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Original Article

A Review of Blockchain Applications For Secure and Transparent Financial Services with Big Data Analysis

Surya Veera Brahmaji Rao Sunnam
Lead Data Engineer, Bank of America.

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Abstract - *Big data is changing the financial sector and could greatly affect the way financial research is done in the future. The implementation of new digital technologies has radically transformed financial services, particularly through big data analytics and blockchain technology. Big data enables companies to work with large, diverse, and moving data to enhance decision-making, forecasting, risk management, and cost optimization in accounting and financial operations. Hadoop and Apache Spark can be used to store, process, and perform real-time analytics on a significant volume of data, supporting more accurate financial reporting and fraud detection. Besides such developments, blockchain enhances transaction security and data integrity by providing decentralised, transparent, and tamper-resistant data structures. The enabling technologies (through cryptographic algorithms, distributed ledger, timestamping, and peer-to-peer networks) provide a high level of confidentiality, traceability, and efficiency. Blockchain has been used in financial services for fraud detection, cross-border payments, smart contracts, credit ratings, and recordkeeping, enabling quicker settlements and reduced intermediary costs. Together, these innovations make accounting information systems more reliable, secure, and efficient, transform conventional financial processes, and contribute to more transparent digital ecosystems.*

Keywords - *Big Data Analytics, Blockchain, Financial Services, Accounting Information, Financial Forecasting, Real-Time Reporting.*

1. Introduction

New financial sector known as fintech [1] uses technology to enhance traditional financial processes. Leong and Sung (2018) further state that "concepts that are novel and provide technological solutions tailored to specific company needs to enhance financial service processes" might be a definition of fintech [2]. The finance industry is especially influenced by digitisation since it is predominantly quantitative information-based, yet subject to Moravec's paradox. That is, computers are often more efficient than humans at performing financial computations, yet more sophisticated ethical imperatives continue to pose obstacles for algorithms. The developments in other technologies, particularly data processing and telecommunications, which are important to financial services, spur further innovation [3]. An abbreviation for "fintech" is a company that provides financial services and products that uses this kind of technology[4].

Fintech has impacted the general expansion of economies in many countries [5]. Investment banks and new-generation retail traders have mastered the art of combining the internet's capabilities with the convenience of smartphones. The importance of financial services increased dramatically during the 2008 global financial crisis. Until then, conventional financial services [6] were synonymous with job security and business stability. The emergence of fintech firms has been fuelled by constraints in conventional banking systems, which have led to catastrophic outcomes for customers, as well as by technological breakthroughs that have enhanced performance, user experience, and convenience. The world's rapidly expanding economy may find fintech to be the deciding factor [7]. The availability of big data has recently drawn the attention of academics studying finance. These datasets have garnered a lot of interest since they offer fresh information to the field of investment management. Big datasets have a lot of potential [8], but if we are to make significant progress in comprehending stock markets and in focusing on trustworthy signals that might increase money managers' effectiveness, several limitations related to their use must be noted. Figure 1 displays a word cloud on big data.

Fig 1: Word Cloud of the Big Data Analytics

A distributed ledger that functions independently of any central authority is known as a blockchain [9]. It comprises numerous lists of records, securely linked via cryptographic hashes, with each block containing a cryptographic hash, a timestamp, and transaction data from the preceding block. Furthermore, blockchain technology [10] possesses qualities such as immutability, anonymity, and consistency; it can

withstand DDoS attacks and other hacker intrusions; and it can publicly record the address of the transaction's sender and receiver to forestall fraud involving false names and addresses. Blockchain [11], used across fields such as digital money, the IoT, smart grids, and supply chains, is a combination of sophisticated technological platforms, encryption schemes, and consensus engines that ensure the security and confidentiality of the financial sector. Nevertheless, blockchain apps have several features that make coexistence difficult, including their security, secrecy, and transparency, and there is always the risk that privacy will be disclosed.

1.1. Structure of the paper

The study's framework is as follows: Section II describes how Big Data is applied to financial services, including the main ideas, the technologies, and the use of accounting. Section III describes the enabling technology of blockchain and the security of accounting systems. Section IV explores the application of Blockchain Technology within Financial Services, encompassing banking, credit assessment, fraud detection, and data transparency. Section V offers an analysis and comparison of pertinent literature on blockchain and Big Data within the Financial Sector. Section VI reviews the findings and highlights relevant areas for further investigation.

2. Role of Big Data Analytics in Financial Services

Over the past years, many industries have been transformed through the introduction of Big Data Analytics [12]and the field of accounting is no exception. The sheer, continually growing volume of data produced by contemporary business, and the further development of data processing technologies, have made it possible to approach financial management issues with more refined and dynamic methods. The term "Big Data Analytics " refers to the practice of identifying previously unknown patterns, correlations, and valuable insights in large volumes of diverse data. Organisations may improve their operations, make better decisions, and get a competitive edge as a result.

2.1. Core Components of Big Data

BigDataAnalytics [13] includes analysing large datasets with a great deal of detail to find insights, trends, patterns, and correlations that may guide decisions. The large quantities and variety of datasets may be too much for conventional data-processing tools to manage. The goal of BigDataAnalytics is to help businesses make better strategic choices by combining methods from several fields, such as data mining, statistics, and ML. Data mining may uncover previously unseen patterns, insights, and efficiency gains across a wide range of contexts, including operational records, social media, financial transactions, and sensor data. Figure 2 shows that the basic elements of big data can be generalized as the 4 Vs: Volume, Variety, Velocity, and Veracity.

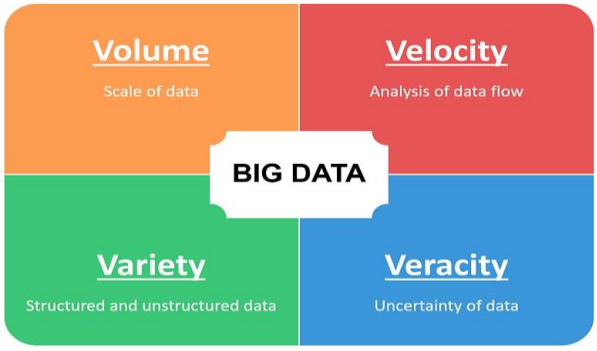

Fig 2: Key Components of Big Data

- The sheer quantity of data being created and stored makes up volume. In contrast to the traditional databases, modern organizations have to work with petabytes or even exabytes of information that is beyond the capacity of traditional databases [14]. The information in this book is drawn from several sources, such as Transactional Data, Multimedia Assets, and Social Media websites.
- Variety represents the variety of data that can be analyzed. Big data may be found in unstructured formats such as emails, videos, social media posts, and IoT sensor data, as well as in organised formats such as databases or spreadsheets. One of the main characteristics of Big Data Analytics is the capacity to manage and evaluate such a wide range of data.
- Velocity is the rate of creation and processing of new data. One such example is in the case of financial transactions, social media updates, sensor information from an IoT device, and so on: analytics systems generate data in real time, which must be processed at high speed to deliver timely results.
- Veracity is the dependability and quality of data. Analytics systems must account for data inconsistencies, noise, and ambiguity to be trustworthy. Data in large datasets may vary in quality and consistency.

2.2. Tools and Technologies of Big Data

A wide variety of methods and tools are the foundation of big data analytics [15] which aims to manage the volume, variety, velocity, and accuracy of massive amounts of data. The technologies let enterprises to store, analyse, and display massive amounts of data while giving actionable insights via batch or real-time processing[16]. The foundation is often built on scalable, adaptable distributed computing and storage platforms, such as Apache Spark and Hadoop.

1. Hadoop: Hadoop is a widely used large data technology. The approach, which is open source and based on a fundamental programmability principle, enables the distributed computation and storage of large datasets across computer clusters. Hadoop is built upon two main components: MapReduce, a programming paradigm for processing massive amounts of data by dividing jobs into smaller, parallelizable parts, and the HDFS, which stores data in blocks on a network of computers [17]. Hadoop has become the principal platform for big data processing because of its capabilities for processing

structured and unstructured data, scalability, and fault tolerance.

2. Apache Spark: Another important big data analytics tool is the Apache Spark, which expands the Hadoop system to provide in-memory processing, which is much faster than data analysis. In comparison to Hadoop batch processing model, Spark can be used to stream real-time data, which is why it is perfectly suited to the situation when real-time insights are required, e.g., FraudDetection or real-time recommended systems [18]. Spark is a great choice for complex analytics applications that go beyond basic data storage and retrieval because of its comprehensive library, which includes MLlib for ML and GraphX for graph processing.
3. In addition to these fundamental processing platforms, many data visualization/analytics applications, such as Tableau, Power BI, and Qlik, exist that assist in converting complex data insights into visual formats that are easy to comprehend, such as dashboards and reports. Additionally, big data pipelines often leverage ML platforms such as scikit-learn and TensorFlow to enhance predictive modelling and sophisticated analytics. These tools complement big data systems to enable the business with an all-encompassing tool for the management, analysis, and visualization of large volumes of data.

2.3. Applications of Big Data in Accounting

Big data has several applications in accounting. These are thoroughly discussed below:

1. Enhanced Financial Forecasting: The capacity to more accurately predict future financial outcomes and trends by the use of improved data analytics techniques, particularly big data, is known as enhanced financial forecasting [19]. Traditional financial forecasting techniques are largely dependent on past data and deterministic models, which are usually constrained by the scope and scale of the data being analyzed. BigDataAnalytics has enabled businesses to incorporate large volumes of structured and unstructured data into their models in real time, enabling more accurate, dynamic projections. Financial forecasting goes beyond average past trends, assisted by big data[20]to embrace current market data, consumer and social media trends, economic conditions, and even political trends.
2. Improved risk management and fraud detection: Risk management and Fraud Detection are also other vital fields that have been revolutionized by Bigdata Analytics and are quite common in the accounting and finance field[21]. The previous approach to risk management and fraud detection relied on existing rules, historical data, and manual audits, which often resulted in delayed or missed risks. The information gathered through the incorporation of big data analytics has assisted organisations to better their risk estimation and detects fraudulent activity more quickly[22]. To more effectively address risk, companies are expanding their use of big data analytics to filter through the mounds of internal and external data, including market statistics, purchase history, social media reviews, and economic indicators.
3. Real-Time Financial Reporting: The digital accounting and big data analytics have enabled businesses to obtain financial reports and insights in real-time through the innovative method of real-time 360 financial reporting. Unlike in the traditional financial reporting, which is usually done at a predetermined time (e.g., monthly, quarterly, or annually), real-time reporting can give a company a clear view of its financial position at any given moment, which helps it to make better decisions more quickly [23]. This is particularly convenient in evolving industries, where financial situations can change rapidly, as in e-commerce, financial services, and technology-oriented industries. The most significant part of real-time financial reporting is the integration of big data systems, which can process large volumes of financial data and transactions in real time. Various technologies (CloudComputing, data lakes, automated data capture, and so forth) can consolidate financial data into a central platform, facilitating aggregation across multiple locations (SalesSystems, AccountingSoftware, and external market feeds, among others).
4. Cost Optimization and Resource Allocation: Cost optimization and resource allocation are essential issues in which big data analytics and digital accounting can present strong advantages [24]. Through advanced data analysis, businesses can identify inefficiencies, minimize waste, and reallocate resources more strategically, ensuring no dollar spent in the business is wasted without generating significant returns on investment. Conventional cost management techniques typically rely on past data and predetermined budgets that do not account for the dynamic conditions of the business. [25]. However, with the help of big data, companies can continuously monitor their expenditures in real time and optimise them in accordance with market trends, operational requirements, and financial results.

3. Blockchain-Enabling Technologies and Security Considerations for Accounting Information Systems

Lately, a disruptive trend driven by blockchain technology has significantly changed a wide range of industries, especially the financial technology (FinTech) industry. [26]. First presented in 1991 by a team of researchers, blockchain was largely unknown until 2008, when the introduction of Bitcoin made this innovative technology popular. Since that time, the use of blockchain has expanded far beyond cryptocurrencies, and its decentralized, transparent ledger system can be applied across diverse areas such as SCM, healthcare, and financial services. The main strength of blockchain lies in its capability to address the inefficiencies of traditional systems through its transparency,

security, and efficiency. These characteristics improve transaction quality, minimize expenses, enable almost instant cross-border payments, and offer more powerful solutions to issues such as fraud and data manipulation.

3.1. Key Technologies for Blockchain

The immutable, decentralized nature of blockchain technology is highly beneficial for security. [27], which is vital in financial services. A traditional, top-down system can be compromised and has one point of failure. Instead, blockchain ensures that once a transaction's information is stored there, it cannot be altered unless more nodes concur. This decentralized check, and in particular the one observable on platforms like Bitcoin and Ethereum, has significantly reduced the risk of unauthorized alteration, establishing a new level of data security.

3.1.1. Role of Cryptography in Blockchain Technology

Cryptography is critical in the security and legitimacy of Blockchain Technology. [28]. Its data and transaction immutability, authenticity, and secrecy render it an essential component of most blockchain applications. Data encryption ensures privacy and security when an individual transacts on the blockchain. The encrypted message is exclusive to the intended recipient of the message, who possesses the corresponding private key. Cryptography keys (public and private) were used to verify transaction validity and facilitate tracking of the sender by generating digital signatures required for blockchain transactions.[29]. Moreover, cryptography is essential to consensus mechanisms (PoW and PoS) that leverage cryptographic algorithms and puzzles to keep the blockchain resilient and the network resistant to attacks. Blockchain technology uses cryptographic hash functions to produce unique information in fixed-length blocks. These blocks are then used to ensure that no tampering or unauthorised changes can be made to the chain by linking subsequent blocks.

3.1.2. Timestamp

Blockchain technology demands that nodes holding an accounting right affix a timestamp to the preamble of the current data block. This field shows the exact time the block was created or inserted into the blockchain. That time-stamping method shows the chronology of transactions, and that is how the blockchain uses it to sequence the main chain blocks. The timestamps add another layer of tamper-evident nature to the blockchain. Any changes or manipulations to the information within a block would lead to a lack of correspondence between the time in a block and the actual time when the tampering occurred, thereby indicating illegal modifications right away. Such chronological order and tamper-evidence allow the general security and integrity of the blockchain system.

3.1.3. P2P Network Technology

The Bitcoin system's use of P2P network technology is largely responsible for its exceptional operational stability since its introduction in 2009. P2P network architectures offer several benefits, such as increased privacy, decentralisation, resilience, load balancing, and speed, compared to the traditional client-server architecture. Decentralization is the core of the P2P technology. In the context of blockchain, the architecture enables the exchange of cryptocurrencies worldwide without intermediaries or central servers. Individuals who want to verify blocks can create a Bitcoin node by leveraging the distributed network. [30]The blockchain is a P2P network that tracks digital assets using a decentralized ledger. There are three distinct generations of P2P networks, distinguished by their design principles, emergence times, and network topologies: first-generation hybrid, second-generation unstructured, and third-generation structured.

3.1.4. Distributed Ledger Technology

The kinds of activities that blockchain technology permits are the main distinction between it and conventional databases. Normal databases provide four fundamental functions: inserting, deleting, updating, and searching. Conversely, blockchain technology has just two operations: addition and data querying. It is vital to realise that blockchain does not allow you to add, remove, or change information after it has been saved. The two most common types of traditional databases are distributed and centralised databases. In distributed databases, many data storage segments located in different locations are connected by fast networks to create the illusion of a single database. This system enables the sharing of big data and enables increased simultaneous traffic. [31]. On the other hand, distributed ledger technology is the term used to describe BlockchainTechnology. Although it shares some commonalities with distributed databases, it differs significantly in its data storage mechanisms and data structures. The fact that data in a blockchain is immutable and decentralized makes it a secure, transparent transaction registry.

3.2. Security Implications of Accounting Information

Despite advances in information technology, the term "information security" is widely used to describe data processing and data transfer operations in computer systems. Information is today more accessible and more susceptible than in the past due to the substitution of contemporary techniques for older methods of storing, processing, and retaining electronic data. As a consequence, information security is a fundamental necessity that consumes significant study and has, in some ways, become an obsession for many people. The term "security of accounting information" refers to the following: the confidentiality, integrity, completeness, continuity, and verifiability of each action or treatment applied to the information; it also refers to the ability to examine each activity or treatment separately. Due diligence and sufficient care must be maintained when preparing financial statements to avoid poor investment choices that result in losses.

- Security of unilateral information: In other words, if an external intruder is unable to alter the system or cause it to deviate from its typical behaviour, or if the data itself is altered or changed, the system is considered secure and believable. This system must be completely reliable and shielded from any potential disruptions to ensure the user's safety. Additionally, there shouldn't be any potential security flaws in the system.
- Security of bilateral information: This pertains to the information that must be safeguarded by both parties when engaging with trade-mail systems, wherein the

buyer and seller trust each other. In the absence of such procedures, it is crucial to make sure that each party acts in a way that is based on integrity and dependability, especially while the parties are closing the deal[32]. To put it simply, academics have described information security as " the science that studies the ideas and tactics for protecting information from the threats that threaten it, as well as the actions of the attack."

3.3. Security Requirements of Accounting Information

It is imperative that the institution's critical accounting information security concerns be addressed and that a thorough strategy be implemented within the material and organisational potentials, which are given priority [33]. This should provide robust protection, and accounting information security must meet several standards. These may be summarised in the following manner:

1. The facility's operations and intended uses dictate the appropriate measures to take to safeguard accounting data in accordance with public policy.
2. The security of the company's accounting data must be backed by top management.
3. The organisation should appoint skilled individuals to handle accounting information security.
4. Determining which protection is best for the various OperatingSystems and apps is crucial.
5. It is necessary to establish procedures for the monitoring and inspection of computer networks and information systems.
6. It is equally crucial to securely store backup copies of information systems.
7. A separate media platform is required for the storage, transportation, and encryption of information.
8. Managing the risks related to information systems, ensuring the continuity of work, and being prepared for the protection of private information in the case of emergencies are continuous concerns.

4. Blockchain Applications in Financial Services

Audits are essential to the banking industry's operations. A time-consuming and expensive process, financial audits are hampered by a lack of openness. In the absence of openness, intermediaries may divulge private information during the audit [34]. A further roadblock to blockchain technology's incorporation into financial services might be the impending blockchain-related regulation. To evaluate blockchain technology's potential effects on companies and customers, as well as its applicability for financial institutions. Table I presents the various applications of blockchain technology.

Table 1: Blockchain Technology Applications in Financial Services

S. No.	Applications	Description
1.	Fraud Prevention	The use of BlockchainTechnology may eliminate the requirement for third-party verification of transactions, which is a common method for preventing fraud. Blockchain technology would be very useful in any industry that needs the immediate, verifiable, and tamper-proof transfer of information and transactions, as it provides a decentralised, P2P network and prevents tampering. The financial industry is crucial for contracts, transactions, and financial practices. BlockchainTechnology could prove highly effective in the processing of this massive volume of papers in transit[35]. Blockchain is problematic because it is decentralised. Fraudsters almost usually target financial institutions. Blockchain technology processes and stores transaction blocks using cryptographic algorithms[36]. Financial institutions may see this encryption as a safer way to handle transactions.
2.	Banks and other financial institutions	Financial institutions are already optimising their services, reducing fraud, and saving money for their customers by using blockchain technology [37]. International money transfers are costly and time-consuming because funds often pass through multiple banks before reaching their final destination. Global transactions might become more precise, effective, and affordable with the use of BlockchainTechnology. BlockchainTechnology is quickly finding its way into the banking sector. There are many banks and other financial organisations that support blockchain technology and invest in blockchain stocks, from small businesses to large corporations [38]. For instance, Blockchain must be adopted by all participating institutions to be used for money transactions. Financial institutions may enable peer-to-peer transactions by using BlockchainTechnology.
3.	Calculate credit scores	BlockchainTechnology paves the way for novel monetary and banking services and products, collaborative operating models, streamlined processes, reduced costs, and safer, more open, and inclusive company networks[39]. During audits, compliance officers and auditors from financial service companies may provide comprehensive information. It encourages unethical behaviour, dishonesty, irregular compliance, and protracted audit periods. Financial services audits might be accelerated by blockchain technology. Because blockchain data is immutable, auditors can use it to verify compliance with standards and determine what is happening in a specific scenario. Additionally, blockchain technology may enable businesses to use non-traditional metrics to assess creditworthiness. Keeping track of credit ratings on a blockchain may provide system transparency[40]. Blockchain technology enables financial industry vendors to securely store consumers' private, public, and legal data. Blockchain technology might thereby increase

		transparency in the investment process in the financial services industry.
4.	Maintaining privacy and confidentiality	The preservation of privacy and secrecy accompanies improvements in efficiency, trust, and transparency. Its private and hybrid networks can handle normal traffic fluctuations and hundreds of transactions per second. Some payments can take up to 7 days to complete under the current banking system [41]. Slower settlement times and higher costs are two drawbacks of using a large number of intermediaries to guarantee authenticity and security in a centralised system. Automating approval processes and clearance computations using smart contracts would help banks reduce the staff needed for these tasks, thereby reducing processing times [42]. Digital ledgers known as blockchain may record most of these transactions; they are unchangeable and safeguard against fraud.
5.	Keeps tracks of transactions	'Blockchains' are decentralised ledgers that record transactions. Future developments in this area might lead to more secure financial service providers, quicker and cheaper transactions, and automated contracts. Blockchain-enabled financial institutions may eventually be able to speed up financial transactions. The objective is to transition this technology from traditional computer systems to Blockchain, a process contingent upon the utilisation of payment gateways [43]. Eventually, banks will have to transition, since older payment methods are less secure. Since the other parties involved in the transaction would likewise receive a record, disputes over missing or incorrect transactions would be a thing of the past. The current methods investment banks utilise for clearing and settlement could be greatly enhanced by blockchain technology. Banks need to safely and swiftly record a high volume of transactions, as they are obligated to report all assets and loans on their balance sheets.

5. Literature Review

This section contains previous research on Blockchain-Based Financial Research. A tabular comparison of previous studies on the problems, blockchain focus, security measures, gaps, and findings is presented in Table II.

Chandra *et al.* (2025) proposed that Fintech is advancing rapidly and revolutionizing the way people conduct, manage, and safeguard their financial transactions. Two of the biggest developments that may help improve transaction accounting and operational transparency are breakthroughs in Blockchain and Artificial Intelligence (AI). On one hand, the paper walks around the resolution principles and constructs of Blockchain and on the other hand, it shows the great potential of Fintech, to vocalize the intersection sphere took by Blockchain and AI in Fintech to meet the increased anxiety of falsification and falsification of information, which Blockchain is supposed to eliminate, as well as the permission to do so easily integrated into AI as a means for immediately making an intelligent decision [44].

Chidambaranathan and MuthuPriya (2024) suggested That Big data and IoT help optimize operations, reduce costs, enhance productivity, and improve lives. Globally, financial institutions and banks are developing innovative approaches to rapidly adopt big data analytics at every step of the process, aiming to maximize efficiency. Numerous previous studies have mostly focused on risk assessment and big data analytics in the banking industry; however, they may not address the challenges posed by cross-border transactions. This research aims to fill the gap by investigating the specifics and advocating the use of BigDataAnalytics to the problem of risk assessment in international financial transactions[45].

Chen and Wen, (2024) study investigated how software developers are incorporating blockchain and big data technologies. The article discusses big data, a technology for handling massive volumes of data, and blockchain, a decentralised method for storing and processing data. It looks at how both could enhance the effectiveness and security of data processing. In the financial sector, blockchain simplifies cross-border transactions and enhances transparency and security in asset management. In logistics management, blockchain enables transparent supply chain tracking, improving data reliability. At the same time, big data technology supports business analytics, scientific research, and public services, providing decision-making support through data mining and machine learning [46].

Saba *et al.* (2024) proposed a blockchain paradigm for secure big data HPC to safeguard financial transactions involving intelligent services provided by a software-defined network (SDN) architecture for businesses. To begin, the SDN controller associates Internet of Things devices and maintains both local and global records to manage security credentials. Secondly, to facilitate network scalability and provide up-to-date routing information for financial data transmission, a ML methodology is investigated using dependable, fault-tolerant approaches. To tackle the issue of financial security in big data, the suggested protocol explores cryptographic approaches while simultaneously maintaining data integrity and a high degree of network availability[47].

Balaji (2023) found that blockchain-based financial management solutions are still in their early stages of implementation. In summary, this study emphasises the importance of examining blockchain's potential in the financial sector and provides crucial background for further research in this area. The investigation has identified three primary areas requiring further examination to advance blockchain technologies as a transformative force capable of revolutionising the banking and finance sectors. This study concludes that the banking and financial services industry may benefit from studying blockchain technology [48].

Akram and Sen, (2022) study's overarching goal is to learn more about BlockchainTechnology and the many ways it might improve digital identity verification and administration, in addition to its legal and commercial uses. The paper will also cover the function of zero-knowledge

proof and encryption. This research examined several blockchain technology use cases for digital identity management in the BFSI sector, using a case study methodology. This study will help researchers, industry professionals, and policymakers learn more about blockchain technology and its applications for digital identity verification [49].

Table 2: Critical Review of Studies of Blockchain-Based Research in the Financial Domain

Author & Year	Problem Addressed	Blockchain Feature Focused	Security Aspects Covered	Limitations Highlighted	Key Findings
Chandra et al., (2025)	Need for improved financial transaction transparency and prevention of data falsification in Fintech.	Integration of Blockchain with AI for transparent and intelligent decision-making.	Eliminates falsification, enhances transparency in financial transaction accounting.	Early exploration of AI-Blockchain intersection, lacks implementation validation.	Blockchain + AI can enhance operational transparency and intelligent decision-making in Fintech.
Chidambaranathan & MuthuPriya, (2024)	Inefficiencies in cross-border transactions and inadequate risk assessment using big data in banking.	Not blockchain-focused (Big Data + IoT mainly).	Not security-focused; emphasizes optimization and analytics.	The cross-border risk assessment gap is yet to be resolved using blockchain or security frameworks.	Big Data + IoT improve operational efficiency; risk assessment in cross-border banking remains underexplored.
Chen & Wen, (2024)	Need for decentralized, secure, and efficient data processing in financial and logistics sectors.	Decentralized data storage and transaction validation via Blockchain.	Enhances transparency, data reliability, cross-border transaction security.	Implementation challenges across sectors not deeply analyzed.	Combined Blockchain + Big Data increases security, processing efficiency, and transparency in finance and logistics.
Saba et al., (2024)	Secure financial data transmission in big data and HPC environments.	Blockchain integrated with SDN for secured data interactions.	Data integrity, network availability, cryptographic credentials protection.	Lacks real-world deployment scalability and performance testing.	Proposed model ensures secure HPC transactions using Blockchain, SDN, ML, and cryptography.
Balaji, (2023)	Early-stage adoption of blockchain in financial management systems.	General blockchain potential for financial management.	Implied improvements in transparency and security in finance.	Adoption remains early-stage; requires further research in three identified domains.	Highlights the need for deeper blockchain research to revolutionize financial services.
Akram & Sen, (2022)	Secure digital identity verification in BFSI sector.	Digital identity management using Blockchain + Zero-Knowledge Proof.	Cryptography-based identity protection; eliminates centralized identity risks.	Limited to case studies; lacks real-time deployment perspectives.	Blockchain enhances decentralized identity verification with strong cryptographic privacy protections.

6. Conclusion and Future Work

Additionally, numerous problems arise as the effects of big data on financial academic research become apparent. Finally, accounting and financial services are being revolutionised by the convergence of Blockchain Technology and big data analytics, which is increasing transparency,

security, and accuracy. Big data can help organizations process large, intricate datasets to make predictions, detect fraud, manage risks, and report in real time. A blockchain can give a company access to decentralized ledger systems that avoid data manipulation and minimize reliance on intermediaries. The combination of these technologies will enhance the security, authenticity, and accessibility of financial information, thereby resolving issues of auditing, compliance, and transaction processing in the long run. Despite regulatory uncertainty and system integration challenges to adoption, the benefits attested indicate a revolutionary transformation toward more efficient, reliable, and data-driven financial ecosystems. The world will keep redefining its financial practices as these technologies continue to advance.

In the future, studies can consider integrating big data and blockchain in more financial capabilities, develop universal regulatory models, and enhance analytics using AI. The further development of financial transparency, the enhancement of interoperability, and the development of security models will contribute to cross-industry cooperation and quicken the global digital transformation of accounting and financial services as adoption progresses.

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