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THE IMPACT OF BLOCKCHAIN TECHNOLOGY ON HEALTHCARE DATA QUALITY: A COMPREHENSIVE ANALYSIS

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ABSTRACT: Immutability, security, authentication, decentralized storage, and distributed records are integrated into blockchain. It is no longer a trend but is employed in numerous industries, including healthcare. Businesses can obtain better services with blockchain technology. This research shows how healthcare data quality issues affect blockchain use. The essay uses 2016 and subsequent materials from several databases in a systematic literature evaluation. This review study selected 560 items to form a single topic about the healthcare situation. Adoption, operational, and technological aspects were used to analyze the outcomes. This review study should aid practitioners, stakeholders, and specialists manage blockchain-related projects that may transform healthcare. Businesses could also make better decisions if potential blockchain users understood the underlying factors.
Keywords: blockchain technology, data quality, information quality, challenges, healthcare

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1. INTRODUCTION

Rapid healthcare automation has created enormous computerized patient records. Private healthcare data utilization is rising (Ali et al., 2021). Blockchain technology allows responsible and open data storage and sharing for healthcare data, improving privacy, security, and integrity. Recently, businesses and scholars have focused on blockchain technology. Katuwal et al. (2018), Prokofieva and Miah (2019), Ali et al. (2021), and Mamun (2022) publish blockchain research and applications daily. Zhang et al. (2018) and Ali et al. 20221 define blockchain as a distributed ledger for P2P network digital data transfers. It securely keeps any data and may be shared publicly or privately with all users.

Ali et al. (2021) state new blockchain technology targets IoTs and AI. Traditional healthcare has tight measurement requirements because it dislikes change (Ali et al., 2021). Global healthcare issues like privacy and information security are examined (Mamun, 2022). Many believe blockchain distributes knowledge. Market Research Future (Prokofieva and Miah, 2019) predicts $42 million in healthcare blockchain revenue and 71.8% growth by 2023.

According to Prokofieva and Miah (2019), the global blockchain AI market would develop rapidly from 2020 to 2027. This widespread adoption of blockchain technology will make things more open, trackable, private and safe, efficient, and cheaper, according to Prokofieva and Miah (2019). Blockchain technology should help all firms work more smoothly and feel more confident exchanging data and keeping records. This tech ensures secure transactions (Katuwal et al., 2018; Zhang, 2018). Blockchain technology is growing in popularity because it speeds up data transmission and transaction processing with privacy, security, and transparency. Due to data quality issues, the healthcare industry still views it as a distraction technology that must be managed.

Healthcare data management systems lack traceability, transparency, audit, immutability, flexible access, data provenance, security, privacy, and trust, according to Abou-Elezz et al. (2020)

and Yaqoob 2020.1. In early 2019, Deloitte conducted a Global Blockchain Survey. 29% of research participants didn't understand blockchain, making it tougher to use (Katuwal et al., 2018). Blockchain quality issues (Griggs et al., 2018; Prokofieva and Miah, 2019). According to many research (Prokofieva and Miah, 2019), blockchain technology in healthcare is still developing. Due to a lack of studies, few systematic literature reviews (SLR) have examined blockchain's usage in healthcare, its promise, and its restrictions (Prokofieva and Miah, 2019).

Few SLR studies have examined cutting-edge blockchain apps. Blockchain in healthcare hasn't been extensively studied. Explaining blockchain and its operation is key. Many health apps use blockchain. Ledger technology tracks the drug supply chain and ensures medical records are delivered safely to assist scientists decipher the genetic code. Blockchain technology protected healthcare data, genetic management, electronic data management, medical records, interoperability, digitalized tracking, issue outbreaks, and other fantastic and technically tough things. Digital and healthcare applications accelerate blockchain's growth. New books and articles discuss blockchain research and applications. The usage, technical issues, new solutions, and future of blockchain are covered. Healthcare blockchain technology needs more research to comprehend, describe, and rate (Zhao et al., 2016; Tama, 2017; Dimitrov, 2019; Abu-Elezz, 2020; Yaqoob, 2021).

Information is rarely combined using SLRs (Angraal et al., 2017). Holbl et al. (2018) summarized blockchain study patterns and healthcare blockchain adoption factors using bibliometrics. Many healthcare companies employ blockchain, according to Agraal et al. (2017). In 2019, Agbo et al. examined healthcare blockchain technology issues and solutions. O'Donoghue et al. (2019) examined researchers' design choices and tradeoffs using this method. Abou Jaoude and Saade (2019) and Hasselgren et al. (2020) examined Blockchain applications. Hasselgren et al. (2020) examined blockchain technology in healthcare in 39 papers. These systematic literature reviews summarize or define blockchain technology patterns and regions while expanding knowledge. Because there have been so many in-depth and various studies on blockchain earlier, it will be good for academics to focus on the impacts of its use (Risius, 2017) as well as the issues it faces and its possibility for progress (Agbo et al., 2019). Review-based research will satisfy these needs by merging current data and selecting important academic themes (Gopalakrishnan, 2013; Aznoli, 2017; Agbo et al., 2019). That's why we run an SLR on the quality of blockchain healthcare data. This wonderful SLR reveals research gaps, future targets, and areas of understanding that still need to be addressed.

Blockchain needs additional research into how it can operate with other systems, keep information private, grow, and keep people safe (Yue et al., 2016; Genestier, 2017; Kuo, 2019; Farouk, 2020; Yaqoob, 2021). To get the most out of blockchain technology, you need to understand how it works. We need to look into the difficulties and impacts of blockchain technology on health care. This study looks into wasted resources, unmet hopes, and slow adoption of new technologies (Prokofieva and Miah, 2019).

Blockchain technology was looked at to see how it would affect the quality of healthcare records. The study looked at the quality of the data and the future of blockchain in healthcare. This evaluation sorts blockchain usage, operations, and technical problems into groups.

"This review assists in identifying blockchain-related challenges relating to healthcare data quality and presents a thorough analysis of the adoption and implementation of this technology in the field of healthcare."

Blockchain background talks about the past, features, traits, and data quality categories of blockchain technology. Section Research Approach lists the steps of SLR, and Discussion looks at the results. Research Implications talks about effects on theory and practice. Research limits and future directions talks about study limits and future goals. The study ends with Section Conclusion.

2. BLOCKCHAIN BACKGROUND

Blockchain technology

Blockchain is a safe, open, and impossible to hack distributed ledger that keeps track of activities on many computers. The technology that made Bitcoin possible can now be used in many different areas (Mendling et al., 2018). Transactional info is stored in blockchain blocks. By linking each block, a continuous data chain is made. The blockchain is an unchangeable record of events because a block can't be added to or removed from the chain without network approval (Kuo et al., 2019; Hasselgren, 2020).

Blockchain technology makes things less centralized (Angraal et al., 2017). A network of computers checks deals with blockchain (Yli-Huumo et al., 2016). This makes the system more reliable and clear, which cuts down on fraud, corruption, and trickery. Transparency is also needed for blockchain technology (Silva et al., 2019). The blockchain keeps track of all transactions, so they can be seen and followed. Since healthcare data quality is very important, being open can help (Yli-Huumo et al., 2016). Blockchain allows for freedom, openness, and safety. A secure hash function on each blockchain block stops people from changing data without warning. Hackers and other bad people have a harder time changing blockchain data because of this.

There are both public and private blockchains (Agbo et al., 2019). Public blockchains can be used by anyone, but private blockchains can only be used by certain people (Efanov, 2018; Angelis and da Silva, 2019). A mixed blockchain is made up of both public and private blockchains (Yli-Huumo et al., 2016). Blockchain could change how healthcare, money, and the supply chain are managed. Usage is limited by scalability, interoperability, and rules (Tama et al., 2017; Abu-Elezz, 2020; Yaqoob, 2021). Kuo and Kim (2017) say that blockchain technology could lead to more creative uses.As Glaser (2017) and Müller-Bloch and King (2018) explain, "blockchain" is a decentralized, tamper-proof system for validating transactions that has many users. Müller-Bloch and King (2018) say that blockchain keeps certificate data safe. Blockchain technology clears up transactions, makes sure they are safe, and lowers uncertainty by giving all network users standard facts and transactions that are completely clear (Naerland et al., 2017).

Blockchain characteristics

Blockchain technology is made up of things like immutability, low friction, peer proof, cryptography, decentralization, flexibility, and automation. Common problems might be solved by using blockchain technology in healthcare, but trust and decentralization are very important (Seebacher and Schüritz, 2017). We will talk more about trust and freedom in blockchain below.

Trust

This important part is hidden by blockchain's decentralization. Proof-of-work methods protect the network even if there is no third-party checking or recording. With this method, blockchain users can protect their assets and transactions without the help of a third party. Blockchain lets people on a network build a safe, sharing network.Relationship made public. Sharing all current and past activities makes the whole system clear to everyone. Friction is lessened by direct user contact. Because the database is immutable and the data is right, once a transaction is committed to a block and published to the blockchain, it can't be changed. It can make you feel better. This is easier to do with the consensus method (Seebacher and Schüritz, 2017).

DecentralizationBlockchain technology is defined by its decentralization, immutability, and opposition to censorship (Seebacher and Schüritz, 2017). Blockchain technology is decentralized thanks to member pseudonyms (Zyskind and Nathan, 2015), automated usefulness (Guo and Liang, 2016; Xu, 2016), data redundancies (Hull et al., 2016), and "versatility" in which peers can help with development. Blockchain technology in healthcare could solve problems by making things less centralized and building trust. It's important to trust healthcare. Medical details are shared by a lot of clinics, hospitals, and insurance companies (Yaqoob et al., 2021). For an accurate medical history, these pieces of patient data need to be put together automatically. Blockchains can store all of

a patient's medical information and keep it up to date, unaltered, and easy to track (Yaqoob et al., 2021). This means that doctors can trust their data and treat patients quickly, correctly, and effectively. Because it can be used in different areas of healthcare, this method is widely used. Blockchain technology makes electronic medical records more efficient, protects data, and confirms and seals deals between many parties. By changing how health information is shared, the technology could improve data protection, patient care, healthcare quality, and medical knowledge. Being harder than they look, blockchains need some important things to be thought about before they are fully put into use (Singh et al., 2022). Deloitte came to the conclusion that traditional businesses are actively looking into blockchain chances to meet their most important needs. In healthcare, blockchain solutions are being looked for. Blockchain should be looked at by healthcare groups like any other new technology in order to teach professionals how to use these tools effectively.

Blockchain categories

Block chains can be public, private, or group-based (Ali et al., 2021). No one on the public blockchain is better or worse than anyone else. Instead of permission from a third party, each person should have the same amount of power (Xu et al., 2016; Sankar, 2017). Anyone can join or leave the network. All sources can get free proof of transactions. No one can verify activities on the consortium blockchain. This means that only a few important people can check deals. Members who are important must agree to look over deals before they can be validated. Centralization is guaranteed by private blockchains.

Healthcare data quality

IT innovations that increase data quality are difficult to adopt in healthcare, according to the American Institute for Health Management (2022). You need good market data and experience. The most modern information systems (ISs) can't fix problems with bad source data or problems with entering or collecting data (The American Institute for Health Care Management, 2022). These traits can help methods for making sure healthcare data is correct (The American Institute for Health Care Management, 2022). A number of things that affect the quality of data depend on the application. Some people cite useful data as data quality. Data quality is complicated because it includes things like reliability, accuracy, consistency, and ease of access (Halimeh, 2011; Data Quality's Importance to Blockchain, 2022). Being accurate means stating the truth (Halimeh, 2011). Validity and accuracy check the trustworthiness of a data source. Organizational and information standards are also kept up over time by regularity and dependability (Halimeh, 2011). Accessibility lets people who are allowed to see medical data at any time (Halimeh, 2011). Healthcare companies that use AI or machine learning and make decisions based on data need good data.Quality is usually what makes users trust healthcare data. These guidelines make this trust stronger (The American Institute for Health Care Management, 2022). For long-term data management that is coordinated in theory, healthcare facilities need good data and effective ways to store it. The American Institute for Health Care Management (2022) says that these trainings would help them make things easier and come up with rules that are good for everyone. Health records that are clean and stored in downstream systems may value. They learn more about the system when they work with outside groups than when their data is kept separate (The American Institute for Health Care Management, 2022).

Data quality in blockchain

Healthcare data could be better with blockchain and data quality guidelines. EMRs make it easier to read hospital data (Data Quality's Importance to Blockchain, 2022). Since blockchain technology is linked to better data, it should make it better. Consistency and trustworthiness are the most important things for blockchain data quality (Data Quality's Importance to Blockchain, 2022). To compare sources to an idea, distributed data equality or redundancy is used. Dan Mayer says that the quality of the data affects how well blockchain can make full transaction audit trails and authenticate entities.

With blockchain, the standard of data will get better. It is possible to check entities and keep

track of transactions with blockchain, but data quality is a problem (Data Quality's Importance to Blockchain, 2022).

Data security could lead to issues. A fantasy system might work better with weak facts. Price discrimination, human and administrative error, competition in the insurance market, and tax evasion can all affect the precision of medical data. There are mistakes in most healthcare data files for different reasons. Before being put on blockchains, healthcare data needs to be cleaned and updated (Yaqoob et al., 2021). A blockchain can help when natural disasters cause the standard healthcare system to lose health data. Decentralized blockchain keeps healthcare data safe from being lost or stolen.

For blockchain networks to talk to each other, the info they share must be consistent. Differences in the consensus model, transaction method, and smart contract can lead to data discrepancies (Yaqoob et al., 2021). This study will find new problems with the quality of healthcare data that pros, stakeholders, and practitioners can use to run projects that use blockchain to change healthcare. When people who want to use blockchain understand why things work the way they do, they can make better business choice.

3. RESEARCH METHODOLOGY

Our current review process uses a reference study (Ali et al., 2018). This review selects and analyses important material in a certain manner. The article makes the review more useful (Tranfield et al., 2003), objective, repeatable, honest, fair, and meticulous (Boell and Cecez-Kecmanovic, 2015). Reference studies (Keele, 2007; Ali et al., 2020, 2021) divide the review into planning, conducting, and reporting. The processes will be explained later.

Planning stage

Here, review conditions are set. Blockchain technology improves healthcare data, yet academic writing and evaluations are few. Therefore, the study will examine research and real-world experience. The major planning question was: What are the main blockchain healthcare data quality concerns? The study answers this research question so other academics can learn about blockchain-related healthcare data quality issues. This step also involved specific methods and steps to determine article selection criteria. This step involved an integrated search strategy that included automatic internet database searches and manual publication searches (Golder et al., 2014). This study uses IEEE, Scopus, ACM digital library, Emerald, Science Direct, and Web of Science. To limit search results to certain databases, tools were carefully selected (McLean and Antony, 2014). The manual review began with reading each study's title and abstract (Kassabet et al., 2019). Reading the sections eliminated irrelevant ones (Ali et al., 2018). Then, the study review approach examined the topic theoretically and practically. This review uses an early Ngai and Wat categorization approach (McLean and Antony, 2014). The report proposes dividing items into three areas based on blockchain-related healthcare data issues. We have technological, operations, and acceptance issues. Additionally, it contains framework component subcategories (Table 2).

Execution stage

More comprehensive planning was done to find relevant papers for this review paper. Key approaches of the review study were (1) defining search terms and words as an ongoing process that begins with field-specific scientific terms. This study found "problems" or "challenges" or "barriers" or "data" and "blockchain" and "quality." (2) Database filtering increased search results, and temporal restriction limited the search to 2012–2022. (3) The title and description were manually evaluated for relevance (Pucher et al., 2013). Fourth, the selected publications were examined for research-related concepts, theories, and data (Shea et al., 2007). (5) A quality evaluation criterion ensured that all systematically screened papers were relevant to the study (Hu and Bai, 2014). The shortlisted papers were approved using Ali et al. (2018) and Sadoughi et al. (2020) criteria. The checklist required you to clearly articulate the research questions, detail the data, explain the methodology, and explain the study outcomes step-by-step. Table 1 indicates

study selection and results.

Summarizing stage

The study followed planning regulations from January 24 to April 23, 2022. The initial search yielded 317 results. 49 articles passed the review, quality rating, and categorization model (Table 2).

TABLE 1 Findings from the selection.

Stage	Result
Study selection process and result	
Stage 1: Search based on the key words	317
Stage 2: Database filtering tools applied	198
Stage 3: Eliminate articles based on title and abstract	127
Stage 4: Eliminate articles based on full text scanning	86
Stage 5: Eliminate articles based on quality assessment	49
Total number of articles that been used in this review study	49

The quality of blockchain-stored healthcare data, acceptance, operations, and technology assessment were important difficulties.

Research discussion

This section discusses blockchain healthcare record quality issues. Good healthcare data is scarce, so doctors and patients require reliable data and integrated security to make therapeutic decisions. Blockchain can be used in healthcare in several ways. Many medical systems employ these pieces. Blockchain's trust, unambiguous transactions, and security speed up transactions and data sharing (Watson, 2015; Abou Jaoude and Saade, 2019). Before blockchain technology is employed in healthcare, prescription, treatment, patient, and symptom data must be accurate, consistent, and accessible.

4. TECHNOLOGICAL CHALLENGES

Blockchain technology is safe, but data privacy and security are still challenges. Private health information should be kept private. Data breaches can compromise patient privacy and lead to identity theft. Many healthcare organizations utilize outdated systems that may not work with blockchain. Implementation is difficult and slow.

Blockchain could improve healthcare by making medical data storage and transmission safer (Abou Jaoude and Saade, 2019). Before blockchain is widely used in healthcare, data privacy and security must be addressed (Chen et al., 2019; Esmaeilzadeh and Mirzaei, 2019). Blockchain in healthcare is problematic for patient privacy (Casino et al., 2019).

TABLE 2 Variable framework classification.

Dimension	Category	Type	References
Healthcare data challenges	Technological	Security	Gobler et al., 2014; Randall et al., 2017; Tama et al., 2017; Abou Jaoude and Saade, 2019; Agbo et al., 2019; Alonso et al., 2019; Beinke et al., 2019; Chen et al., 2019; Clim et al., 2019; Dimitrov, 2019; Khezr et al., 2019; McGhin et al., 2019; Prokofieva and Miah, 2019; Shahnaz et al., 2019; Shuaib et al., 2019; Syed et al., 2019; Yaqoob et al., 2019; Zubaydi et al., 2019; Mansa and Mori, 2020; Pandey and Litoriya, 2020; Tanwar et al., 2020; Adere, 2022; Attaran, 2022; Saeed et al., 2022
		Privacy	Angraal et al., 2017; Liang et al., 2017; Sharma, 2018; Zhang et al., 2018; Abou Jaoude and Saade, 2019; Agbo et al., 2019; Alonso et al., 2019; Beinke et al., 2019; Casino et al., 2019; Clim et al., 2019; Esmaeilzadeh and Mirzaei, 2019; Khezr et al., 2019; McGhin et al., 2019; Prokofieva and Miah, 2019; Shuaib et al., 2019; Syed et al., 2019; Yaqoob et al., 2019; Khan et al., 2020; Mansa and Mori, 2020; Pandey and Litoriya, 2020; Adere, 2022; Attaran, 2022; Saeed et al., 2022
		Integration	Gobler et al., 2014; Guo and Liang, 2016; Hull et al., 2018; Angraal et al., 2017; Tama et al., 2017; Griggs et al., 2018; Müller-Bloch and King, 2019
	Adoption	Interoperability	Tama et al., 2017; Beinke et al., 2019; Cao et al., 2019; Abu-Elezz et al., 2020; Tanwar et al., 2020; Yaqoob et al., 2021; Attaran, 2022
		Compatibility	Liang et al., 2017; Randall et al., 2017; Kanawal et al., 2018; Abou Jaoude and Saade, 2019; Alonso et al., 2019; Kanaan et al., 2019; McGhin et al., 2019; Yaqoob et al., 2021; Attaran, 2022
		Standardization	Randall et al., 2017; Kanawal et al., 2018; Abou Jaoude and Saade, 2019; McGhin et al., 2019; Attaran, 2022
		Data governance	Angraal et al., 2017; Chen and Huang, 2018; Golnlp et al., 2018; Cao et al., 2019; Khezr et al., 2019; Patel, 2019; Abu-Elezz et al., 2020; Attaran, 2022
	Operational	Scalability	Hussein et al., 2018; Kanawal et al., 2018; Agbo et al., 2019; Casino et al., 2019; Clim et al., 2019; Kanaan et al., 2019; Khezr et al., 2019; McGhin et al., 2019; Shuaib et al., 2019; Mansa and Mori, 2020; Sengupta et al., 2020; Adere, 2022; Marmsa, 2022
		Data availability	Wood et al., 2016; Randall et al., 2017; Kanawal et al., 2018
		Accessibility	Angraal et al., 2017; Genestier et al., 2017; Farouk et al., 2020; Yaqoob et al., 2021
		Usability	Adere, 2022; Saeed et al., 2022
		Data sharing	Yue et al., 2016; Khezr et al., 2019
		Data processing speed	Yuan et al., 2018; Beinke et al., 2019; Esmaeilzadeh and Mirzaei, 2019; Omar, 2019; Zhang et al., 2019; Abu-Elezz et al., 2020; Mansa and Mori, 2020; Pandey and Litoriya, 2020

Protect sensitive healthcare data from unauthorized access (Zubaydi et al., 2019). Blockchain encrypts data, yet a patient's name could be accessed without authorization (Khan et al., 2020). Even if blockchain is safe, data breaches can happen. Blockchain hackers could steal medical records for fraud, identity theft, and other crimes (Agbo et al., 2019; Khan, 2020). Another issue is verifying blockchain healthcare data. Inaccurate or outdated healthcare data could harm patient treatment. The preservation and sharing of medical data is strictly regulated, as is healthcare. Blockchain technology may not comply with these rules, making it tougher to use. Healthcare organisations must restrict data access to authorized users.

Integration issues hinder blockchain healthcare application (Tama et al., 2017; Griggs, 2018). Blockchain technology is difficult and time-consuming to implement in healthcare. Some key integration issues are. Blockchain technology may not function with many healthcare companies' existing ways (Guo and Liang, 2016; Hull et al.,

2016). Connecting blockchain technology to legacy systems may need major infrastructure improvements (Angraal et al., 2017). Healthcare organisations may not be able to afford blockchain technology. Hardware, software, and training costs can make blockchain technology tougher to adopt (Angraal et al., 2017; Seebacher and Schüritz, 2017). Healthcare providers may struggle to adopt blockchain technology due to resistance to change. Healthcare organizations may avoid new technologies if they are harmful or difficult to use (Hull et al., 2016; Tama, 2017).

Adoption challenges

This study finds blockchain adoption in healthcare difficult. We discuss these issues next. Not being able to communicate makes blockchain less effective in healthcare (Abu-Elezz et al., 2020; Yaqoob, 2021). Interoperability lets blockchains share data (Yaqoob et al., 2021). Many blockchain systems in healthcare must work together to aid patients, doctors, and other key people (Cao et al., 2019). Blockchain-based healthcare systems can't communicate because they're not standardized (Tama et al., 2017; Abu-Elezz, 2020; Tanwar, 2020; Yaqoob, 2021). Blockchain platforms lack a healthcare data exchange standard, making system integration difficult. Blockchain systems may use incompatible data formats, terminologies, and regulations without standardization (Beinke et al., 2019; Attaran, 2022). Building data silos that can't be shared could make blockchain technology less beneficial for healthcare. Safe data interchange hinders blockchain-based healthcare system interoperability (Beinke et al., 2019; Cao, 2019; Tanwar, 2020). Healthcare data traded between blockchain systems must be secure to ensure patient privacy. Due to their diverse privacy and security approaches, blockchain platforms make data exchange difficult (Tanwar et al., 2020).

Standardization hinders healthcare blockchain use (Katuwal et al., 2018; Abou Jaoude and Saade, 2019; Yaqoob, 2021). Standardization creates technical and operational rules so systems and parties may collaborate. Standardization makes blockchain data sharing straightforward and dependable, which is crucial in healthcare where clinicians and organizations must share patient data. There are no industry-wide guidelines for blockchain-based healthcare systems, making standardization difficult (Katuwalet al., 2018; Yaqoob, 2021). Different blockchain systems may require incompatible data formats, terminologies, and other elements. This can create unshareable data silos. Blockchain technology may not be beneficial in healthcare since systems cannot share data. Regulatory advice also hinders blockchain-based healthcare system standardization. Regulatory organizations must clarify the legal and moral implications of blockchain technology in healthcare so everyone knows what to do (Abou Jaoude and Saade, 2019; Alonso et al., 2019; Attaran, 2022). Many rules govern healthcare. Healthcare blockchain laws are still being developed, raising concerns regarding data security, safety, and other issues (Kassab et al., 2019).

Data management is a major issue with blockchain in healthcare (Data Quality's Importance to Blockchain, 2022). Data governance governs data collection, use, sharing, and protection. In healthcare, patient data is private and must be protected to comply with regulations (Liang et al., 2017). Data governance in blockchain-based healthcare systems requires balancing patient privacy and data sharing benefits. Blockchain technology enhances patient care and results by securely sharing data across many servers (Randall et al., 2017). People worry about patient safety and data misuse. Blockchain-based healthcare systems need clear regulations and procedures to preserve patient data and use it ethically (Kassab et al., 2019; Attaran, 2022). Data governance challenges include maintaining data integrity and accuracy in blockchain-based healthcare systems (Liang et al., 2017; Randall, 2017; McGhin, 2019). Data must be accurate and high-quality for blockchain to work. Accidents can damage its security. Complex and varied healthcare data makes it hard to collect accurate and high-quality. Clear data quality and consistency requirements are essential to maintain blockchain-based healthcare data valid (Liang et al., 2017).

Operational challenges

The study indicated that block-level data and prolonged transactions worsen scalability. Data Governance that isn't scalable may be challenging to accept by the public. Operations Scalability (Hussein, 2018; Katuwal, 2018; Agbo, 2019; Casino, 2019; Clim, 2019; Kassab, 2019; Khezr, 2019; McGhin, 2019; Shuaib, 2019; Maesa and Mori, 2020; Pandey and Litoriya, 2020; Sengupta, 2020; Adere, 2022; Mamun Data access (Wood et al., 2016; Randall, 2017; Katuwal, 2018). Accessing things (Genestier, 2017; Farouk, 2020; Tanwar, 2020; Yaqoob, 2021). Workability (Adere, Saeed et al., 2022). You can share data (Yue et al., 2016; Khezr, 2019). Speed of Data Processing (Vora, 2018; Beinke, 2019; Esmaeilzadeh and Mirzaei, 2019; Ornes, 2019; Zheng, 2019; Abu-Elezz, 2020; Maesa and Mori, 2020; Pandey and Litoriya, 2020)" Blockchains decide if a healthcare system can change how fast it works and how much it costs based on the needs of the program and system. But some blockchains, like Ethereum, can only handle 20 transactions per second, which is very slow. It's hard for doctors to share and use healthcare data across IT systems (Adere, 2022; Saeed et al., 2022). For instance, a patient's medical information needs to be gathered before a prescription is written (Boell and Cecez-Kecmanovic, 2015). Accessibility is another problem with how well blockchain works (Genestier et al., 2017; Farouk, 2020; Tanwar, 2020; Yaqoob, 2021). Blockchain, like other disruptive technologies, has a problem with variety that makes it harder for some people to use. Communication is also hard because blockchains don't have rules for how they work with each other (Tama et al., 2017; Beinke, 2019; Cao, 2019; Abu-Elezz, 2020; Tanwar, 2020; Yaqoob, 2021; Attaran, 2022). A lot of nodes have to agree on a transaction before it can be confirmed, which slows down the processing of data on public blockchains. Each node needs to be able to connect to the whole blockchain network in order to make deals and reach a consensus (Vora et al., 2018; Beinke, 2019; Esmaeilzadeh and Mirzaei, 2019; Ornes, 2019; Zheng, 2019; Abu-Elezz, 2020; Maesa and Mori, 2020; Pandey and Litoriya, 2020). This makes public blockchains slow down. But full access to the blockchain makes privacy and security issues worse (Yaqoob et al., 2021). Blockchain technology is getting a lot of interest and has a lot of potential. The study found a strong link between data quality and blockchain technology, which should make data quality better, but its effect on healthcare data quality is still growing. Because the healthcare sector is growing so quickly, blockchain is expected to soon have a positive effect. Blockchain technology should make data more secure and accurate. Lockchain technology has some good points when it comes to data quality, like keeping full records of transactions and verifying entities. But it also has some problems with data quality, like consistency, data integration, interoperability, scalability, security, and privacy, which we've already talked about in this paper.

Research implications

This study makes important theoretical contributions to IT and systems research, blockchain study in healthcare, and blockchain classification. Technology, acceptance, and management issues need more research and development in blockchain-based applications. The classification system may make it easier for researchers to use and improve this technology in data quality.

Research limitations and futuredirections

There are major problems with this work. The study only looked at journal articles from Science Direction, Scopus, and Google Scholar, as well as IEE and conference proceedings. Blockchain research is new and not well understood yet; the study looked at most pieces written since 2016. Because so few studies have been published, it is hard to compare and generalize the results. Second, the study is only about health care. Blockchain technology is still being worked on, and this study shows that we need to do more research right away. Interoperability, security, scale, and privacy are still the biggest problems with putting blockchain technology to use in healthcare (Abu-Elezz et al., 2020). So, the areas of future research can be found, as we'll see later. We need to learn more

about blockchain technology's security features and how it might affect healthcare and government departments that need to keep identities and data safe. If someone gets access to the whole blockchain, privacy and security may be at risk. Another important topic is how to speed up the public blockchain. These problems need to be fixed for blockchain to become widely used (Abou Jaoude and Saade, 2019). To adapt to and accept blockchain-based operational services, processes, and applications, data governance needs new models for regulating data quality. Blockchain technology doesn't have any rules about how to handle data, and there aren't any trusted parties. This makes it hard for legal authorities to give the right people access, which raises security and privacy issues. Another important thing that needs to be done for the blockchain is the creation of new data quality standards. This is because the lack of blockchain standards makes contact harder because no two blockchains can work together. Policies and guidelines need to be made before healthcare businesses can use blockchain technology. Standards should list all of the stated goals. Also, they should be able to change with the times and learn from past mistakes. The technology and global environment changes quickly.

5.CONCLUSION

Blockchain is a decentralized transactional record that makes business processes better and makes sure that data can be trusted. This new method lets users check, save, and share a copy of a transaction ledger that has been copied by many users. The report lists problems with the quality of healthcare data, points out research gaps, and offers possible areas for blockchain study. The other goal of this review study is to help healthcare experts, practitioners, and stakeholders run and oversee blockchain transformation projects. Making them more aware of the mentioned factors would also help their companies make decisions. Blockchain is a new technology that is being studied more and more by academics. Businesses find it hard to adopt new technologies. Not having enough information also makes it hard to handle projects and daily tasks. These important factors should be taken into account when developing and implementing healthcare. As blockchain technology keeps getting better, future studies should look at how easy it is for people to use and how they feel about it. Policies and new business models should be based on the needs of technology, the environment, ecology, the economy, technology, and information management. More empirically tested healthcare studies should be the goal of high-quality academic studies.

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