminal innovation warranting consideration within the spheres of accounting, finance, and auditing. Originally conceived as the foundational apparatus underpinning cryptocurrencies, blockchain technology has broadened its purview due to its intrinsic attributes of transparency, security, and immutability. In the realm of accounting, blockchain technology holds the potential to substantially reform conventional methodologies of record-keeping, endowing them with a decentralized and impervious ledger system [4].

* Corresponding author: Abdullahi Giza Abubakar

This mechanism ensures the secure logging and sequential linkage of transactions, thereby negating the exigency for intermediaries and concomitantly curtailing the risk of deceitful practices. Moreover, the transparency and instantaneous accessibility of blockchain-generated data empower auditors and stakeholders to autonomously corroborate the precision and genuineness of financial documentation, thereby ameliorating the veracity of financial reporting.

Within the precincts of auditing, blockchain technology furnishes auditors with a novel modality for assuring the accuracy and credibility of financial data. The immutability inherent to blockchain records ensures that once transactions are recorded, tampering cannot transpire without consensus from the network constituents [5]. This characteristic significantly augments the verifiability trail, thereby facilitating the audit process by facilitating the traceability of financial data's provenance and evolution. By accessing a communally shared and synchronized wellspring of information, auditors can more efficaciously validate transactions and account balances, obviating the need for manual reconciliation protocols. Furthermore, the contemporaneous nature of blockchain data equips auditors with real-time insights into an organization's fiscal standing, thus enabling the timely detection of potential anomalies or incongruities. Holistically, the assimilation of blockchain technology within the realms of accounting, finance, and auditing heralds a paradigmatic transformation in the recording, validation, and dissemination of financial information, with the latent capacity to amplify transparency, security, and operational efficiency throughout these interwoven domains.

The utilization of blockchain technology also contributes to resolving the many challenges by furnishing a secure and dependable means of data storage and transmission, obviating the need for trust in intermediaries and minimizing error-related risks. The decentralized nature of the blockchain empowers each network user to manage their own data, ensuring its confidentiality and consequently diminishing the potential for data loss or unauthorized exposure [6-8]. The integration of blockchain technology into accounting practices has the capability to significantly improve the effectiveness and safety of accounting tasks, while also guaranteeing the trustworthiness of data retention [9-11]. This is especially crucial in orchestrating the operations of economic and commercial endeavors within the framework of E-commerce and the Digital Economy [12,13].

2. Literature Review

The primary focus of the present study revolves around the prevalence of errors within the domains of accounting and auditing. Investigating these errors holds immense significance for a variety of reasons, which can be supported by the data provided in [14]:

- Taxation Challenges: A report from Bloomberg's BNA in 2015 revealed that around 27% of accounting errors result from erroneous tax data entries. This can lead to significant tax-related predicaments for companies, including overpayments or underpayments of taxes, and even subject them to potential IRS audits and penalties. Exploring errors through research can help identify the origins of these errors and establish protocols to evade them.
- Financial Implications: The substantial fines, amounting to nearly USD 7 billion, levied on U.S. corporations due to mishandled data and errors in spreadsheets underscore the profound financial repercussions of inaccurate accounting practices. Such fines can severely affect a company's profitability and operational efficiency. Research into errors can aid in uncovering the root causes of these errors and devising strategies to prevent them.
- Deficient Measurement and Management of Internal Processes: Statistical data indicates that merely 4% of Polish companies engage in the measurement and management of their internal processes. This implies that a majority of companies lack effective mechanisms for supervising and enhancing their accounting and auditing processes. The study of errors can pinpoint weaknesses within these existing processes and provide recommendations for enhancements. This, in turn, can bolster the effective execution of accounting responsibilities and diminish the probability of errors occurring.
- Enhancing Trust Levels: Delving into errors within the realms of accounting and auditing can play a pivotal role in bolstering trust levels in a company's financial statements. Demonstrating the capability to detect and rectify errors can foster greater trust among stakeholders such as investors, creditors, and regulatory bodies in the company's financial integrity.

Overall, probing miscalculations in account and auditing holds significance for securing companies' fiscal stability, meeting duty liabilities, enhancing internal processes, and erecting trust. Similar studies can punctuate worrisome areas and give suggestions for enhancing the account and auditing frame, thereby abetting in the complete fiscal operation of companies.

According to study in [15], fiscal statements serve as the primary information source for colorful stoner groups. The delicacy of the entered information significantly influences decision- making grounded on counting data. Dissecting the fiscal statements of the company examined in their exploration, the authors discovered significant inconsistencies in the reporting of fiscal earnings by the account unit. This difference latterly distorted the company's profitable substance and its capability to induce cash inflow. As a result of their analysis, the researchers recommended that both auditors and corporate management conduct thorough audits specifically targeting these areas of accounting. This is crucial due to the substantial risk of encountering accounting errors and fraudulent activities. The study cautioned potential investors against investing in the company under investigation due to the identified risk of manipulating earnings and engaging in off-balance sheet financing. These actions have the potential to impact the accuracy of reported cash flows.

A recent investigation conducted by Boisseau-Sierra, Chu, and Rajgopal in [16] concerning the implications of errors within the domain of public accounting yielded the subsequent outcomes:

- Identification of errors: The study revealed that Eurostat tends to comment more frequently on the financial statements of member states within the European Union. This observation suggests the existence of errors in public accounting that require corrective measures and attention.
- Influential factors on errors: The researchers identified that Eurostat is more inclined to issue comments to countries displaying substantial discrepancies between changes in public debt and deficit relative to GDP. Moreover, this trend was prominent in nations with weaker economic conditions and those in which central banks hold a higher quantity of government bonds. These factors potentially contribute to the occurrence of errors in public accounting.
- Ramifications for financial markets: The study uncovered that the release of Eurostat's observations on government financial reporting corresponds with an abnormal rise in government bond yields. Furthermore, domestic investment in government debt tends to increase subsequent to these observations. These findings underscore the critical significance of accurate and dependable public accounting. Errors in financial reporting can exert a noteworthy influence on financial markets and domestic investment. The research highlights the imperative nature of vigilant oversight and management of public financial reporting, aiming to ensure the dependability and credibility of financial information from member states.

In a nutshell, the results of the studies [15,16] show that accounting errors have an impact on not only the financial outcomes of specific domestic businesses but can also cause instability at the national level or even within transnational organizations. Therefore, it is strongly advised to focus research efforts on identifying policies and methods that help to lessen or eliminate the negative effects resulting from mistakes when preparing financial reports.

By acting as a decentralized database, blockchain technology ensures the safekeeping and reliable transfer of data. Each block in this system holds information about blocks that came before it, ensuring dependability and resilience to changes. This chain is connected to by other blocks, promoting a uniform and reliable system. Blockchain is used in a variety of industries, including supply chain management, financial services, and healthcare, despite being predominantly used for the storage and exchange of cryptocurrency. We will evaluate recent papers and research projects in order to understand the current trends and theoretical underpinnings of using this investigated technology in accounting and analysis.

The study by Han et al. in [7] looked at how blockchain technology and artificial intelligence are being incorporated into the fields of accounting and auditing. To identify the potential benefits and challenges connected with the use of these technologies, this inquiry included the review of 100 academic studies. According to their research, using blockchain technology has the potential to significantly improve safe and effective data transmission and storage, increase transaction accuracy and speed, lower infrastructure costs, and promote greater information transparency and dependability. AI can also be used to advance the automation, analytical, and forecasting procedures used in the domains of accounting and auditing. The authors stress the significant potential for utilizing these technologies to increase accounting and auditing process efficiency, reduce fraud risk, and provide financial reports with more accuracy and dependability. However, they draw attention to the need for more research and the creation of suitable legal frameworks in order to successfully integrate new technologies into accounting processes.

The study conducted by Al Shanti & Elessa in [6] explores into the influence of digital transformation on the utilization of blockchain technology within the banking sector, with the aim of enhancing the quality of accounting information and streamlining corporate governance processes. The research scrutinized the deployment of blockchain in the banking field, the nuances of its application in accounting and corporate governance, and the advantages and challenges tied to its implementation. The researchers deduced that the adoption of blockchain technology can indeed enhance both the caliber of accounting information and the efficiency of corporate governance within the banking domain.

However, they highlighted the necessity to address a range of challenges, including regulatory issues and data protection. The article explores diverse strategies for employing blockchain technology in the banking industry and examines research outcomes that highlight the potential merits of using this technology to ameliorate accounting information quality and ensure proficient corporate governance. The authors emphasize that the successful integration of blockchain technology in the banking sector hinges upon a thorough understanding of the industry's specific requirements and the adoption of a meticulous approach when implementing projects based on this technology.

The main focus of Oladejo's study in [10] is to examine the potential changes to accounting and auditing methods brought about by blockchain technology. The study includes a thorough analysis of several blockchain application parameters, covering elements like security, dependability, efficiency, and cost-effectiveness. The study also explores how blockchain may be used to improve sustainability in financial reporting and the auditing sector within the accounting business. The study's findings demonstrate the blockchain's enormous potential as a powerful tool for upgrading both accounting and auditing operations. The report does emphasize that a number of organizational and technical issues need to be resolved. The dissertation finishes with a list of suggestions for additional research projects and the successful use of blockchain in the accounting industry.

The study's key findings center on blockchain's potential to dramatically advance the accounting and auditing industries. This results from its capacity to promote more effective information transmission, reduce the dangers of data tampering, and encourage greater transparency and openness. The report also emphasizes the need to fully comprehend and evaluate the potential hazards associated with blockchain usage as well as the necessity of addressing the legal complexity of its deployment. In order to successfully integrate blockchain into the fields of accounting and auditing, the author also emphasizes the need for cultural and relational changes among stakeholders.

A thorough investigation was conducted to determine how blockchain technology has the capability to change the fields of accounting, auditing, and finance in [8]. The study looked into how smart contracts were being used to automate financial transactions, how blockchain was being used in accounting to manage financial transactions, improvements in auditing practices, and the fight against financial wrongdoing. The writers also explored how to better the processes of accounting and auditing by integrating other technologies such as artificial intelligence, machine learning, and they provided several examples of how these technologies were put to use. The article thoroughly examined the body of literature that has already been written on the application of blockchain technology to accounting, auditing, and finance. The results addressed various important issues, including: Because it allows for the tracking of transactions, the automation of procedures, and the facilitation of smart contracts, blockchain has the potential to significantly improve the efficiency, security, and accuracy of financial reporting. However, issues with scalability, standardization, and protecting individual privacy and information must be resolved for blockchain technology to become widely used in accounting and auditing.

The prospective effects of blockchain on the industries of accounting and financial management are examined in [9]. The paper includes a review of many research works that have used blockchain in accounting, auditing, and financial management as well as an analysis of the historical development of accounting. The article provides examples of how blockchain is used for various financial tasks, such as recording payments, conducting electronic elections, and protecting stocks. The researchers also investigated the ways artificial intelligence and machine learning can be used to improve accounting and auditing procedures.

In light of these considerations, the authors arrive at the conclusion that blockchain technology could emerge as a significant tool for the domains of accounting and financial management. This assertion stems from its potential to introduce security, precision, and transparency into transactions. Nonetheless, a range of technical, legal, and regulatory obstacles must be addressed for effective utilization of blockchain. The authors delve into the conventional approach to accounting and evaluate the applicability of blockchain to various accounting facets, including currency transactions, production accounting, and taxation. The ultimate inference drawn is that blockchain technology has the potential to deliver heightened accuracy, speed, and security in financial transaction accounting, thereby enhancing overall efficiency. However, the authors underscore that the successful integration of blockchain technology into accounting necessitates a proficient workforce and an appropriate regulatory framework.

The study by Singh et al in [11] explores how blockchain technology is transforming the industries of accounting, auditing, and finance. The analysis was carried out via a systematic review of the literature, in which the authors painstakingly examined 46 academic papers on the application of blockchain technology in the financial sphere. The results of this investigation showed that implementing blockchain can lead to increased security and efficiency in both accounting and auditing procedures. It's noteworthy that this technology creates a secure data repository system that is open and immutable and requires prior authorization for any changes.

Additionally, blockchain enables automated communication between various financial entities, lowering error risks and reducing the possibility of fraud. The study also highlights how blockchain technology has the potential to improve financial data's accessibility and transparency for all market players. The technology's integration also promises to strengthen risk management procedures and improve the effectiveness of fraud detection. In conclusion, the study emphasizes how much blockchain has the potential to transform the fields of accounting, auditing, and finance. The authors urge more research into the technology's numerous uses across industries and its continuous disruptive impact on various fields in the paper's conclusion. The authors' conclusions regarding the transformative impact of blockchain on accounting, auditing, and finance are as follows:

Blockchain has the latent to boost the security and transparency of financial transactions. It also holds the capacity to enhance the effectiveness of the audit procedure. The utilization of blockchain can effectively tackle issues linked to imprecision and deficiencies in financial reporting quality. By incorporating blockchain, the expenses linked to the safekeeping, handling, and transmission of financial data can be curtailed. The amalgamation of artificial intelligence and blockchain has the potential to enhance precision. In summation, the authors contend that blockchain bears the capability to ameliorate efficiency and dependability in the realms of accounting, auditing, and finance, concurrently diminishing the expenses affiliated with these activities.

Therefore, after carefully reviewing important and relevant literature, we can conclude that blockchain technology has a great deal of potential to be included into the field of accounting and auditing, along with benefits and difficulties for doing so. Increased security, provided by the distributed network storage, ensures a robust safeguarding of transactions and financial data; decreased operational costs, attributable to the technology's capacity to increase transaction processing efficiency and reduce reliance on intermediaries; and transparency, made possible by the transparency inherent in blockchain technology.

However, there may be some negative effects from the adoption of blockchain technology in the accounting and auditing industry. These include complexity—the technology may be difficult for users who are unfamiliar with its functionalities to use; infrastructure requirements—using blockchain may require significant expenditures for network servers and equipment; and regulatory considerations—the absence of clearly defined legal frameworks for blockchain in different countries may make it difficult to understand and navigate its legal dimensions. Therefore, finding workable solutions for the systematic and thorough assimilation, incorporation, and utilization of blockchain within the accounting industry becomes a pressing requirement, with direct implications for the operational, structural, and financial aspects of the sector.

Study Objectives

The major goal of this study is to demonstrate the viability of incorporating Blockchain technology into the fields of accounting and auditing, while taking into account the stated risk factors of inaccurate reporting and information vulnerability. The following list summarizes the study's main goals:

- To determine the real-world applications of Blockchain technology and how they might be used effectively in the field of accounting and auditing.
- To compare and contrast traditional and technologically advanced organizational frameworks for accounting support of financial and economic processes, using Blockchain technology.
- To provide a solid foundation of proof outlining the benefits brought about by the implementation of Blockchain technology in order to increase the effectiveness and longevity of accounting systems.

3. Methodology

Following strategies were used to accomplish the study's goals and objectives:

- An information-based and analytical analysis of how Blockchain technology is being used in real-world accounting and auditing applications. This evaluation included a thorough investigation of academic sources, relevant publications, technical documents, and actual Blockchain implementations in the context of accounting and auditing. This made it easier to find opportunities and benefits related to using Blockchain to improve accounting and auditing processes.
- A comparison of the technological and organizational foundations supporting systems for financial and commercial transactions. In this investigation, numerous accounting and auditing methodologies—including both conventional and Blockchain-based ones—were contrasted. Organizational and technological aspects

were taken into account, and each framework's benefits and drawbacks were assessed along with their suitability for use in the field of accounting.

These approaches allowed for a thorough examination and evaluation of the potential uses of Blockchain technology in the fields of accounting and auditing. By utilizing the technological solutions and smart contracts provided by Blockchain technology, the study's findings will be used as a basis for developing and implementing organizational and technological frameworks for strengthening the support systems underlying financial and economic transactions.

4. Findings

The advantages and traits of using blockchain technology in the fields of accounting and auditing have been identified using insights from the findings of the information-driven and analytical examination. We examine recent works [17-19] that demonstrate the practical applications of blockchain technology in accounting by utilizing the tools provided by Review Research:

- Blockchain technology has the capacity to validate financial data, including transactions like payments and invoices. This has the potential to lessen the likelihood of financial fraud while boosting the reliability of reporting.
- The blockchain's secure data storage capabilities are of utmost importance for accounting and auditing. The accuracy of financial reporting depends critically on such secure data keeping.
- By effectively tracing financial transactions, blockchain technology reduces the risks associated with fraud and mistakes. Additionally, it has the potential to increase the effectiveness of accounting and auditing procedures.
- The use of blockchain innovation possess the potential to automate a number of operations involved in accounting and auditing. Such automation has the potential to increase productivity while reducing the likelihood of error.

Blockchain technology has the potential to be used to build systems that speed tax-related activities, improve reporting accuracy, control expenses, secure data, and automate procedures in the field of accounting and auditing. However, as indicated in recent study [20-24] that the integration of blockchain technology inside accounting and auditing workflows can be confronted with specific obstacles and concerns as highlighted below:

- It is clear that accounting and auditing experts are not familiar with blockchain technology or it’s potential. It's possible that many businesses aren't fully ready to use this technology in their operations.
- The adoption of blockchain technology may require significant financial outlays for development, deployment, and upkeep.
- The smooth collaboration between various businesses and systems using blockchain technology may be hampered by the lack of established procedures. Lack of standardization could result in problems with interoperability and security.
- Because openness is at the core of blockchain technology, issues may arise when it comes to protecting private information. It is crucial to provide proper data safety within the blockchain.
- Concerning the storage of data within the blockchain and the legitimacy of the blockchain technology itself, legal ambiguities arise. It is essential to address these issues before the technology is adopted.
- Although blockchain technology has shown to be effective at assuring the confidentiality and accuracy of accounting and auditing operations, its processing time can be noticeably slower than that of traditional data processing systems. This could present problems, particularly in situations where real-time processing of numerous transactions is required, like in the banking industry.
- Compatibility with current accounting and auditing frameworks may be required for the integration of blockchain, requiring complexity and a lot of labor. Additionally, incompatibilities between multiple blockchain versions and different protocols could cause problems.
- Accounting and auditing professionals may need to have unique knowledge and skills in order to apply blockchain technology. If firms lack expertise in this area and find it difficult to give their personnel the proper training, this could be an issue.

In light of this, applying blockchain technology to accounting and auditing processes has the potential to improve the effectiveness and precision of those processes. This integration does, however, face a number of challenges and problems, including those related to employee education, costs, standardization, data confidentiality, and legal ramifications. Therefore, in order to successfully adopt blockchain, a thorough understanding of these issues is required before doing so, as is the search for appropriate solutions to address them.

The application of blockchain technology to accounting and auditing operations has the potential to provide significantly higher levels of accuracy and security for transactions and data. Recent researches in [25-29] explain the following fundamental mechanisms for the integration of blockchain inside these processes:

- Blockchain can create a decentralized data storage system by distributing data among numerous network nodes, enhancing data security and accessibility. This method is especially useful for accounting and auditing duties, which involve managing enormous data volumes.
- The use of blockchain can make it easier to create a system for validating transactions, which is intended to verify their accuracy and promote a higher degree of dependability in financial reporting.
- The ability of blockchain technology to implement a data access control system contributes to a higher level of security and the protection of sensitive data.
- The use of blockchain technology can make it easier to create a system for automating processes, enabling the automation of accounting and auditing procedures. As a result, these duties are carried out with increased accuracy and efficiency.
- Security and secrecy in the accounting and auditing areas can be considerably strengthened by a blockchain-powered identity validation system. Blockchain provides a secure and reliable pathway for identity verification, in contrast to traditional identifying systems that are vulnerable to fraud.
- The adoption of blockchain technology enables the development of an accurate and dependable audit system. The solution offers an unchangeable and secure transaction record, which is crucial for precisely tracking transactions and identifying any fraud and accounting irregularities.
- Blockchain can be used to build a reporting system that guarantees the accuracy and reliability of financial reporting. Blockchain technology enables the generation of accurate and reliable financial reports by virtue of an immutable transaction log.
- Making use of blockchain technology makes it possible to develop a cost control system that efficiently manages a business's spending. The secure and unchangeable transaction log that blockchain offers enables thorough tracking of business expenses, improving the accuracy and efficacy of cost management.
- The construction of a data storage structure that ensures security and protects against unwanted access to firm data is another area where blockchain excels. Blockchain's decentralized network storage feature boosts security and dependability, and the technology's innate structure maintains data integrity by mandating validation from all network users before any modifications can be made.
- The incorporation of blockchain enables simplified tax procedures, fostering the accuracy and effectiveness of tax accounting. Blockchain makes it possible to track a company's tax requirements meticulously because to its immutable transaction log that includes relevant transaction details.

In alignment with the outlined research proposal, we intend to undertake a comparative examination of conventional and modernized (via blockchain technology) organizational and technological frameworks for facilitating accounting support concerning financial and economic transactions. This analysis will be conducted using a straightforward transactional interaction as an illustrative instance. The conventional organizational and technological framework for accounting support regarding financial and economic transactions between two distinct industries is depicted in Figure 1.

- The Financial Transactions of Industries 1 and 2 engages encompassing activities like the exchange of goods or services, receipt of payments, disbursement to suppliers, salary disbursement, and the like.
- The industry’s Accountants shoulder the responsible for recording financial transactions. The accountant for Industry 1 maintains a record of transaction-related financial data within Industry 1's accounting system, and similarly, the accountant for Industry 2 handles transactions pertinent to Industry 2.
- The Independent financial statements are generated by each industry, incorporating balance sheets, income statements, and statements of equity alterations. These reports adhere to both internal and external accounting standards and are presented to the respective industries.
- The Auditors ensure impartial validation of financial data's accuracy and compliance with accounting standards, external auditors might be engaged by each industry. These auditors independently scrutinize financial records and procedures, overseeing conformity with accounting standards within each industry.

The following stages (shown in Figure 1) could be included in an organizational and technological framework for accounting support regarding financial and economic transactions between two industries (Industry 1 and Industry 2), enabled by blockchain technology:

- Creation and Verification of Transactions: Industries 1 and 2 create a transaction that records the exchange of resources or financial assets in the form of a data block.

- Hashing and Encryption: The transaction is encrypted and hashed using cryptographic methods. The generated hash code is incorporated into the block.
- Participants share the block containing encrypted transactions in a process known as block dissemination. A decentralized data storage system is made possible by the fact that each participant obtains a copy of the block.
- Mining and Confirmation: Network users, like as miners, certify transactions and add new blocks to the blockchain. This process can involve resolving challenging mathematical puzzles or using other safeguards to increase network security and prevent double-spending.
- Data Storage and Security: The blockchain's immutability is established by the fact that each block contains the hash code of the block that came before it. This ensures the reliability and integrity of the data. Additionally, information contained in the blocks is protected against unauthorized access by cryptographic techniques.
- Automated Accounting Record Updating: Accounting records are automatically updated inside the systems of Industries 1 and 2 after block confirmation and integration into the chain. This provides accurate and almost quick insights into financial transactions. Transparency, reliability, and security in financial accounting and reporting between industries are made possible by an organizational and technological paradigm with a blockchain foundation. Error risk is reduced, verification and auditing procedures are streamlined, and industry interaction and cooperation are encouraged.

The hypothetical example of accounting transactions between the fictitious Industries (as shown in Figure 1) serves as an illustration of the key differences between accounting and auditing systems with and without technology integration.

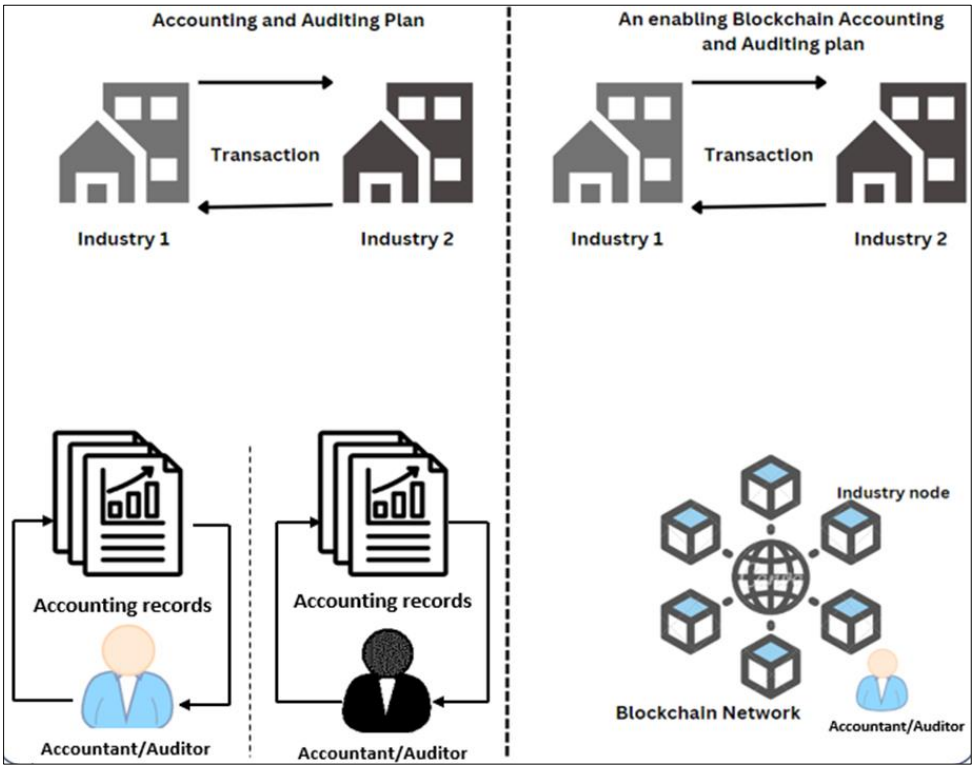

Figure 1 The distinctions in the arrangement of accounting and auditing processes between a conventional system and a novel system that incorporates blockchain technology

The information in Figure 1 above shows that blockchain technology dramatically streamlines the auditing infrastructure, even in a typical financial-currency transaction scenario with two fictitious organizations. This lowers the resource costs associated with managing the data while simultaneously ensuring the secrecy and security of important data. This highlights the potential for cost savings as well as increased productivity and efficiency within the accounting system. As a result, increasing money flows and a favorable investment environment are promoted. This is consistent with the expected positive impacts of blockchain technology on the accounting industry, which are one of the justifications for the relevance of this explored direction and predictions made by specialized organizations.

Compared to traditional methods, using an organizational and technological framework based on blockchain technology to monitor financial and economic transactions has several benefits:

- Efficiency and Speed: Automatic data updates made possible by blockchain make accounting and reporting processes easier and faster. The time needed for human data processing and validation is decreased by this automation.
- Collaboration and interaction: Because real-time access to shared data is made possible via blockchain, it creates a favorable atmosphere for corporate collaboration. This instant accessibility streamlines information exchange and makes collaborative work on financial transactions possible.
- Data Integrity and Reliability: Because each block contains a hash code from the one before it, the use of blockchain ensures reliable data storage. This approach makes data manipulation more difficult while ensuring resistance to changes.
- Decentralization: Blockchain eliminates a single central point of vulnerability thanks to its foundation on a distributed network where each user has a copy of the database. Network security and resilience are improved by this architecture.
- Transparency: The network's members all have access to transaction information, which encourages a high degree of openness and transparency. This characteristic is especially important for auditors and other parties with an interest in the financial stability of businesses.

The security, efficacy, and dependability of accounting and reporting processes can be improved by incorporating Blockchain technology into the field of financial transaction accounting. Additionally, it promotes trust between parties, streamlines audit procedures, and allows for a clearer and more effective flow of financial data. According to study in [30], Blockchain technology significantly reduces the risks associated with information inaccuracies and vulnerabilities in accounting and audit activities, thereby causing immediate financial consequences.

The following risks related to the field of accounting and auditing have been identified by using evaluation methodologies from [31-33] reviewed research below:

- Risk of Efficiency Decline in Remote Divisions: When remote divisions lack permanent accountants or accounting departments, there is a risk of efficiency decline. As a result, processes are delayed, data reflection occurs too soon, information is skewed, decision-making is slowed down, and other negative impacts occur. Efficiency in accounting is disrupted by communication issues from distant departments. Lack of a reliable accountant causes volatility and slowdowns in the processing of financial data.
- Risk of Data Reliability Reduction: Reliability reduction risk is concerned with accounting data that has been skewed as a result of insufficient internal control mechanisms, organizational flaws, and other factors. It stands highlighted that "incomplete accounting" distorts information about entity activities because not all standards are applied. Simplified accounting practices increase financial information distortion, resulting in inaccurate reporting and rule violations.
- Accounting Inefficient Cost Risk Organization: Inefficient costs might result from incurring unwarranted expenses during accounting operations. Common causes include having too many employees, doing redundant work, not effectively using accountants' time, overstating payroll amounts in comparison to industry standards, and not using automated accounting software to its full potential. These hazards may result from utilizing software not designed for small or medium-sized businesses or from an accounting system that is not customized to a company's needs.
- Risk of Control Erosion: This risk has a detrimental effect on management choices, accounting quality, and an entity's reputation. When tasks are overly spread or centralized, control, as exercised directly by persons, confronts difficulties. While excessive decentralization results in responsibility dispersion and inefficient resource usage, over centralization creates dangers to self-control and decision-making bias.
- Risk of Trust Erosion: Stakeholders' skepticism about an entity's reputation causes distrust risk. Accounting practices that seem to support illegal activities are clearly suspect, attracting regulatory scrutiny, legal action, and higher costs. Due to incomplete information, fraud, dubious schemes, unpaid bills, and frequent legal issues, distrust makes it difficult to communicate, build connections with others, and conduct business.
- Risk of Accounting Errors: Inaccuracies in financial statements can be brought about by human errors in accounting and reporting, such as incorrect data entry, incorrect transaction classification, or incorrect financial measure computations. These errors result in data that is unreliable for making decisions.
- The possibility of fraud and falsification is increased by inadequate accounting process control. Aiming for unlawful gain or misrepresenting the company's financial situation, dishonest workers or outside parties may falsify financial data through record modifications, document forgeries, or false transactions.
- Risk of Legal Non-Compliance: The Company may face fines, legal disputes, reputational harm, and other legal implications if it disregards accounting standards, tax laws, and regulatory duties.
- Centralization Risk: When accounting centralizes in remote-entity contexts, centralization risk, a byproduct of diminished control and distrust, manifests. Due to a lack of oversight, misleading information from units

intended for personal advantage poses a concern. Centralization can indicate dubious ties, management centralization, and regulatory worries regarding illicit schemes if an organization manages other people's accounts without specialization.

- Risk of Information Leakage: The risk of information leakage, a component of the lower control and centralized concerns, involves the disclosure of confidential information (such as trade secrets or personal information). Data leaks may be used by bad actors. Strong internal controls reduce these risks. Reduced control increases the potential of leakage. Outsourced accounting, another kind of centralization, increases the danger.

The most likely threats in light of the current risk framework are accounting error [14]. A common problem is the occurrence of a significant number of data input errors, which account for 27.5% of all manual errors in the accounting field. These mistakes come from a variety of data sources, including written documents, emails, and online forms. It is crucial to combine numerous sources into one format, yet doing so not only extends processing time but also increases the chance of mistakes. Such mistakes could include inaccurate payment totals or the unintentional generation of multiple invoices. The Wall Street loss of USD 1.1 trillion in 2010 is one famous example of how these errors can lead to late payment penalties [14].

Significant mistakes are also evident on the part of the accountant, according to Bloomberg [14]. These mistakes include unintentionally saving files containing important business, financial, or tax information to personal devices, which can result in data corruption (18% of errors). Additionally, 17% of errors come from accidentally deleting a customized Excel formula used for calculating company taxes, and 13% come from overwriting corporate system data with statistics obtained from external sources.

It is important to remember that, albeit less commonly, errors can also come from auditors and regulators. The expense of fixing these problems is considerable and requires significant system-wide fixes. For instance, due to similar errors, Bank of America suffered a loss of USD 7.7 million in 2009 [14]. However, according to Bloomberg in [14], there are several elements involved in the more significant errors that auditors and regulators are reporting. One of these causes is a lack of control over how centralized accounting rules are interpreted, which results in skewed interpretations and incorrect system entries (which account for 31.2% of all errors). These huge differences are also caused by regulators prematurely closing reporting and reference forms (which accounts for 12% of all errors) and incorrectly applying tax laws and other provisions of centralized accounting standards (which accounts for 10% of all errors).

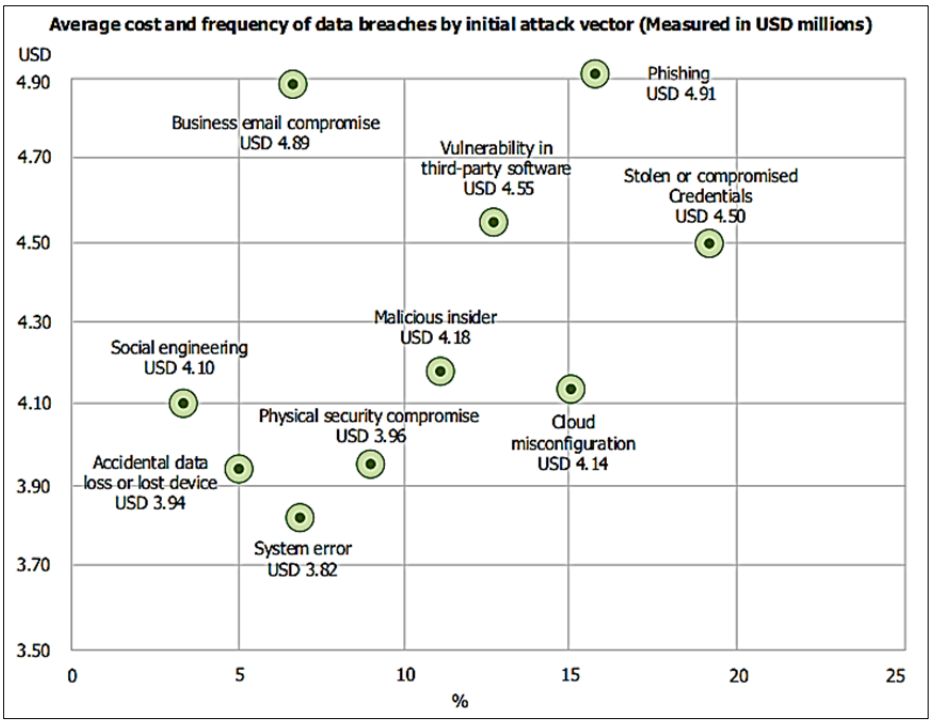

Figure 2 The categorization of digital risks and vulnerabilities based on their associated financial losses in the year 2022, as estimated by IBM 2023

Based on the information provided in Figure 2, in 2022, a number of industries suffered losses in relation to research on accounting rules of more than USD 26.85 million as a result of information security flaws. Over 26.85 million dollars in losses were incurred overall. The simultaneous exposure or compromise of financial data, which accounted for 19.5% of all risks and had an estimated financial worth of almost USD 4.8 million, was the most common risk to information security.

5. Discussion

Blockchain technology has considerable potential for use in accounting and auditing procedures. According to the study's conclusions, blockchain technology can boost data management and financial transactions' accuracy, security, and efficiency. The following benefits are a result of decentralized data storage, cryptographic hashing, and automation: a. Validation of Data and Security The use of blockchain technology lowers the danger of financial fraud and improves the accuracy of financial reporting by validating transactions and maintaining secure, unchangeable records. b. Efficiency and Automation: Using blockchain technology to automate business processes can boost productivity and lower error rates in accounting and auditing procedures. c. Transparency and Trust: The transparency of blockchain transactions can increase stakeholder trust and make auditing processes easier and more accurate. d. Data integrity is guaranteed by the immutability of blockchain records, which makes financial data resistant to illegal changes.

Concerns and difficulties in integrating blockchain technology into accounting and auditing are also noted. Even while the benefits appear good, there are still a number of issues that must be resolved before blockchain technology is widely used in accounting and auditing: Lack of Knowledge: The fact that many industry experts are unfamiliar with blockchain technology could prevent successful integration. b. Financial Costs: Implementing blockchain technology might come at a high cost in terms of development, deployment, and upkeep. c. Interoperability and Standardization: The blockchain technology's smooth implementation may be hampered by the absence of defined methods for business and system collaboration and interoperability. d. Data Privacy: Blockchain's transparency and the need to safeguard confidential information collide, necessitating measures to maintain data privacy. e. Legal and Regulatory Issues: To assure compliance, legal issues around blockchain technology, particularly worries about data storage and validity, must be resolved. Processing times for blockchain transactions may not be fast enough to fulfill real-time standards in some businesses, which could limit their application. f. Compatibility and Complexity: Integrating blockchain with pre-existing frameworks for accounting and auditing may necessitate sophisticated compatibility fixes. g. Skill Requirements: To successfully adopt and manage blockchain technology in accounting and auditing procedures, professionals need to possess particular knowledge and abilities.

6. Conclusion and future work

The efficiency and accuracy of accounting, auditing, financial-commercial analysis, and financial-economic analysis could all be improved by incorporating blockchain technology. Using blockchain technology can improve security and transparency, reduce the possibility of mistakes and tampering, and make it easier to collect and analyze data. Nevertheless, the implementation of this technical innovation may confront barriers, such as a lack of preparedness for acceptance, large expenses, challenges connected to standards and securing data, legal considerations, and sluggish transaction rates. Evaluating the viability of integrating blockchain technology needs a complete assessment that takes into consideration both the advantages and the potential risks and expenditures, enabling a well-informed decision-making process.

In spite of these considerations, there are a number of advantages that can be derived from the use of blockchain technology within the domain of Accounting, Auditing and Finance and Economic Analysis. These benefits include:

- Enhanced precision and dependability of data. Blockchain protects the integrity and correctness of data kept within the system, thereby decreasing the possibility of errors and reducing the vulnerability to misuse.
- Improved operational effectiveness. Blockchain integration has the ability to reduce the time and costs associated with auditing and carefully examining financial operations. This is achievable by automating procedures and diminishing the dependency on human resources.
- Decreased expenses for data storage and processing. The utilization of blockchain technology can lead to a reduction in the costs linked to storing and processing data, as the technology ensures both the security and accuracy of data.
- Heightened data safeguarding. Through encryption and decentralization, blockchain ensures the protection of data. This attribute aids in circumventing the compromise of sensitive information and intensifies the shielding of user data.

- Real-time audit capabilities. Blockchain has the capability to facilitate real-time auditing, enabling the expedited identification and resolution of issues

In future research, the focus should be on exploring expert views and finding pragmatic ways to integrate blockchain technology tools seamlessly into the current accounting processes and operations, as well as financial and economic analysis. On this research journey, the goal should be to identify and develop pragmatic ways to incorporate blockchain tools into the current and customary accounting processes and operations. These strategies should not only be theoretical, but also practical, addressing the complexities of the financial industry's processes while leveraging blockchain's unique strengths. Blockchain integration should be pursued with an in-depth understanding of workflows, needs, and existing technologies. Strategies should focus on maximizing the benefits of blockchain, such as security, transparency and efficiency, while minimizing disruption to current operations and interoperability with legacy systems.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1] Bozhkova, V., & Halytsia, I. (2022). Mechanisms to ensure the development of the economy of the future in the context of global change. Futurity Economics&Law, 2(2), 4–13. https://doi.org/10.57125/FEL.2022.06.25.01

[2] Rawashdeh, A., Bakhit, M., Abaalkhail, L. (2023). Determinants of artificial intelligence adoption in SMEs: The mediating role of accounting automation. International Journal of Data and Network Science, 7(1), 25-34. https://doi.org/10.5267/j.ijdns.2022.12.010

[3] Prokopenko, O.V., Biloshkurska, N.V., Biloshkurskyi, M.V., & Omelyanenko, V.A. (2019). The role of banks in national innovation system: general strategical analytics. Financial and credit activity: problems of theory and practice, 3(30), 26-35. https://doi.org/10.18371/fcaptp.v3i30.179455

[4] Lianos, I., Hacker, P., Eich, S., & Dimitropoulos, G. (Eds.). (2019). Regulating blockchain: techno-social and legal challenges. Oxford University Press. https://global.oup.com/academic/product/regulating-blockchain-9780198842187

[5] Dhillon, V., Metcalf, D., & Hooper, M. (2017). Blockchain enabled applications. Berkeley, CA: Apress. https://doi.org/10.1007/978-1-4842-6534-5

[6] Al Shanti, A. M., & Elessa, M. S. (2023). The impact of digital transformation towards blockchain technology application in banks to improve accounting information quality and corporate governance effectiveness. Cogent Economics & Finance, 11(1), 2161773. https://doi.org/10.1080/23322039.2022.2161773

[7] Han, H., Shiwakoti, R. K., Jarvis, R., Mordi, C., & Botchie, D. (2023). Accounting and auditing with blockchain technology and artificial Intelligence: A literature review. International Journal of Accounting Information Systems, 48, 100598. https://doi.org/10.1016/j.accinf.2022.100598

[8] Singh, M., Joshi, M., & Sharma, S. (2023). Integrating Blockchain Technology into Accounting Curricula: A Template for Accounting Educators. In Handbook of Big Data and Analytics in Accounting and Auditing (pp. 337-360). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981- 19-4460-4_15

[9] Jayasuriya, D. D., & Sims, A. (2023). From the abacus to enterprise resource planning: is blockchain the next big accounting tool?. Accounting, Auditing & Accountability Journal, 36(1), 24-62. https://doi.org/10.1108/AAAJ-08-2020-4718

[10] Oladejo, M. T. (2023). Blockchain Technology: Disruptor or Enhancer to the Accounting and Auditing Profession (Doctoral dissertation, The University of Waikato). https://hdl.handle.net/10289/15539

[11] Singh, M., Joshi, M., Sharma, S., & Rana, T. (2023). How Blockchain Is Transforming Accounting, Auditing and Finance: A Systematic Review. Handbook of Big Data and Analytics in Accounting and Auditing, 535-560. https://doi.org/10.1007/978- 981-19-4460-4_23

[12] Guntara, R. G., & Nurfirmansyah, M. N. (2023). Blockchain Implementation in E-Commerce to Improve The Security Online Transactions. Journal of Scientific Research, Education, and Technology (JSRET), 2(1), 328-338. https://doi.org/10.58526/jsret.v2i1.85

[13] Shukla, S., & Shyam, K. C. (2023). Leveraging Blockchain for sustainability and supply chain resilience in e-commerce channels for additive manufacturing: A cognitive analytics management framework-based assessment. Computers & Industrial Engineering, 108995. https://doi.org/10.1016/j.cie.2023.108995

[14] Majewski, S. (2018). How mistakes in tax and accounting are slowly killing your business from the inside: the need for A.I solutions. Medium. https://medium.com/dlabs-ai/how-mistakes-in-tax-and-accounting-are-slowly-killing-your-business-from-the-inside-the-need-for-1aa6d32902c1

[15] Drábková, Z., & Pech, M. (2019). Financial statements risk: Case study of a small accounting unit. Scientific papers of the University of Pardubice. Series D, Faculty of Economics and Administration. 45/2019. https://hdl.handle.net/10195/72238

[16] Boisseau-Sierra, M., Chu, J., & Rajgopal, S. (2023). Market Consequences of Sovereign Accounting Errors. Available at SSRN 4319249. http://dx.doi.org/10.2139/ssrn.4319249

[17] Cheng, X., Holt, T., Long, J., & Loraas, T. M. (2023). Blockchain Applications: The Impact of a Firm's Choice of Financial Accounting System on Nonprofessional Investor Judgment and DecisionMaking. Available at SSRN 4386081. https://dx.doi.org/10.2139/ssrn.4386081

[18] Peter, N., & Vukovljak, B. (2023). The impact of Blockchain on audit profession. MAP Social Sciences, 3(1), 11-24. https://doi.org/10.53880/2744- 2454.2023.3.1.11

[19] Stafie, G., & Grosu, V. (2023, January). The Impact of Artificial Intelligence on Accounting. In Digital Economy and the Green Revolution: 16th International Conference on Business Excellence, ICBE 2022, Bucharest, Romania, March 24-26, 2022 (pp. 247-265). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-19886-1_18

[20] Du, J., Shi, Y., Li, W., & Chen, Y. (2023). Can blockchain technology be effectively integrated into the real economy? Evidence from corporate investment efficiency. China Journal of Accounting Research, 100292. https://doi.org/10.1016/j.cjar.2023.100292

[21] Li, X., Zhang, J., Nan, K., & Niu, X. (2023, January). An Analysis of Trends and Problems of Information Technology Application Research in China's Accounting Field Based on CiteSpace. In Advanced Intelligent Virtual Reality Technologies: Proceedings of 6th International Conference on Artificial Intelligence and Virtual Reality (AIVR 2022) (pp. 217-236). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-19-7742-8_17

[22] Spanò, R., Massaro, M., Ferri, L., Dumay, J., & Schmitz, J. (2022). Blockchain in accounting, accountability and assurance: an overview. Accounting, Auditing & Accountability Journal, (ahead-of-print). https://doi.org/10.1108/AAAJ-06- 2022-5850

[23] Vardia, S., & Singh, H. (2022). Adoption of Blockchain Technology in Accounting and Auditing: Benefits and Challenges. Pacific Business Review (International), 14(08), 95-103. https://pbr.co.in/2022/2022_month/February/9.pdf

[24] Yawalkar, P. M., Paithankar, D. N., Pabale, A. R., Kolhe, R. V., & William, P. (2023). Integrated identity and auditing management using blockchain mechanism. Measurement: Sensors, 100732. https://doi.org/10.1016/j.measen.2023.100732

[25] Bellucci, M., Cesa Bianchi, D., & Manetti, G. (2022). Blockchain in accounting practice and research: systematic literature review. Meditari Accountancy Research, 30(7), 121-146. https://doi.org/10.1108/MEDAR-10-2021-1477

[26] Cazazian, R. (2022). Blockchain Technology Adoption in Artificial Intelligence-Based Digital Financial Services, Accounting Information Systems, and Audit Quality Control. Review of Contemporary Philosophy, (21), 55-71. https://ceeol.com/search/article-detail?id=1071087

[27] Morton, E., & Curran, M. (2023). Exemplifying the Opportunities and Limitations of Blockchain Technology Through Corporate Tax Losses. In Handbook of Big Data and Analytics in Accounting and Auditing (pp. 177-205). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981- 19-4460-4_9

[28] Petchenko, M. V., Fomina, T., Balaziuk, O., Smirnova, N., & Luhova, O. (2023). Analysis of trends in the implementation of digitalization in accounting (Ukrainian case). https://doi.org/10.55643/fcaptp.1.48.2023.3951

[29] Shah, I. A., Jhanjhi, N. Z., & Laraib, A. (2023). Cybersecurity and Blockchain Usage in Contemporary Business. In Handbook of Research on Cybersecurity Issues and Challenges for Business and FinTech Applications (pp. 49-64). IGI Global. https://doi.org/10.4018/978-1-6684-5284-4.ch003

[30] Suslenko, V., Zatonatska, T., Dluhopolskyi, O., & Kuznyetsova, A. (2022). Use of cryptocurrencies bitcoin and ethereum in the field of e-commerce: case study of Ukraine. Financial and Credit Activity Problems of Theory and Practice, 1(42), 62–72. https://doi.org/10.55643/fcaptp.1.42.2022.3603

[31] Ahmed, R. A., & Habeeb, S. M. A. (2023). The effect of employing ready-made accounting programs by auditors on the audit risk and quality: An analytical study of a sample of auditors' opinions in the Kurdistan Region-Iraq. resmilitaris, 13(1), 1953- 1964. https://resmilitaris.net/menu-script/index.php/resmilitaris/article/view/1616

[32] Al-Taee, S. H. H., & Flayyih, H. H. (2023). Impact of the electronic internal auditing based on IT governance to reduce auditing risk. Corporate Governance and Organizational Behavior Review, 7(1), 94-100. https://doi.org/10.22495/cgobrv7i1p9

[33] Kend, M., & Nguyen, L. A. (2022). Key audit risks and audit procedures during the initial year of the COVID-19 pandemic: an analysis of audit reports 2019-2020. Managerial Auditing Journal. https://doi.org/10.1108/MAJ-07-2021-3225