

Resilient Supply Chains to Improve the Integrity of Accounting Data in Financial Institutions Worldwide Using Blockchain Technology

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ABSTRACT

Accounting information systems (AIS) gather, store, and analyze data in providing information to business leaders. Information technology resources and a computer-based accounting system are often used to monitor accounting activities in an accounting information system. Supply chain management strategies, planning, and implementation are increasingly dependent on the expertise of accountants with globalization. The accountant's job is to assist the supply chain design, development, and implementation group. Top management commitment, the kind of accounting information systems used, and input controls are all factors that affect accounting information systems' data quality. They can trace any form of theft or misappropriation using the blockchain (BC), which maintains asset transfers. In hopes of avoiding fraud, agreements loaded with economics and finance principles might be used to govern corporate operations. Using internet of things (IoT) data, banks can better understand their customers' business demands and value chain.

KEYWORDS

Accounting Information, Artificial Intelligence, Blockchain, IoT, Bank, Supply Chain

INTRODUCTION OF ACCOUNTING INFORMATION

Global and cross-disciplinary interest in Blockchain (BC) technologies has risen dramatically since the Bitcoin cryptocurrency has been embraced (Hameedi et al. 2021). In practice, the term BC digitally signed pages of a book accounting system that can make digital payments using cryptocurrencies (Abdelraheem et al. 2021). Decentralized payment transaction management and validation is a key feature of the BC protocol since it avoids duplicate or digitally multiplied currencies when used in its most basic context (Liu et al. 2021). It has a lot of potential for expansion and growth, is cheap to use, and is altering the way private transactions are recorded because of its ease of use and high level of security (Wahyuningsih et al. 2021). Human and financial resources inside an organization are collectively called the AIS, responsible for collecting and processing transaction data to provide financial information to management (Ahmed. 2021). All levels of management have access to this data, which is then used to plan and monitor the organization's actions (Fullana & Ruiz. 2021).

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Organizations utilize supply chain networks to purchase, manufacture, and distribute products and services all over the globe using supply chain and information systems (SC&IS). It's possible to enhance ordering, production, and inventory operations via the use of supply chain management (SCM), a management technique in cost accounting. SCM aids in streamlining the process. When a customer places an order, the SCM system is used to keep tabs on its progress from placement to confirmation to delivery. This ensures orders are handled quickly and correctly.

Production activities, such as resource and material allocation, are planned and scheduled using the SCM system so that output can be maximized while still meeting customer demand.

Raw materials, finished products, and Production process are all tracked through the SCM system to keep tabs on production progress. This ensures that the right products are in stock at the right time to meet customer demand and reduce inventory costs.

In contrast to finance, Supply Chain is concerned with procuring, producing, and distributing items to consumers. It is possible to connect and interact between Finance and Supply Chain, although they typically use separate platforms.

Investors, creditors, and management rely on this system to keep tabs on the organization's financial health and disseminate the findings to the appropriate parties (Malo-Alain et al. 2021; Balios. 2021). Information systems supporting the various aspects of the accounting functions have been established for each area, which must provide the required quality of accounting information to work effectively and efficiently, from preparing financial statements to completing tax returns (Jovanović & Vašiček. 2021; Stoel & Havelka. 2021). Provide summaries of this data in financial reports for the benefit of external users (Choi. 2021). Accounting Information Systems (AISs) monitor accounting processes utilizing information technology resources to satisfy the accounting information quality criteria (Anwar et al. 2021). It employs a mechanism that keeps track of accounting operations through IT resources (Caruana. 2021). There has been an increase in the role of accounting in management due to this transformation in both local and global economies, which has resulted in a shift in accounting practices. Customers' and employees' information and tax data must all match the quality requirements of the accounting information system (Bătae et al. 2021; Wang. 2021).

An AIS collects and stores financial and accounting data, a mechanism for monitoring accounting operations using information technology resources, to attain quality accounting information features (Chatzitheodorou et al. 2021). Quality of financial and accounting data and information on investors, debtors, and taxes focus on the accounting information system (AIS) (Nugroho et al. 2021). This data is kept in the database of the accounting information system, and it is processed in a way that benefits the company (Dabbicco & Mattei. 2021; Ali et al. 2021). This system employs cyber security to keep the information safe (Budur & Poturak. 2021). The accounting profession is no exception to the widespread effects of globalization. The expansion of global corporations impacts accountants, expanding their employment options and mobility. It raises the need for a consistent accounting system. Because many organizations are following the globalization process, accounting must follow this process and report financial problems using a unique accounting technique that the whole business community can understand.

In AIS-BC-IoT, financial information can be checked to verify or change expectations based on historical performance patterns, and customers can make future choices based on feedback. AIS is critical because of the role feedback plays in a firm's long-term viability and growth. As a result, the system's ability to react to continually changing situations has improved, resulting in an overall increase in accounting information quality. It helps customers make better choices by providing them with more relevant information. It is preferable to deliver information quickly yet accurately than to provide accurate information deliberately. This is because information loses its usefulness if it is not supplied when it is required. Analyze the workday with the help of the IoT devices, and they can determine when they have been most effective and least successful.

- For financial statements to be meaningful, they need to be relevant to the decision-making process of the end-users, as other information cannot be utilized. Unless it directly impacts future investment or lending choices, this information must be included in the financial statements.
- Numerous elements must be present in financial data to be considered dependable. These features include the consistency of the findings and the reliability of the data itself.
- For investors and creditors to profit from current or future actions, accounting information must be published quickly to ensure that the quality of accounting information can be guaranteed. For the AIS outputs to be timely, the information must be sent to its customers promptly.

Accordingly, the rest of AIS-BC-IoT can be organized. Describe the relevant research in section 2 of this paper. In section 3, a summary of the recommended study is provided, and section 4 details the simulation results and discussion. Section 5 concludes the report by going into great depth on the observations and developments that have taken place.

RELATED WORK

(Alawaqleh. 2021) introduced that internal control and employee performance were intertwined in this research, which examines the function of the Accounting Information System (AIS). This research explores whether internal control and the AIS affect the performance of employees in small and midsize enterprises (SMEs) .

(Mohsin et al. 2021) explained that there was a correlation between employee performance and internal control according to this study. Accurate earnings timeliness information and investor decision-making depend heavily on the use of International Financial Reporting Standards (IFRS) compliant accounting data measurement methods. This research looked at whether or not the adoption of IFRS was required by law. Additionally, the banking sector was examined in the research. They expect legislative changes to close the gap between asymmetrical earnings exposure and value relevance for investors' decisions.

(Garg et al. 2021) said the many advantages blockchain technology could bring to banking, and this research will examine how these benefits might be quantified. Banking services need concerns about security, values, and standards. The reliability and validity of the proposed instrument were evaluated by conducting a confirmatory factor analysis (CFA).

(Omran et al. 2021) detailed an assessment devised by the researchers that might assist decision-makers in assessing the potential advantages of blockchain technology before deciding whether or not to use it in their current system. External financial markets' capacity to appraise the efficiency of management's quality plan for manufacturing businesses that relate executive remuneration to non-financial performance measures (NFPM) was one of the study objectives they addressed. Manufacturing businesses that emphasize quality strategy reveal more information on non-financial indicators in annual reports. The disclosure of non-financial measures favorably improves operating financial performance for quality-oriented enterprises.

(Quagli et al. 2021) discussed an overall measure of the primary monitoring activities that were likely to impact financial reporting quality at the national level was proposed in this study. Three separate financial reporting controls (FRCs) were combined to form a composite indicator to calculate the overall indicator (FRC).

(Al-Delawi et al. 2020) introduced the demand for accounting information systems is on the rise since it has a significant impact on organizational performance and is a new field to study. Since accounting information systems play an important part in petroleum industry performance management, this essay will focus on this topic. The petroleum industry's significant contribution to the country's GDP and the widespread usage of accounting data has heightened the need to look into this new field. Policymakers may use these results as a roadmap to concentrate on an accounting information system that improves organizational performance.

(Al-Waeli et al. 2020) explained that internal control serves as a mediator between accounting information systems and financial performance in this paper. Workers in 18 industrial enterprises

received (90) questionnaires, and the results were delivered to them. The study found that timely, accurate, and verifiable financial reporting substantially influences a company's financial success. On the other hand, the financial performance had no meaningful impact on its relevance. Internal control was shown to be a positive moderator when it comes to relevance. Internal control is used as a mediator to facilitate the link between accounting information systems and financial performance. This study fills a need in industrial company research by offering a fresh theoretical perspective and management framework for future investigations.

(Andarwati et al. 2020) detailed for retail businesses, accounting information systems (AIS) play a critical role. There are difficulties in achieving good results when employing an AIS (automated information system) to handle financial data. Using this data, it is possible to see how the simplicity of use, a high-quality system, and user satisfaction with accounting information affect the view of Small and Medium Enterprise's utility. An analysis of Structural Equation Modeling (SEM) data is then performed to determine whether or not there is an association between the variables studied. The AIS-BC-IoT can be used to solve problems with financial records as follows.

It is important to verify the accuracy and trustworthiness of the data collected by Internet of Things (IoT) gadgets. Checks and audits performed on a regular basis can achieve this goal. Use rigorous safety protocols to safeguard the information gathered by IoT gadgets from theft, manipulation, and unauthorized access. Integrating the information gathered by IoT devices with the AIS in a smooth way will reduce inaccuracies and boost productivity. For the data collected by various IoT devices to be consistent and compatible, standard data formats and protocols must be established. Ensure the accuracy of the data being collected from IoT devices by putting in place quality control measures and adjusting as needed. Organizations can use IoT to improve the quality of their financial information and overcome obstacles in accounting data by implementing the aforementioned measures.

These three components were measured by the overall indicator (FRC). FRC does not need to capture a latent construct of quality of financial reporting visible in other metrics, allowing for its creative use in cross-country accounting. The AIS-BC-IoT has been created to overcome existing techniques. AIS-BC-IoT has recommended improving internet finance, accounting quality, performance ratio, management information systems, and online payment.

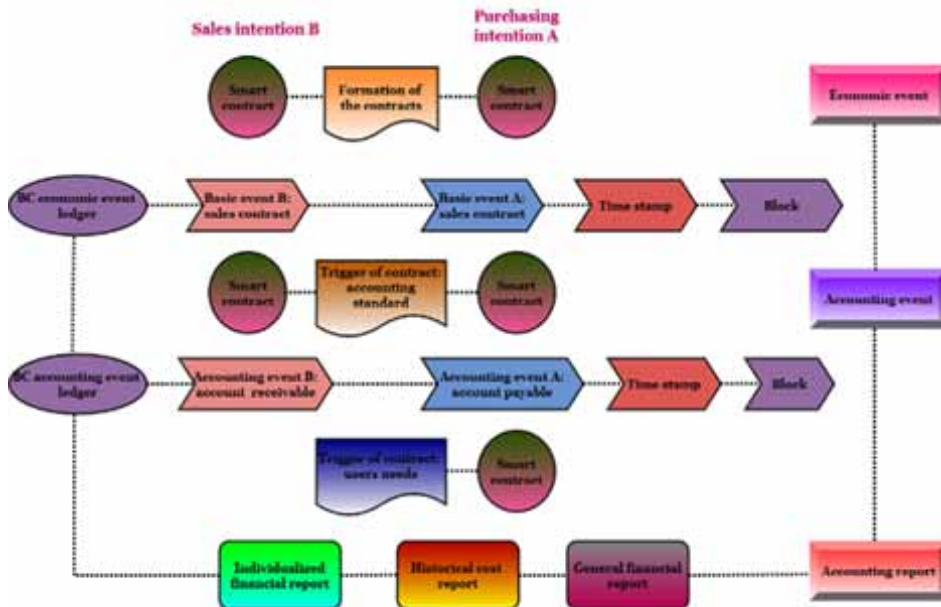
PROPOSED METHOD: ACCOUNTING INFORMATION SYSTEMS USING BLOCKCHAIN AND THE INTERNET OF THINGS

In accounting, it is critical to optimize security management while minimizing risk. There is a high value in the information that computer accounting systems manage, such as financial data, email addresses, and phone numbers of the firms they serve. As a general rule among corporate accountants, avoid hacking assaults because computer accounting systems are chock-full of valuable information. A strong password is crucial to the security of company accounting software solutions, which are supposed to be secure. BC is based on decentralized accounting, which means that all members in the network are responsible for approving, validating, and recording transactions rather than a single institution.

Like other departments, accounting offices preserve their data online for speed, efficiency, and convenience; yet accountants have sensitive client information that cannot be shared with the public. It's easy for hackers to get their hands on sensitive information via ordinary actions like downloading, storing it on the computer, or sharing it over email. Instead of sending papers over email, accountants should utilize a secure and encrypted warehouse to store and distribute documents with their customers. They should be on the lookout for spear phishing and hacking assaults. As long as a password manager is used to save the login credentials of an organization's workers, they are less likely to fall for scams like phishing.

Figure 1 shows the accounting information systems using blockchain and the internet of things. According to the Events Approach to Basic Accounting Theory, examples include and are not limited to leasing, promising, and placing (EABAT). Consequently, inventory does not represent either

Figure 1. Accounting information systems using blockchain and internet of things



value or expenses and rather describes acquisition and consumption processes. According to the experts, accounting information system boundaries are defined by economic events, and all financial transactions that fall within these parameters should be recorded and documented accurately. User-related accounting operations such as adjusting for estimating, amortizing, and summarizing are removed from EABAT's records so that users can easily find the information they need. An economic event-accounting report based on the EABAT system architecture is provided. A smart contract is an economic event involving companies A and B in the preceding example. For Company A, items inventory declines while tokens rise.

The following three sectors of the economy offer a wide variety of specialized services:

- Services in accounting and auditing aid businesses in keeping tabs on their financials, ensuring that their bookkeeping methods are lawful, and putting together reliable financial statements. Auditing financial statements to verify their veracity and accuracy may also fall under this category of services.
- Advice on managing a company's finances is provided by financial consultants. This includes investment strategies, risk management, and capital structure. Consultants in this field may also assist companies in performing in-depth analyses of their financial data.
- Mobile payments, digital currencies, and online lending are just some examples of the financial services made possible by financial technology, or FinTech. Financial technology firms work toward the goal of making traditional banking services more available and user-friendly.

The following are typical components of a model built using the Events Approach to Basic Accounting Theory:

- The first step is to catalogue all the monetary activities (transactions, sales, and purchases) that have occurred during a given time frame.

- It is then necessary to quantify the monetary value of each event. To do so, one must typically put a dollar amount on the event and analyze how it will affect the company's financial statements.
- Afterwards, a journal entry is made to document the monetary occurrences and serve as a permanent record of all business dealings.
- Journal entries are then posted to the relevant ledger accounts, giving a more in-depth breakdown of the monetary dealings.
- Finally, financial statements (balance sheet, income statement, and cash flow statement) can be compiled from the ledger accounts.
- Financial events are identified, their effects are measured, transactions are recorded in a journal, posted to ledger accounts, and financial statements are prepared, all within the framework of the Events Approach to Basic Accounting Theory. This structure allows companies to more easily keep tabs on and assess their financial data.

The smart contract comprises the smart contract's content and the smart contract's execution outcome. The name, amount, cost, location, and date the products were transported are included in the inventory drop information recorded in the block. The location, date, and notification information for a token increment are included in the information provided. The decrease in commodities (feedstock, work-in-process, and completed products) and the rise in tokens correlate to accounting events. Accounting policy choice a company's decision to value its assets by adopting the historical cost or net realizable value method.

The higher a keyword's relevance score y , the more accurate it is in predicting a customer's needs are given as,

$$Relevance\ score(y) = \frac{m_{dy}}{m_{ey} - b} \quad (1)$$

As shown in equation (1), accounting departments m_{ay} save their files electronically for speed, efficiency m_{ey} and convenience b .

Analyze each state's likelihood of occurrence and determine that, for the attacker to succeed δ , they must occur at least once is defined as,

$$\frac{1 + \beta}{1 - 2\beta + \gamma} = \delta > \frac{1}{2} \quad (2)$$

As shown in equation (2), γ denotes the attacker's processing power, and β indicates the honest nodes in the attacker's chain. Efficiency, security, and the quality of the user experience are some of the benefits that have accrued from the financial sector's adoption of Internet of Things (IoT) technology.

Manual or centralized computer systems process financial transactions in conventional systems. The Internet of Things (IoT) paves the way for instantaneous processing of monetary transactions via internet-connected gadgets like smartphones, smart watches, and other wearable's.

Additionally, IoT enables the collection of massive amounts of data, which can then be analyzed to learn more about customer habits and enhance fraud detection. As a result of the information gathered about each individual customer, IoT-enabled financial systems can tailor their services to meet their unique requirements.

When applied to the financial sector as a whole, IoT integration has the potential to user in a period of unprecedented growth and change by facilitating safer, more efficient, and more user-friendly financial transactions.

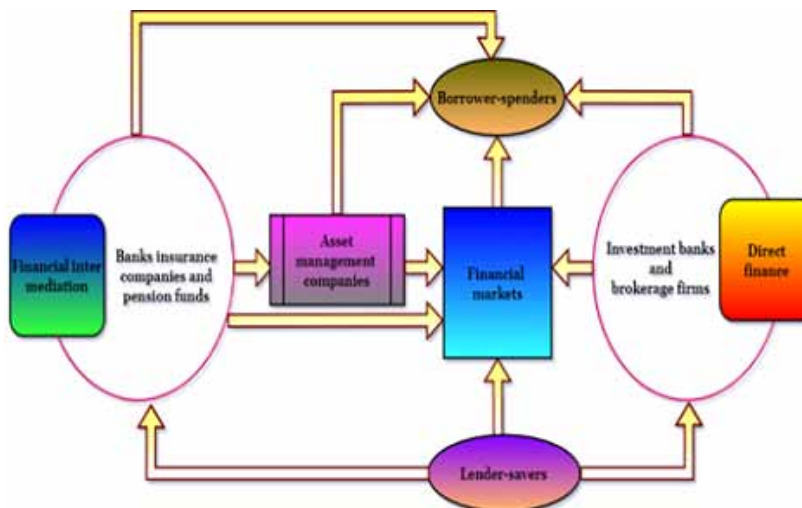
The EABAT is used as a theoretical framework and the distributed ledger as a platform to generate an interactive, real-time, and demand-driven distributed financial report. Concerning its range, its new format extends reporting components such as smart contracts and product sales information beyond the scope of the present value-based financial report. In certain cases, limiting access to reporting items related to trade secrets can be possible. This new accounting record format allows the report author to add and delete elements from the existing/old-style financial statement and then compare old-style financial reports.

Figure 2 shows the systemic transfer of financial resources. The basic economic function of financial markets is to route monies from those who have saved to others who are short of finances. These are lender-savers and borrower-spenders since they both save and lend money. It is possible to finance loans by selling assets like certificates of deposit, commercial paper, corporate bonds, government securities, and equities in the financial markets. Investment banks and brokerage businesses play a key role in raising cash or borrowing money through this approach.

Getting money from lenders to borrowers can be accomplished differently. Using this method, a third party acts as a go-between for lenders who want to conserve money and borrowers who want to spend it. There are three basic groups of financial intermediaries: banks, life insurance, pension fund providers, and asset management organizations. A wide range of specialized services can be found in these three areas of the economy: As financial intermediaries, banks often take deposits from people and organizations and make loans. Families and corporations deposit their savings into insurance or pension plans, which invest them in money market and capital market instruments and other sorts of assets. The services of asset management organizations are meant to assist investors in achieving their financial goals. A wide range of options is available to meet the demands of both individual customers and investors who want to combine their resources.

Asset management organizations serve as a go-between for various financial institutions, including pension funds and insurance companies, in addition to individuals, corporations, and governments. In terms of buy-side banks, asset management companies are the most important for investors who like to handle their money properly. As the opposite of a sell-side company that helps businesses

Figure 2. Systemic transfer of financial resources



issue securities and acquire other businesses through acquisitions, such as investment banks, or brokerage firms that carry out transactions in the financial markets on behalf of the customers or for their benefit, the buy-side is an entity.

Blockchain has a significant influence, notably by transforming the marketing strategy R_{qt} from centralized to decentralized and establishing trustworthiness for unreliable actors in transactions are stated as,

$$R_{qt} = \left(A^2 - \frac{s}{2} \right) * \frac{\sqrt{\varphi(1 + \varepsilon)}}{(\varepsilon - 1) + \sqrt{\varphi(1 + \varepsilon)}} \quad (3)$$

As shown in equation (3), a distributed system of documents ε is a data structure that keeps transactions ordered manner φ and links them to the preceding block, $\left(A^2 - \frac{s}{2} \right)$, through which the financial system in some methods.

Transaction models B and approaches to financial information gathers have traditionally separated marketing strategy from financial information μ^r is described as

$$\mu^r = \sum_{k=1}^n B(x_k, \widetilde{x}_k(s-1) + F_k(T_k)) - \varphi(E_k) \quad (4)$$

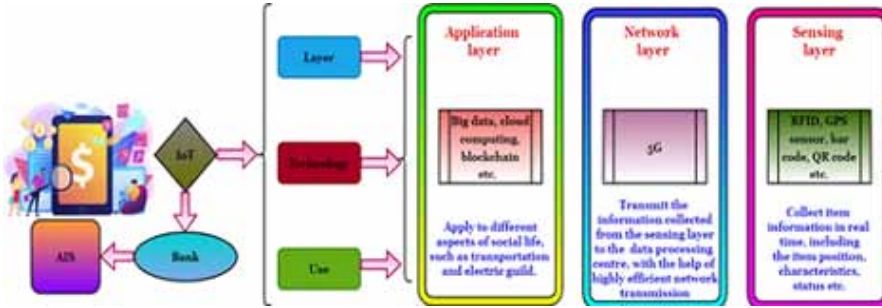
As shown in equation (4), financial reports x_k to make their judgments about the appropriateness of a certain accounting assessment model F_k by entering relevant data E_k into the report φ . Investors can spread their money around and lower their overall risk by combining their resources. Spreading your investment capital across a variety of assets, companies, and regions is known as diversification, and it is a crucial tactic for any investor. By combining their resources, investors can lower the risk associated with their portfolio as a whole and gain access to a broader range of investment opportunities. Investment management costs can be reduced and efficiency increased by combining assets into a larger pool that can be managed more efficiently than several smaller portfolios.

The term “Internet of Things” (IoT) is used to describe a system wherein a large number of disparate physical objects are linked together and enabled to collect and exchange data through the use of embedded electronics, software, and network connections. The data presented by IoT layers can significantly improve the timeliness and accuracy of financial information used in accounting. On the other hand, the sensors’ precision, the robustness of the software, and the safety of the network all play a role in how trustworthy the data presented by IoT layers is taken to be. Therefore, in order to improve the quality of their accounting information, businesses must make sure the data presented by IoT layers is accurate, secure, and reliable.

It is possible to lower risk by helping investors diversify their financial wealth by pooling funds from a wide group of investors, given the transaction costs associated with doing so. By investing in illiquid assets, they can give their fund customers a high degree of liquidity. In addition, their ability to trade large blocks of securities allows them to decrease the value of the dealing charge as a proportion of the transaction value. As protectors of their customers’ interests, asset managers play a key part in their function. The asset managers do not own a customer’s assets; rather, they stay in the client’s hands.

Figure 3 shows the IoT layers in accounting information quality. With self-configuring capabilities and a foundation in open, standard protocols, the Internet of Things (IoT) is an integral aspect of the future network. This network’s physical and virtual objects have unique coding and physical qualities connected via smart interfaces to facilitate information transfer. Connecting physical devices to the

Figure 3. Internet of Things layers in accounting information quality



digital world, or IoT, is what it's all about. There are three levels to the IoT system from a vertical perspective: a sensor layer, a transmission layer, and a third application layer.

Using blockchain (BC) technology, the IoT's application layer can be a stable platform for the IoT's application layer to be developed. They include Robo-advisors, the IoT, and Blockchain technology (BC). If looking to retrieve reliable raw sensor data from IoT devices in complicated contexts, deep learning looks to be a viable option. They use cutting-edge computer technology optimization of IoT applications through innovative offloading techniques. Many industries can benefit from the IoT, from manufacturing to healthcare to smart cities to sports and well-being. It's clear, however, that IoT solutions will be a tiny portion of the entire answer. IoT solution that contributes to overall services is not always crystal evident. IoT solutions can be challenging to scale; operators are suspicious and reluctant to share data and platforms. Enterprises are hesitant to modify their business strategy because of this.

A timestamp confirms the transaction data's existence Z_d while indicating when a block X_c is generated as follows,

$$Accuracy = \frac{Z_d - Z_c}{Z_d + Z_c - X_d - X_c} - \left(\frac{1}{2r} \right) \quad (5)$$

As shown in equation (5), blockchain technology assists banks Z_c since it enables them to handle more transactions X_d without difficulty, $\left(\frac{1}{2r} \right)$ from the internet of things accounting in the financial process. There are a number of ways in which block chain technology can help banks, such as: The potential for fraud and hacking is mitigated with the help of block chain technology, which provides a decentralized ledger system that is secure and reliable. Due to the elimination of middlemen and the decreased need for manual reconciliation, block chain-based transactions are both quicker and cheaper than wire transfers. Block chain technology has the potential to help banks cut costs and improve efficiency by automating manual processes and decreasing reliance on intermediaries.

In order to keep data safe and prevent tampering, block chain technology creates a permanent record of all transactions. The block chain technology ledger facilitates greater openness and trust in financial transactions by involving more parties. With block chain, all parties involved can see and verify transactions in real time because they are recorded permanently and can be traced by anyone. Since block chain transactions are encrypted with sophisticated cryptographic methods, the likelihood of fraud and theft is drastically reduced. By eliminating the need for middlemen and

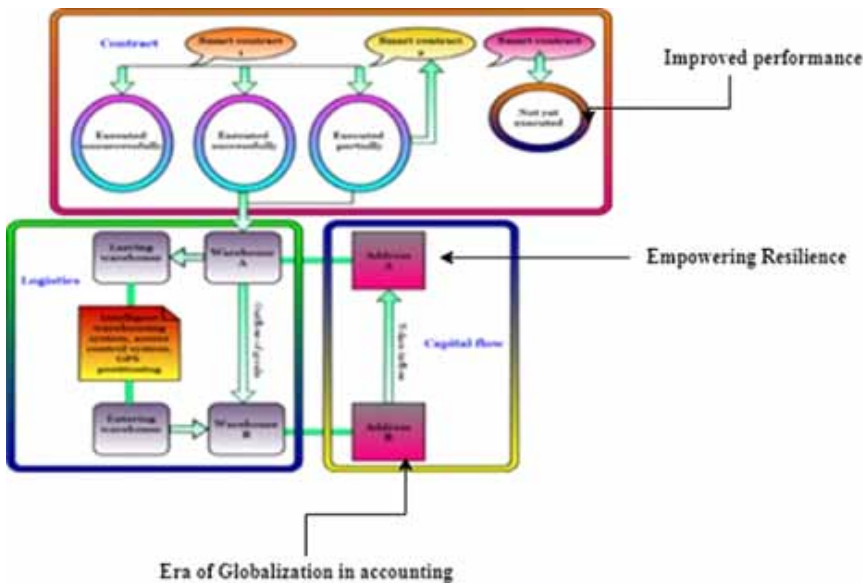
increasing efficiency, block chain technology has the potential to automate many of the previously manual steps in the transaction process.

Using block chain in the circulatory transaction system can increase safety, transparency, efficiency, and automation, which in turn boosts the system's overall performance.

Using a sensor, the IoT establishes a correlation between the physical world and the data it collects. Security and privacy issues hampered large-scale IoT development before BC's introduction and implementation. There are concerns about ensuring that the data are not altered when transferred across different application systems. They are not unlawfully retrieved and taken when transferred between separate application systems. On the one hand, BC technology can assist in addressing the security and privacy concerns associated with IoT data. On the other hand, smart contract scripts based on BC can give the IoT socializing properties. A new business transaction model can be created by integrating the two.

Figure 4 shows the BC in the circulatory transaction system. The starting point of the transaction, the contract, is linked to logistics, money, and information flow. A transaction cannot take place if there is no contract. The contract is a part of a transaction, and a great deal of information can be found in a contract. Performance improvement is organizational development focusing on raising outputs and improving efficiency for a specific process or procedure. Quality control is a typical kind of performance improvement technique to assure consistency of output and consistency of performance analysis.

Figure 4. Blockchain in the circulatory transaction system



Consequently, contracts, orders, and other comparable entities should be considered significant occurrences by the EABAT. Even if a transaction contract has been completed successfully (partially, failed to, and not yet), it is still implemented through a smart contract under the BC transaction model. There are three possible outcomes here: first, the contract is void, and the transaction is canceled when it cannot be carried out for various reasons, such as contract cancellation. Contract information is saved and identified as Smart contract 1 in the block. Logistics and financial flow are completed when a contract is completely performed. According to the smart contract terms, for example, Company A shall move products to Company B's warehouse. Ownership of the Products passes from Company

A to Company B after the warehouse's access control and warehousing systems certify receipt of the shipment. When things don't go as planned, we rely on resilience (or resiliency) to get us back on track. To be resilient, have to accept the circumstance, learn from errors, and then go on to the next challenge. It is a trait that enables one to overcome hardship and bounce back from adversity in one's life. Resilience does not imply a lack of experience with anxiety, depression, or other unpleasant feelings.

When a contract, token payment, and marketing gain are all recognized, ownership transfer is necessary. Third, just a portion of the contract has been completed. The prior contract is canceled, and a new one is established and successfully executed, containing all transactions performed. Smart Contract 2 is the name given to this smart contract. Using IoT-based logistics, this trade model has a strong technological basis. A mature and robust IoT platform aids the seamless installation of a smart contract system. The IoT works as a data logger and recorder impenetrable to human mistakes and fraud to ensure that inventory data is uploaded accurately and on time to the BC. The speeding up of global movement and exchange of people, products and services, money, technology or cultural practices is meant by globalization. As a consequence of globalization, inter-regional and inter-population exchanges are encouraged and increased.

Advances in technology G have had a significant influence on many parts of modernity x , most notably in the bank sector is defined as,

$$G(x|\mu + 1) = x^l(1 - \mu + 1_i) + H_l + \sin(t - 1) \quad (6)$$

As shown in equation (6), a worldwide collection μ of data mapping methodologies and paths is connected to this. Bank strategy x^l is an area of knowledge H_l within the corporate world $\sin(t - 1)$ in the globalization of supply chain in the different format.

Customers S_{rt} get a confirmation email after their receipt details A_{rt} has have been entered into the database record H is stated as,

$$A_{rt} = H \left[\exp(d_k \overline{S_{rt}}) + X_{rt} \rho_k + B\sigma_{rt} \right] \quad (7)$$

As shown in equation (7), to secure X_{rt} of customers' personal information ρ_k when they transact or services $B\sigma_{rt}$ from the banks. An integral part of AIS is its connection to the integrity of the data presented by the IoT layers. AIS are in charge of accumulating, processing, and storing data pertaining to a company's finances. Financial data processed by AIS can be compromised by inaccurate, incomplete, or otherwise unreliable information presented by IoT layers. However, the quality of the financial data processed by the AIS can be greatly improved if the data presented by IoT layers is accurate and up-to-date. This, in turn, can lead to better decision-making and enhanced organizational performance. Therefore, in order to maximize the efficacy of their AIS, businesses should check the quality of the data presented by IoT layers.

Traditionally, transaction models and approaches to accumulating financial information have kept marketing strategy and data separate.

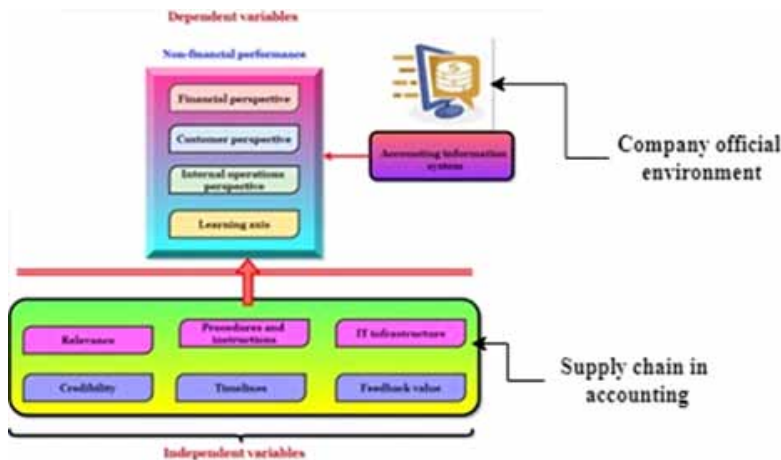
Comparatively, financial information gathering focuses on collecting, analyzing, and using financial data to make informed business decisions, whereas marketing strategies center on promoting and selling products or services to customers.

But in recent years there has been a shift toward combining marketing and financial data. Integrating the two sets of information helps businesses better understand their customers' actions and preferences, which in turn leads to better marketing and financial decisions.

An intelligent automated execution system based on real-time data collecting and analysis can be built using the physical products in the supply chain. Using this paradigm, companies A and B can monitor, record, and upload the current state of their items using warehouse management systems, access control systems, and GPSs they've deployed on their premises. The smart contract can determine whether or not to carry out the contract based on the submitted data after reading, analyzing, and assessing it. As a form of entitlement (money) evidence, a token is employed in this system, making the settlement of transactions and money monitoring throughout the cycle easier.

Figure 5 shows the reliability of financial reporting. Computers, portable devices, databases, printers, and storage media are part of the accounting information system's IT architecture. All of these devices must be quick and store large quantities of data. These devices must be compatible with the system to guarantee compatibility. That implies that firms will obtain exactly the right combination of hardware and software for an accounting system, along with a strategy for replacing and developing any interrupting devices. Procedures and instructions must be adopted to secure sensitive data, such as a simple or complex password, such as biological identification. This assures that those permitted to use computers and often use the company's systems have access to and protect sensitive data. There is a possibility that it contains sensitive data, such as social security numbers and credit card details, which necessitates that all of the data be encrypted to guarantee the quality of accounting information is satisfied. A company's external environment affects all of the company's business choices, plans, and activities in some way. The environment in which a business operates has a significant impact on its success. Data warehousing, data mining, distributed databases, and real-time analytics should all be used to build a database that can produce financial reports on demand, in real time. The reliability and precision of the findings can be enhanced by introducing an element of chance into the analysis procedure.

Figure 5. Reliability of financial reporting



New operational performance measures had to be developed that are consistent with current business objectives, such as superiority measurements, record performance, productivity to keep up with the changing technological environment of today's production processes and the increasing demands of customers and fierce competition. A key instrument for strategic control is non-financial performance metrics that underline the necessity of controlling internal activities. So as a consequence, non-financial success factors like production management by the number of units produced and measurements of how to evaluate things like a product's or service's reputation are critical to the

organization's long-term survival. Non-financial performance metrics have been used to assess the impact of AIS quality on banks in the present research. They are regularly reporting at the designated time. For information on critical and urgent events, the decision-maker should be informed immediately and directly, even if the regular reporting session will be disrupted.

A company's overall financial performance and the value of its stockholders are enhanced by considering the financial perspectives of its earnings, operational returns, and investment returns. Companies' financial risk management must be created urgently to achieve a stable state of development and control over possible hazards, notably financial risk from the businesses themselves. According to financial development, increasing income can improve ties with clients, particularly banks. Since income can be increased through producing and expanding goods and services and dealing with other items that might generate extra money for a company in the second scenario, it is possible. Therefore, it is ensured that the highest risk management and strategic performance levels are maintained to regulate the financial axis. A strong relationship between the organization and its customers is critical to its success. Through customer-centric marketing strategies, firms have been able to more effectively manage their exposure to marketing risks due to this axis' dominance. From the customer perspective, companies are concerned with reaching and dealing with customers and achieving the required level of customer satisfaction. This helps the company design plans to optimize customer happiness, which boosts market profitability and competitiveness in the long run. Technology-enabled business and financial processes give a buyer and one of their supplier's flexible payment choices at reduced financing costs via supply chain finance. Supply chain finance is often compared to more conventional forms of trade financing. Unlike supply chain finance, trade finance has a wider range of options for financing international and local supply networks.

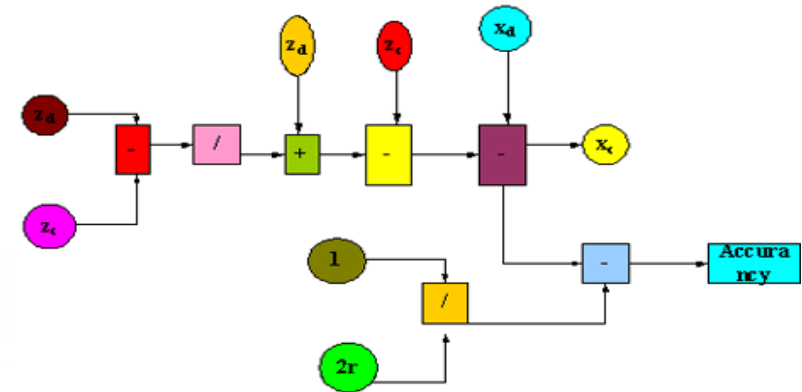
An axis of non-financial performance, the internal operations axis, shows how well an organization's internal operations are running and business administration. Internal operations are all about functioning efficiently and ensuring that these operations are developed within the proper frameworks to help achieve the company's goals. Operational efficiency is directly linked to reducing waste and speeding up processes in the non-financial performance measures. Organizational culture is reflected in the non-financial performance measures, which have an axis for learning and development. Individuals' level of awareness and their link to middle and upper management departments are examined through this axis and their ability to interact and share information. Therefore, it is possible to answer numerous questions about the organization's administrative instability or the level of complexity in issuing and overlapping decisions through the balanced scorecard. Employees have access to a wide range of training and support options to help them enhance their individual and organizational performance. The proposed method enhances internet finance, accounting quality, performance ratio, management information systems, and online payment.

Figure 6 says AIS may significantly impact the conventional supply chain since it creates a more efficient and timely environment for businesses to operate in. Improved customer satisfaction and reduced costs may be achieved via more efficient processes. It might imply enhancing or personalizing an existing product or service in any of the following ways: increasing its speed, reliability, quality of service or advice, limiting its availability, or adding new features. Accounting is critical to supply chain management, and an accountant can help maintain the supply chain system by offering all of these services.

NUMERICAL RESULTS

Both IoT and Blockchain technology (BC) embody transformative impulses in accounting operations. Accounting processes can be revolutionized by combining the Internet of Things with block chain technology, which provides secure, distributed ledgers and real-time data. Accounting departments can benefit from increased precision, safety, productivity, and openness by adopting such tools. The accounting system relies on human control procedures, such as reconciliation, which necessitates more work, and distributed ledger eliminates control and reconciliation operations between organizations

Figure 6. Supply chain with accounting information systems



and the need for intermediaries. Consequently, time and expenses are reduced, improving the system's efficiency. The purpose of this study is to identify the key theme axes that have been created and to discover new ones in the research of IoT and BC technology for safe accounting management. It's possible to enhance ordering, production, and inventory operations via the use of supply chain management (SCM), a management technique in cost accounting. SCM aids in streamlining the process.

Table 1 shows the analyzing internet finance. New technology and innovation in financial services delivery disrupt traditional financial processes. It's a new industry that utilizes technology to enhance financial processes. New technologies like bitcoin and mobile banking are being developed to make financial services more accessible to the general population. Using the internet and other information and communication technologies, financial institutions and internet service providers provide various financial services, including lending, payment, investing, and information intermediary services. Personal loans from internet lenders are comparable to bank loans in the following ways: to decide how much money to lend a customer and the annual percentage rate, the bank will look at the credit score, history, and income when they apply. Customers will make monthly payments on their loans when they get them. The suggested strategy improves internet finance by 98.7% compared to the existing methods.

Table 1. Analyzing internet finance

Number of Customers	FRC	CFA	AIS-BC-IoT
10	52.6	69.1	76.5
20	47	53.5	81
30	53.8	60	78.9
40	59	73.7	84
50	48	69	77
60	52	68.9	82.9
70	54	65	90.9
80	49.7	73.8	93.6
90	51	61.4	89
100	59.7	79.7	98.7

Table 2 shows the accounting quality ratio. Accounting quality is paramount to all parties in the financial reporting supply chain. Permanent records are kept for every transaction in a bank's accounting system. Technical and negotiated qualities are two components of accounting quality, which can be defined as two separate constructs. There are two distinct aspects of accounting quality: technical quality and negotiated quality. The technical quality of a financial report is its conformity to generally accepted accounting principles and standards in terms of both accuracy and completeness. It involves compliance with generally accepted accounting principles (GAAP) and other accounting standards, as well as the use of appropriate accounting methods and treatments. On the other hand, the term "negotiated quality" describes how well the reported financial data satisfies the needs and preferences of those who have a stake in the report. This includes discussions between financial information regulators and preparers, as well as preparers and users, to determine what data will be disclosed and in what format. Financial information's technical quality is concerned with its accuracy and completeness, while financial information's negotiated quality is concerned with its conformity to stakeholders' needs and expectations.

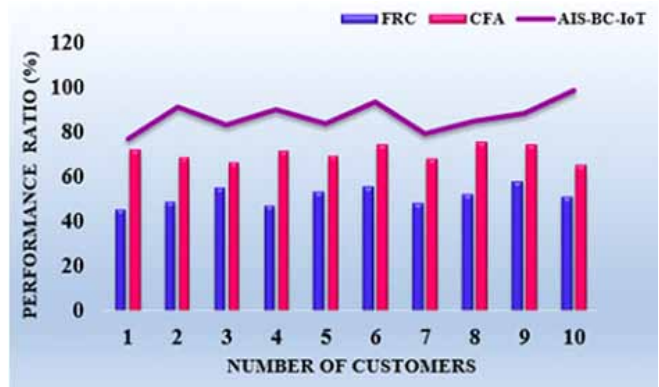
Table 2. Accounting quality ratio

Number of Customers	FRC	CFA	AIS-BC-IoT
10	45.3	67.9	70.6
20	55	71	84
30	58	75	80.6
40	47.1	60.9	83.7
50	53	72	90.3
60	57	78	91
70	45	68.2	92.7
80	50.7	74.1	93
90	57	79.8	82
100	55	75.2	93.6

There were two distinct research trends in the assessment area: accrual metrics-based evaluation and informational quality assessment of accounting quality selected for practical testing. According to the suggested technique, the accounting quality is improved by 93.6%. Several financial metrics can be used to assess the quality of accounting: accrual-based metrics, earnings aggressiveness, loss avoidance measures, and value relevance measures. However, the author believes that it is not enough to rely solely on financial metrics to reflect the quality of accounting accurately. The quality, accessibility, and comparability of accounting information should be considered.

Figure 7 shows the performance ratio. The banking sector's success has always contributed to nations' overall growth and development. When assessing a bank's performance, several elements should be considered. The findings showed that the public banks' performance improves as bank deposits rise by 97.6% using IoT and BC. According to the study, a rise in inflation and economic growth positively impacted bank performance. As recommended research concepts revealed, adoption and implementation led to better corporate governance and ethical behavior, which helped public banks improve their performance. The report suggests that public bank management should use steps to protect against inflation, hedge, and diversify to reduce risk to the bank's performance. Bank performance in emerging economies can be studied using an economic and conceptual model developed by AIS-BC-IoT.

Figure 7. Performance ratio



The above evaluates the safety of the AIS's handling of financial data. If the data security ratio is high, then the financial data is safe from theft, manipulation, and other breaches. Companies can use IoT to monitor these ratios to gauge the efficiency of their Accounting Information System and make adjustments as needed.

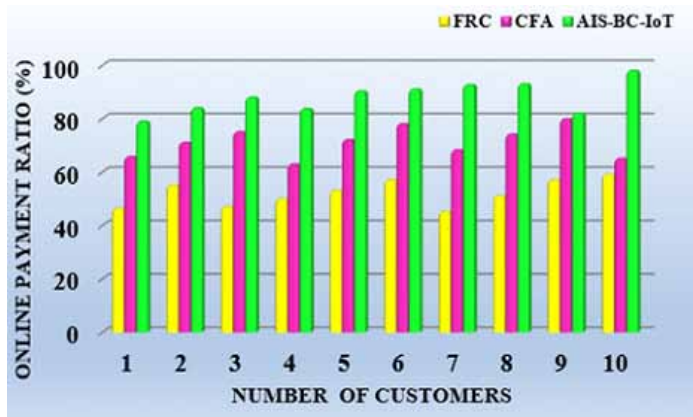
Table 3 shows the analyzing management information systems in the bank sector. Management Information Systems (MIS) is an integrated collection of operations that acquire and create trustworthy, relevant, and correctly structured data that aids in an organization's decision-making process. To put it simply, it is a collection of procedures used to gather, organize, and present data in a manner that helps make decisions. There are several advantages to using MIS to monitor and oversee a company's activities. Systems like this are designed to organize and consolidate data received at every firm level and display it in a manner that aids decision-making to boost profitability and efficiency. The suggested technique improves the MIS 94.9% compared to the existing methods. Many financial institutions still rely on a single mainframe computer to run various outdated systems.

Table 3. Analyzing management information systems in the bank sector

Number of Customers	FRC	CFA	AIS-BC-IoT
10	58.9	74	86.9
20	44.4	63.5	82
30	57	60	78.9
40	59	73.6	84
50	48	63	77
60	52	68.9	92
70	54	65	92.3
80	49.7	73	90
90	51	70.9	89
100	57.6	69	94.9

Figure 8 shows the online payment ratio. A payment method is receiving and approving a company's customers' payments. Online payments make it possible to receive money fast and securely while selling a product or service. Customers can pay for goods and services online by using online

Figure 8. Online payment ratio



payments used by all digital enterprises. Its benefits include improving conversion rates and an increase in client retention. Online sales made possible by this payment mechanism have allowed a slew of companies to grow their operations. Customers who are happy with their purchasing experience are more likely than those dissatisfied to choose the payment method that best meets their requirements. Confidence, simplicity, and clarity are the most important aspects of any payment method. E-commerce can do this by integrating payment methods that are quick, simple, and secure. The proposed method evaluated internet finance, accounting quality, performance ratio, management information systems, and online payment. The efficiency of accounting information systems can be greatly improved through the incorporation of the Internet of Things and online payment systems (AIS). There are many advantages to using the Internet of Things to process Accounting Information payments online, including:

- Payment data can be collected in real time by IoT devices, allowing businesses to track their finances as they happen.

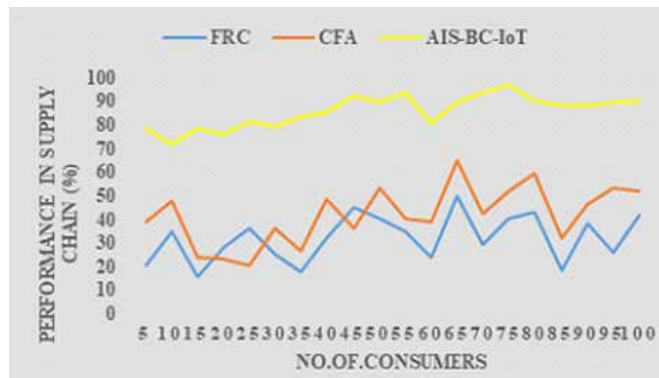
- Real-time data validation by online payment systems improves the reliability of financial data by catching mistakes as soon as they happen.

As a whole, Accounting Information Systems can benefit greatly from the incorporation of IoT and online payment systems by increasing their access to real-time data and consequently enhancing their precision, efficacy, security, and overall usability.

Figure 9 says a company's supply chain performance relates to its ability to satisfy the needs of its customers, including product availability, on-time delivery, and the supply chain's ability to meet those needs in a timely way. Management accounting skills may assist supply chain management in various ways, including reporting and enhancing financial and non-financial performance management across the supply chain, increasing performance via the use of technology.

Several indicators, such as accounting quality ratios, analysis of management information systems, physical activity ratio, and online payment ratio, can be used to assess a bank's efficiency and effectiveness. You can gauge the success of different strategies and projects, as well as gain valuable insight into the bank's growth, stability, and efficiency, with the help of these metrics. Having a high online payment ratio, for instance, may indicate the bank is able to adapt to the changing needs of the digital economy, while a high accounting quality ratio may indicate the bank has a strong control environment and provides accurate financial reporting. Banks can track their progress toward their goals using these and other metrics to guide their strategy and operations improvement efforts and ultimately benefit their customers.

Figure 9. Overall performance in the supply chain in accounting



END OF THE PROPOSED METHOD

In this paper, analysis and debate can be conducted to understand the impact of blockchain technology on the financial system. The banking sector has a lot to gain from blockchain technology, and these challenges must be dealt with in the financial sector to see an impact. In any event, the banking industry should keep an eye out for new regulations regarding the use of this technology. Supply chain management strategies, planning, and implementation are increasingly dependent on the expertise of accountants. The accountant's job is to assist the group in charge of supply chain design, development, and implementation. Security rules must be observed for the benefit of both individuals and organizations. Numerous additional features have emerged in the long term as blockchain innovation continues to progress. IoT and blockchain (BC) technologies have the potential to drastically alter current accounting information systems by providing transparent, reliable, and real-time data. A recently created model can identify, analyze, and evaluate contracts, execute transactions, transmit data, store event information, and provide customized financial reports. If the banking sector doesn't begin to use this new technology, it will be obsolete in no time. According to the present study and prior research, trustworthiness is a crucial component in the quality of the information provided by AIS. High-accuracy information demands a high level of commitment to measuring and disclosing the information's integrity to establish credibility and dependability in the information received. The numerical result of the proposed method increases internet finance (98.7%), accounting quality (93.6%), performance ratio (97.6%), management information systems (94.9%), and online payment (98.2%), overall performance ratio (99.9%). The immutability of the block chain's distributed ledger improves the reliability of audit trails for monetary transactions. The potential of block chain technology to enhance the reliability and accuracy of audits is an area that could benefit from further study. The scope of this study is, however, limited in some ways. The absence of a standardized regulatory framework for block chain and IoT technologies is a major hurdle. Another constraint is the difficulty in integrating new technologies with preexisting infrastructure and procedures, which can act as a substantial barrier to adoption. Security vulnerabilities in block chain and Internet of Things (IoT) infrastructures raise additional concerns. With its ability to record transactions in a secure and decentralized manner, block chain technology has emerged as a game-changing development for applications that must rely on trust and transparency. The Internet of Things (IoT) strategy entails enabling a wide range of devices to connect to the internet and communicate with one another, leading to massive amounts of data. Secure and decentralized data management, as well as the automation of various processes, is two of the many potential new applications made possible by the combination of these two technologies. For instance, block chain can be used to protect Internet of Things (IoT) gadgets and the data they produce, while IoT can supply the data inputs required to power block chain-based decentralized applications.

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