# Blockchain Technology Across Industries: A Review of Application in Finance, Healthcare, Governance, Forensics, Digital Forensics, and Internet of Things

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## Abstract:

Block-chain technology has evolved from its application in cryptocurrencies to become a widely accepted digital technology in various applications and fields. The major aspects of Blockchain technology are that they render trustworthy and reliability for applications without requiring intermediaries are their key properties of decentralization, immutable nature, cryptographic security mechanisms, and consensus mechanisms and transparency. The review paper majorly aims to study the applications of Blockchain technology in fields like, finance, healthcare, governance, digital forensic analysis, forensic analysis, and Internet of Things (IoT) applications. The review paper consolidates literature studies and provides an overview of various applications of blockchain technology to enhance security in financial transactions, to maintain the privacy and confidentiality of medical records in healthcare applications, and to maintain integrity and purity of evidence in forensic analysis while being free from custody, and complexity of blockchain technology that acts as a hindrance to its own applications and as well as for the applications of blockchain technology in IoT, requiring security and integrity of sources of information that remain untampered and unchanged for its applications and usage. Challenges in this area that the literature survey highlights include the scalability problem, energy issue, interoperability problem, regulatory hype, and no easy solution or process. The last section discusses the future work on how a scaled, privacy-conscious, and bespoke blockchain solution must be developed.



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**Keywords –** Distributed ledgers, block-chain technology, intelligent contracts, systems of finance, transparency in governance, security of healthcare data, IoT forensics, digital forensics, Integrity of data.

## 1. Introduction

Blockchain technology is a type of encrypted data record on a distributed database; it is one of the emerging aspects of computers and information technology. Moreover, this deals with the information related to contract, transaction, independent record, etc. Only the registered members with permission / access (authorization) are permitted to use the Blockchain, which provides instantaneous, shareable, and fully visible information [1]. Blockchain technology is extremely popular and well used nowadays. Chains of information blocks are called Blockchains. This method was first described in 1991 by a team of researchers [2]. Its fundamental feature—a shared, unchangeable ledger—has opened up new possibilities for safe, transparent transactions involving both actual and intangible assets [3]. The issues regarding safe storage, access to patient medical records, ownership, and medical data from related sources have become more widely recognized as a result of the increasing digitization of healthcare. Blockchain has been recommended as a way to resolve important problems in the healthcare industry, such as secure health record sharing and compliance with privacy laws [39]. The goal of IoTF (Internet of Things Forensics), a subset of DF (Digital Forensics), is to solve the problem of IoT forensics in the context of IoT crime investigations. Finding compromised devices, collecting and storing data, examining logs, and presenting the results in legal and regulatory contexts are the first steps in an investigation [4]. Authenticity, reliability, and refutation are the three essential characteristics that ensure the admissibility of the related evidence in a court of law [24]. From Fig 1, it can be observed that, since 2015, the amount of research in this field has increased, indicating a growing interest in Blockchain technology over the past few years.

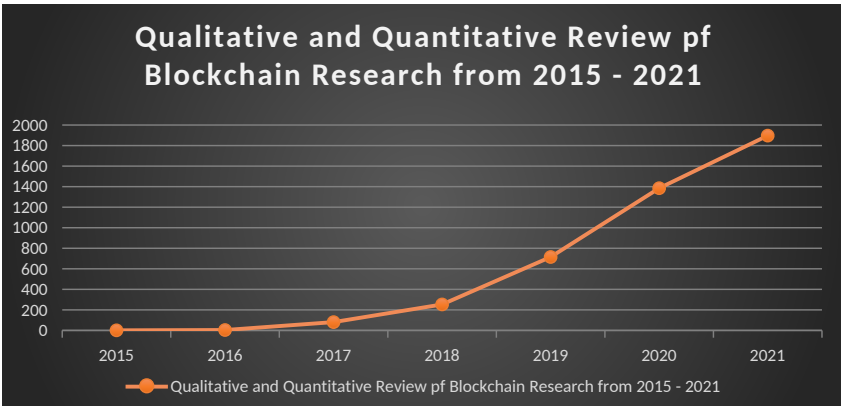


Figure 1: Qualitative and Quantitative Blockchain review

( Data extracted from : https://www.mdpi.com/sustainability/sustainability-15-05067/article_deploy/html/images/sustainability-15-05067-g002.png )

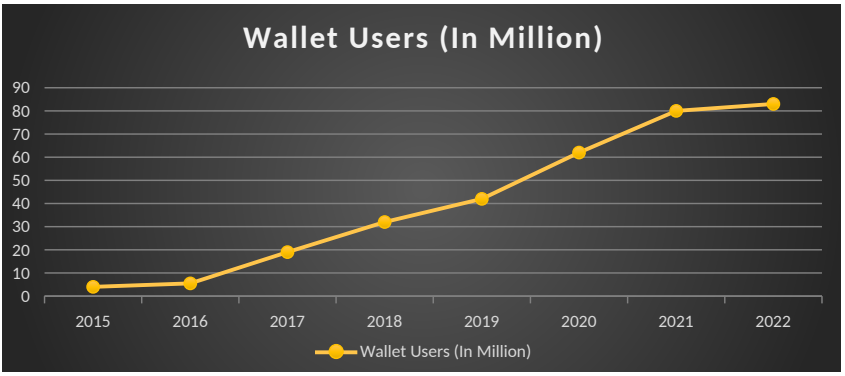


Figure 2: Wallet users from the year 2015 to 2022

(Data extracted from: https://www.demandsage.com/blockchain-statistics/ )

The increase in Wallet users from the year 2015 to 2022, in millions is depicted in the Fig. 2, mentioned above. Blockchain's inherent qualities—such as auditability due to append-only characteristics, immutability, transparency, automation capabilities through smart contracts, file

storage capabilities, and security features—all contribute to the creation of verifiable chains of custody that may be admissible in court. Initially developed as the underlying technology for cryptocurrencies such as Bitcoin and Ethereum, the inherent properties of Blockchain have resulted in the expansion of its potential applications across a variety of domains, including healthcare, supply chain and finance, and, more recently, digital forensics [5]. The first generation of Blockchain technology, often known as Blockchain 1.0, consists of the initial implementations of Blockchain-based cryptocurrencies like Bitcoin. The introduction of smart contracts and smart properties is linked to the second generation of blockchain technology, or Blockchain 2.0. Blockchain technology 2.0 includes Ethereum as an example. On the basis above mentioning's, Blockchain technology is the third generation, or Blockchain 3.0, is currently focused on non-financial uses [7] The passed-on feature of physical decentralization, inadequate security protocols that require improvement, the requirement to expose the data to the Internet unrestricted or any other IoT-related problem could be the cause of the shift in research trends. Since the beginning of the study, the combination of these two technologies—Blockchain and IoT—has grown in popularity [42]. Two categories—centralized and distributed—can be used to represent software system architecture approaches. Additionally, Blockchain can be viewed as a pure peer-to-peer system, which consists of each individual node inside a distributed system. A distributed ledger, or block chain, is a decentralized system of safe and reliable distributed databases [9]. Accurate interpretation of timestamps is crucial while investigating criminal situations. Courts rely on the accuracy and dependability of digital forensic tools when investigating metadata, such as time stamps from file systems. Most investigations assume that these tools can parse the file systems they purport to support. The inquiry shouldn't depend only on tool interpretation because timestamp interpretations could provide a defendant with an alibi [13]. Blockchain still has certain technological issues and restrictions that need to be researched and resolved, even though it appears to be a good option for carrying out transactions utilizing cryptocurrency. To stop attacks and efforts to disrupt Blockchain transactions, high transaction integrity, security, and node privacy are required. Furthermore, the Blockchain requires more processing power to verify transactions [15]. Blockchain has enormous potential to change every aspect of Supply chain, from the acquisition of raw materials to consumer distribution. By creating a Blockchain-based Business Process Re-engineering, it also makes supply chain re-engineering possible. Blockchain technology allows for the re-construction of every transaction, making the process quicker and

safer [16].

## 2. Objective and Methodology

Our research is based on review papers collected from google scholar to analyse blockchain and attain the importance of blockchain in various Industries. We initially acknowledged the core purpose of attaining blockchain technology into the present day utilization and examined the major advantages as well as the limitation on this technology which was immense and felt there was a need to research how it makes massive industries flexible in multiple ways. Based on our ideology we choose six major Industries to reflect according to the intensive acknowledgement and also study related objectives— Governmental, Healthcare and Finance are the basic right and usage of any citizen for survival and apart from that we also choose—Digital Forensics, forensics, and IoT which are relating field related content.

Our research:

- We initially researched for other research papers relating to these major Industries and how they all are benefited by the utilization of blockchain.
- Analyzed and examined those review papers their advantages and disadvantages, their upgradation, and all related aspects
- Attaining important information relating blockchain technology implementation into numerous Industries to find appropriate result and conclude.

As a result factor we have examined

We conducted research on 44 review paper posted by people all around the world on blockchain in numerous fields along with limitations. Significantly focusing on how flexible Industries are by the introduction of block chain.

## 3. Background and Related work

Previous research work on the topic of Blockchain technology focuses on the underlying architecture of the Blockchain structure, whether it is a public, private, consortium, or hybrid Blockchains [3]. The community and existing literature highlight the importance of consensus protocols like the Proof of Work, Proof of Stake, and the Practical Byzantine Fault Tolerance in reaching a consensus among the nodes in the Blockchains [4]. The existing literature addresses the implementation of Blockchain in the banking, supply chain management, health information system, and government sectors [5]. In the healthcare sector, Blockchain-based applications have been discussed for secure management of electronic medical records, tracing pharmaceuticals,

and sharing clinical data [6]. Blockchain technology can be utilized in public healthcare in developing nations in a number of ways, such as Electronic Medical Records, Supply Chain Management (that uses Blockchain technology to track the movement of drugs and other medical supplies from manufacturers to patients), and Clinical Trials (that use Blockchain technology to develop an open and safe system) [40]. Studies on governance applications describe the importance of the technology in digital identity, electoral systems, and the maintenance of clear public records [7]. In digital forensics, recent literature reviews cover the application of the technology in the management of chain-of-custody processes via the IoT [8]. The baseline methods currently in use are limited to detecting knives; they are unable to identify any other items of criminal activity. This is due to the fact that knives are not the only weapons used in criminal activity. a sophisticated technology that can identify a variety of weapons that could be employed in criminal activity [23]. We used the framework from Arksey and O'Malley [20] and Levac et al. for the scoping review technique. This framework is used to guarantee that the study adheres to high standards of accuracy, consistency, and dependability. For this investigation, comprehensive literature was found by searching and reviewing major databases. Elsevier, ResearchGate, IEEE, ScienceDirect, and ABI/INFORM Collection were among the databases [38]. Sharding, Segregated Witness, Hard Forks, State Channels, Sidechains, Lightning Network, Cross Chain, Rollups, Consensus protocol optimization, and AI or ML-based solutions were among the optimization strategies that might be identified. A Review on Blockchain Technology, Current Challenges, and AI-Driven Solutions, according to experts [43].

Blockchain is a cutting-edge technology that transforms and upends the financial industry, and its application in FinTech is becoming more and more common. FinTech has undergone three stages of development. Mobile payments, like Apple Pay, are the first stage. Smart contracts, like Docusign, are the second stage. Blockchain is the third stage. Even though Blockchain technology is still in its early phases, the industry has noticed this shift and is keen to learn more about its architecture, design, implementation, and upkeep [37]. An ecosystem of financial market infrastructure is formed by the central securities depository, securities settlement system, central counter-party, payment system, and transaction repository. The original purpose of Blockchain technology was to facilitate the use of Bitcoin. The use of Blockchain technology has grown over time. Blockchain technology's two essential characteristics—immutability and tamper-resistance—can offer better answers to these issues [44].

## 4. Literature Review

For the analysis of the use of Blockchain technology in finance, health, governance, digital forensics, IoT forensics, and Internet of Things (IoT) and other aspect, We, analysed numerous literatures / review papers on the implementation of Blockchain into various Industries and examined their advantages as well as disadvantages. Furthermore, on the basis of the suitability, analysis complexity, and existing understanding of Blockchain-enabled security, transparency, and data integrity solutions, this literature analysis has selected particular studies for this analysis. Below is listed studies selected for this literature analysis, encompassing various conceptual studies and analysis work focuses related to implementation aspects, placed under Table I.

In finance and governance realms, prior research studies attempted to enhance trust, auditability, and decentralized transaction processing [10]. For Blockchain-enabled secure electronical health records' processing, controlled data sharing, or pharmaceutical chain tracking, research studies in health domain consider frameworks such as [14]. To build reliability of evidence, authenticity, or chain tracking aspects within distributed networks, current studies in digital forensics and analysis studies related to IoT forensics consider chain-of-custody frameworks using Blockchain [15]. Moreover, analysis studies in relation with the IoT domain architecture considers issues of "privacies," "interoperability," along with "scalability," majorly acquiring imperative for hybrid forms of Blockchain [27]. These studies clearly compile that studies across various domains encompass more advanced aspects of various Blockchain applications, while multiple research aspects remain yet to be explored.

**TABLE 1:** STUDIES INVOLVED IN THE SYSTEMATIC LITERATURE REVIEW.

| Authors & Years | Country / region | Work focus | Conceptual framework |
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| P. K. Paul, P. S. Aithal, Ricardo Saavedra, & Surajit Ghosh<br><br>(2021) [1] | India, Mexico | Significant participation in Blockchain initiatives, especially in underdeveloped nations. The development of Blockchain technology and the resolution of implementation problems depend heavily on incubation centres. | The framework typically integrates popular theories of technology adoption from the information systems literature, such as the Technology Acceptance Model (TAM), Task-Technology Fit (TTF), and the Unified Theory of Acceptance and Use of Technology (UTAUT). |
| Karthik Kumar | India | Benefits sectors like healthcare by | A conceptual approach to blockchain |

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| Vaigandla, Mounika Siluveru, Madhavi kesoju, RadhaKrishna Karne (2023) [2] | | protecting sensitive data. Blockchain enables secure, tamper-proof data sharing through decentralization and immutability which are the core features of Blockchain technology. | technology in the area of healthcare data security would revolve around the principles of decentralization and immutable blockchain technology and cryptography and would enable the patient to take control of their medical records through digital identities and smart contracts to secure the transfer of Electronic Health Records between healthcare providers while providing an immutable audit trail for this transfer. |
| Shi Dong, Khushnood Abbas, Meixi Li and Joarder Kamruzzaman. (2023) [3] | China, Australia | Blockchain is a transparent technology that enables tamper-proof transactions. Since Bitcoin's introduction in 2006, it has been widely adopted in finance, supply chains, healthcare, and digital currencies, boosting efficiency, security, and automation through smart contracts. The elimination of reliance on centralized systems, Blockchain enhances trust and transparency, particularly in developing economies. | The conceptual framework revolves around how the technology, that is a decentralized, unchangeable ledger analyses particular results especially like trust, security, and efficiency all across a wide range of applications, resulting in a wide socioeconomic impact. |
| Marwa Popal, Ashfaq Ahmad, and Muhammad Arshad. (2025) [4] | Larnaca, Cyprus, United Kingdom, Pakistan, Ireland. | On international investigations, its immutability and transparency features increase security, traceability, and trust. While offering promises in transforming IoT forensics through an even more reliable framework, there are still concerns on ethics and more applicability-oriented research. As a whole, Blockchain technology has been tackling significant concerns in digital forensics as well as security and digital evidence in IoT. | Creates an untamperable chain of custody for digital evidence using the immutability and transparency of Blockchain and smart contracts. In the IoT environment, it will increase the reliability of the digital evidence regarding its dependability by creating an untamperable record of all the processes executed, thereby mitigating challenges of evidence tampering, security threats, standardization, among others, albeit with some ethical and knowledge gaps. |
| Oshoke Samson Igonor, Muhammad Bilal Amin and Saurabh Garg. (2025) [5] | Australia | This paper assumes significance in understanding the application of blockchain technology and its potential in tackling issues associated with digital forensics, including issues of evidence, privacy, and jurisdiction, using the PRISMA 2020 approach in carrying out systemically developed reviews. | The study provides a synthesis of its results and acts as a guideline in future studies and examination due to its fast-paced environment. |

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| Gousia Habib, Sparsh Sharma, Sara Ibrahim, Imtiaz Ahmad, Shaima Qureshi and Malik Ishfaq (2022) [6] | India, Germany | The topic of this research paper is blockchain technology and it discusses the benefits of this technology, which include enhanced cybersecurity and the capability to be integrated with cloud computing to ensure the security of IoT and data. The cons of the blockchain technology include higher levels of power consumption and infancy stages. | The conceptual framework of the paper may revolve around the central idea that while blockchain technology offers significant advantages in cyber security, as well as in the integration of cloud computing and IoT, its wide extension today is restricted by key drawbacks-only high energy consumption and challenges at an early stage. |
| Cornelius C. Agbo, Qusay H. Mahmoud and J. Mikael Eklund. (2019) [7] | Canada | Evolutionarily, blockchain technology has advanced through three phases: cryptocurrencies, smart contracts, and non-financial healthcare applications. In the field of health, it offers the following:<br>a. EMR-48%: Electronic medical records maintain all the data securely.<br>b. RPM-15%: Remote patient monitoring improves care delivery.<br>c. Biomedical Research: Prevention of fraud and anonymous data sharing are possible.<br>d. Insurance Claims: Brings in more transparency. | A conceptual framework for blockchain technology adoption within the healthcare industry aligns the process of blockchain technology adoption with the three stages of progression involving cryptocurrencies, smart contracts, and non-financial uses to cater to the crucial needs of the industry related to the secure management of data, improved delivery of care, fraud reduction, and transparency within claims for insurance. |
| Gautami Tripathi, Mohd Abdul Ahad, Gabriella Casalino (2023) [8] | India, Italy | Despite its enormous potential in identity management, health, and decision analytics, the technical, financial, societal, and environmental obstacles prevent it from its widespread implementation. The trade-offs are thereby highlighted by the comparative analysis of the consensus algorithms, and it was thought that blockchain was not always the best option, especially in situations when centralized systems could be enough. Further Future developments like the behavioural biometrics and zero-knowledge proofs may improve security and privacy. The conclusion emphasizes careful adoption based | Summary of findings and need for a pragmatic adoption strategy. Careful or Measured Adoption, Implementation according to Suitability, Need for Further Research. The overriding lesson is that the process of adoption itself must be informed by a pragmatic assessment of need and suitability rather than mass adoption or enthusiasm. |

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| | | on suitability and cost; further research is necessary to address its shortcomings. | |
| Rahul Paliwal, Shubham Yadav, Sameer Dev Sharma (2019) [9] | India | Its applications, which sprang from a genesis block, include supply chain (transparent tracking), healthcare (safe data), and finance (cryptocurrencies). Blockchain has enormous potential to change businesses in the future by increasing efficiency, security, and transparency; cryptocurrencies are a prominent example of this. | This is because the whole thing has its origins in one base or "genesis block" that is the basis of everything. Each new block is then chained to the next one through cryptography that helps ensure the security of the whole chain. |
| Alex Akinbi, Aine MacDermott, Aras M. Ismael (2022) [10] | United Kingdom, Iraq | By providing tamper-resistant, immutable record capabilities such as Ethereum or Hyperledger blockchains, IoT forensics is strengthened using blockchain technology. Thus, IoT applications benefit from improved provenance, privacy, chain of custody, or integrity. | The above extract describes a comprehensive conceptual framework that can be used to enhance Internet of Things (IoT) forensics based on blockchain technology. The framework takes advantage of inherent security characteristics within distributed ledgers to overcome significant hurdles in digital forensic analysis. |
| Hany F. Atlam, Ndifon Ekuri, Muhammad Ajmal Azad and Harjinder Singh Lallie. (2024) [11]. | Coventry, Derby UK. | Blockchain forensics is dealing with financial transactions to combat financial crimes while utilizing the transparency feature in blockchain technology. However, this technology has limitations because of the decentralized nature. It is also rapidly developing in the fields of IoT security along with cloud security. Researchers are using sophisticated tools like PRISMA because of the increase in cybercrime. | Researchers are employing sophisticated systematic review techniques like PRISMA to assess the growing industry and counteract the rise in cybercrime. Additionally, it outlines a conceptual framework for blockchain forensics that highlights the technology's transparency to combat financial crimes despite limitations caused by decentralization and scalability issues in large networks. |
| Moez Krichen 1, Meryem Ammi 2 , Alaeddine Mihoub 3 and Mutiq Almutiq 4 (2022) [12]. | Saudi Arabia, Tunisia. | Blockchain is a present day-day-day generation that has revolutionized the way society interacts and trades. It could be defined as a sequence of blocks that shops information with virtual signatures in an allotted and decentralized community. decentralization, persistence, anonymity, and auditability. The importance of blockchains in the sectors of clever healthcare, clever | It is an cutting-edge-day era that allows secure and decentralized statistics control through a chain of blocks included through digital signatures. It helps make certain statistics integrity and bear in mind. At the same time as covered with IoT structures, blockchain addresses critical protection issues through protecting statistics from hacking and misuse. This makes it particularly precious in clever healthcare, clever grids, |

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| | | grids, and clever financial systems is likewise said in this have an have an have an take a look at. IoT information can be hacked and misused if information safety isn't always installed. | and clever financial structures, wherein secure statistics sharing, transparency, and reliable choice-making are critical. |
| Rune Nordvik, Stefan Axelsson. (2022) [13]. | Norway, Sweden. | The forensic analysis carried out on timestamp processing in exFAT file systems on macOS Monterey, Windows 10, and Ubuntu 20.04 (using FUSE and native drivers) has shown some essential differences between Platforms and OS on timestamp processing:<br>1. Windows 10 fully complies with exFAT standards, prefixing timestamps with UTC and applying proper time zone and daylight-saving adjustments.<br>2. macOS fails due to its reversed UTC sign.<br>3. Ubuntu 20.04 (Linux OS) exhibits incongruity between FUSE and native drivers | The conceptual framework for the forensic analysis of timestamp processing in exFAT file systems across different operating systems can be based on the fact that the exFAT specification acts as the ground truth, and analysing the deviations in OS implementations and forensic tool interpretations that will point out why flawless adherence to standards-one of the important bases of correct digital evidence interpretation-should not be assumed. |
| Pankaj Duttaa, Tsan-Ming Choib, Surabhi Somanic, Richa Butalac. (2020) [14]. | Hongkong, India. | Blockchain enhances supply chains with decentralization, transparency, and security but faces high costs and regulatory issues. Adopted across industries for efficiency and trust, it powers cryptocurrencies and global advancements despite challenges like irreversible transactions. | The conceptual framework for conducting the forensic analysis of timestamp processing for exFAT file systems on various operating systems can perhaps be established on the grounds that the exFAT standard will serve as the ground truth and that the forensic analysis of the variance of OS and the forensic tools interpretation that will indicate why perfect conformity with standards, one of the key pillars for proper interpretation of digital evidence, cannot be presumed. |
| Jesse Yli-Huumo, Deokyoon Ko, Sujin Choi, Sooyong Park, Kari Smolander (2016) [15] | Finland, South Korea, Finland, South Korea. | The systematic review emphasizes blockchain research, pointing out its positives, including data security, immutability, decentralized architecture, and its applications in P2P sharing and smart contracts, and on the other hand, its negatives concerning latency, inefficiency, usability, and scalability. This effort aims to provide an overview | Develops a framework by analysing the dual impact of blockchain technology across various applications, varying inherent benefits against significant technological limitations. It eventually uses the contrasting findings to identify current research gaps and propose concrete future directions within the chain of block implementation challenges. |

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| | | of current research and suggest future directions in blockchain technology by underlining current issues. | |
| Mohamed Ali, Ahmed Ismail, Hany Elgohary, Saad Darwish, and Saleh Mesbah (2022) [16] | Egypt | This paper aims at safeguarding the digital image evidence chain of custody through fusion of fuzzy (grey) hashing and blockchain technology in order to mitigate tempering risks and integrity ambiguity. | The system combines similarity-based hashing with a blockchain ledger to create an immutable chain of provenance for perpetually validating the integrity and authenticity of images during investigations. |
| Donghyo Kim, Sun-Young Ihm and Yunsik Son (2021) [17] | Korea | The work provides a solution for scalable and efficient digital crime evidence management by proposing a two-level architecture of blockchain to deal with forensic datasets of large size. | The frequently updated information during the evidence collection process, and static evidences are distinguished and stored on hot-chain and cold-chain in our two-level distinction mechanism to balance the traceability, security, efficiency. |
| Mfundo A. Maneli and Omowunmi E. Isafiade (2022) [18] | S | This survey investigates the evolution of 3D crime scene reconstruction methods and immersive technologies in support of improving forensic investigative accuracy. | We adopt a systematic review approach to categorize tools, methods, and immersive technologies applied, and identify in research trends shed light on limitations and future opportunities. |
| F. Rizal batubara, jolien ubacht, marijn f w h a janssen, (2018) [19] | Netherlands. | The blockchain era to file transactions on disbursed ledgers offers new opportunities for governments to enhance transparency, save you fraud, and installation in the public region. Blockchain has the capacity to make authorities' operations more inexperienced via a way of enhancing the transport of public services and growing undergo in thoughts in public sectors. Moreover, blockchain packages can be transformative, as it could exchange the way wherein transactions are recorded. Our findings show that educational research on this region has superb without a doubt began out and troubles said in the determination of literature are but very limited. Therefore, more in depth research | It allows governments to document transactions on distributed ledgers, developing new opportunities to decorate transparency, save you fraud, and enhance duty in the public area. Present educational studies in this area continues to be restrained, indicating the need for similarly in-intensity studies to better apprehend blockchain adoption and to help the maturity of blockchain-based totally absolutely public area systems. |

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| | | on this region is still essential to enhance the adulthood of this region of research. | |
| Dr.K. Nagamani, Nemmani Srija (2025) [20] | India | The significant aim is to digitize the scene of the crime and manage evidence with the utilization of blockchain technology, as it helps strengthen the chain of custody along with enhancing the trust for forensic investigators. | An authorized model of blockchain with role-based access control as well as smart contracts responsible for automating and securing evidence tracking. |
| M. Ramalingam, G. Chemmalar Selvi, Nancy Victor Rajeswari Chengoden, Sweta Bhattacharya, Praveen Kumar Reddy Maddikunta, Duehee Lee, Md. Jalil Piran, Neelu Khare, Gokul Yenduri, and Thippa Reddy Gadekallu (2023) [21] | India, South Korea, China | Blockchain can be combined with computer version systems, and this review examines how it is done. Its major role is to protect image and video data for secure usage in applications and many more. | Blockchain can be combined with computer version systems, and this review examines how it is done. Its major role is to protect image for more efficient, scalable, and secured blockchain industrial uses, additional work in the future is required.and video data for secure usage in applications and many more. |
| Shada Alsalamah and Emilio Nuzzolese (2020) [22] | Saudi Arabia, Italy | To investigate and examine blockchain-based disaster resolution that is detected by permitting secure, cross-border management of forensic data, one can look into this paper. | As blockchain is a trusted framework in various aspects, and one of them is in the data-sharing ecosystem, it reinforces immutable records, genuine HIMA identification, and also inter-jurisdiction collaboration. |
| Dev Patel, Harshil Sanghvi, Nilesh Kumar Jadav, Rajesh Gupta, Sudeep Tanwar, Bogdan Cristian Florea, Dragos Daniel Taralunga, Ahmed Altameem, Torki Altameem and | Saudi Arabia, India, Romania | The study examines the application of deep learning models in the process of spotting suspicious actions in recorded videos. It has long emphasized blockchain technology, by focusing on secure reporting capabilities through improved coordination in safety systems designed for public. | Blockchain-based ledgers record and share detected events securely. A pre-trained CNN model analyses input visual data to detect crime related patterns. |

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| Ravi Sharma. (2022) [23] | | | |
| Harsh Patil, Ravshish Kaur Kohli, Sorabh Puri and Pooja Puri (2024) [24] | India | The advantages of traditional chain-of-custody are moderate when compared to that of the disadvantages or vulnerabilities examined through its study. For which we can count on blockchain as an evidential resolution for accountability as well as integrity. | Evidence or any record bearing content that is admissible in a court of law regarding a legal issue is decentralized and immutable, maintained in the form of a ledger. |
| Fran Casino, Thomas K. Dasaklis, Georgios P. Spathoulas, Marios Anagnostopoulos, Amrita Ghosal, István Borocz, Agusti Solanas, Mauro Conti, and Constantinos Patsakis (2022) [25] | Spain, Greece, Norway, Denmark, Ireland, Italy, The Netherlands, Belgium | Analyzing numerous pre-written review papers in forensic fields. By which we get to know about some of the similar challenges, vulnerabilities, research gaps, and emerging focus areas. | The results of earlier articles are linked using an umbrella review method. Shared technical and procedural limitations are revealed by cross-domain comparison. |
| Majid H. Alsulami (2024) [26] | Saudi Arabia | Evidential data obtained from mobile phones/devices are challenging to preserve. It introduced a simpler mechanism with better reliability for investigations. | An organized method to preserve mobile evidence/evidence handling. Blockchain technology ultimately promises to provide immutability, traceability, and secure access. |
| Alexandros Z. Spyropoulos, Charalampos Bratsas, Georgios C. Makris, Emmanouel Garoufallou and Vassilis Tsiantos (2023) [27] | Greece | Utilizing knowledge management systems, this study looks at the integration of forensic data. Here, the ultimate and main focus is on reducing human bias in crime via proper data representation. | Forensic ontologies along with semantic logic help in managing and sorting data derived from the scene of the crime. Accessing automated reasoning and cross-agency data sharing can be done by interoperable systems. |
| Prince Waqas Khan, Yung | Korea | Smart city surveillance systems play an important role in | Blockchain format stores CCTV footage securely and CCTV video |

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| Cheol Byun and Namje Park (2020) [28] | | securing footage from CCTV. Validating proper video footage and seeking to provide authenticity to the acquired evidence is a breeze with the usage of blockchain. | metadata. Usage of hash comparison and time-stamping helps in detecting alteration of data or attempts of modification. |
| Akinseye Oluwaseyitan Charles, Abiodun Oguntimilehin, Oniyide Alabi Bello (2023) [29] | Nigeria | In order to securely and entirely provide protection for evidence collected in digital forensics, this review paper describes how blockchain technology is utilized for it. From the process of investigation till judicial processes, it enhances evidence integrity, authenticity, and traceability. | The study revolves around a forensic system that is enabled by blockchain technology wherein the evidence's metadata and access logs are found to be immutable and thereby recorded on a Hyperledger Fabric, and the actual data is securely stored off the chain. The controlled access, key management enforced with cryptography, and tracking system of chain-of-custody all ensure its handling to be secure and safe as well as help in audit trail verification. |
| Guangjun Liang, Jianfang Xin, Qun Wang, Xueli Ni, and Xiangmin Guo (2022) [30] | China | Analysing the study of numerous review papers on Internet of Things devices and examining challenges. It participates in and enhances the purpose of building trust along with reliability in IoT devices/forensics by blockchain. | Blockchain-based architecture serves to manage the IoT forensic investigations. Evidence integrity is preserved by decentralized storage and controlled access. |
| Deepa Elangovan1, Chiau Soon Long, Faizah Safina Bakrin, Ching Siang Tan, Khang Wen Goh, Siang Fei Yeoh, McLin, Mei Jun Loy, Zahid Hussain, Kah Seng Lee, Azam Che Idris, Long Chiau Ming. (2022) [31]. | Australia, Gadong, Malaysia. | Blockchain era is part of organisation four.0's new net of decentralized structures, disbursed ledgers, and immutable and cryptographically secure era. This period includes a sequence of transaction lists with same copies shared and retained through one-of-an-kind groups. This test used a scientific technique to find out literature associated with the implementation element of the blockchain era in health care. The findings must help the clinical community to understand the implementation component of blockchain generation. The outcomes from this have a look at | The conceptual framework highlights blockchain implementation as a key cause force for reinforcing accessibility, usability, and understanding of healthcare records systems, thereby supporting extra green and dependable healthcare offerings. Blockchain technology, as a part of enterprise four.0, offers decentralized, disbursed, and cryptographically at ease systems for handling immutable transaction records. inside the healthcare vicinity, blockchain supports at ease records sharing, transparency, and bear in mind among stakeholders. |

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| | | help in spotting the accessibility and use of blockchain generation inside the health care place. | |
| Wajde Baiod, Janet Light, Aniket Mahanti (2021) [32]. | Canada. | Blockchain generation has come to be a lively location of studies and a technological alternative for plenty of corporations and business communities. With its dispensed, decentralized, and trustless nature, blockchain can offer corporations with new possibilities and advantages via accelerated efficiency, decreased expenses, extra superb integrity and transparency, better protection, and progressed traceability. Even though blockchain's largest programs were within the finance and banking area, we now see experiments and proposed programs in splendid fields. Blockchain structures are decentralized in nature, which eliminates the want for a third-birthday celebration, depending on authority. Blockchain has confirmed its capability for facilitating complicated techniques consisting of transaction verification, reconciliation and agreement, and dispute decision via its format abilities. | A massive region of studies and a viable solution for companies because of its decentralized, allotted, and trust less nature. Through the usage of eliminating reliance on 0.33-birthday party authorities, blockchain complements overall performance, reduces fees, and improves transparency, protection, and traceability. This conceptual framework positions blockchain functions as enablers of at ease transaction verification, reconciliation, agreement, and dispute selection across several sectors beyond finance, helping step forward organizational techniques and average overall performance. |
| Min Xu, Xingtong Chen, Gang Kou (2019) [33]. | China. | Blockchain is considered with the aid of the use of many to be a disruptive middle generation. No matter the fact that many researchers have found out the significance of blockchain, the research of blockchain stays in its infancy. Therefore, this has a look at opinions the cutting-edge instructional research on blockchain, mainly in the scenario area of enterprise and economics, languages. No matter the fact that most of the people of the previous research has centered at the determinants of fulfillment of initial | Its miles recognized as a disruptive era with big capability, regardless of the reality that research on its miles even though in its early tiers. cutting-edge-day-day research popularity largely on its packages in organization, economics, and era, which encompass the determinants of success for initial coin services (ICOs) and cryptocurrencies. This conceptual framework highlights blockchain's feature in reworking digital markets and sectors collectively with computer era, engineering, telecommunications, and organization, emphasizing the want for further research to recognize its adoption, impact, and destiny development. |

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| | | coin services, we agree with that destiny research will communicate the way to alter cryptocurrency and the ICO marketplace. It suggests that the maximum not unusual scenario area is computer technological knowledge, observed with the aid of the use of Engineering, Telecommunications, and enterprise and Economics. | |
| Abhishek Guru 1, Bhabendu Kumar Mohanta 2, Hitesh Mohapatra 3, Fadi Al-Turjman 4,5, Chadi Altrjman 6 and Arvind Yadav 1 [34]. | India, Turkey, Canada. | Blockchain has about 30 consensus algorithms. This architect- rurally allotted database stores records in an encrypted shape with multiple tests, alongside elliptical curve cryptography (ECC) and Merkle hash tree. Moreover, many researchers' goals to place into effect a public key infrastructure (PKI) cryptography mechanism to enhance the safety of blockchain-based certainly records control. Passive, energetic, focused, clickjacking, brandjacking, botnets, phishing, direct mail, inner, and outside. An attacker launches someone-in-the-middle attack (MITM) via handing over poisoned deal with decision protocol answers to each the focused tool and the router. The take a look at covers great worries and future studies paths in blockchain IoT systems. On the back of each notable allotted ledger implementation, there can be a consensus protocol that powers it. | This conceptual framework positions consensus mechanisms and cryptographic safety as center additives that shield blockchain IoT networks closer to numerous cyberattacks, which consist of man-in-the-center and phishing assaults. Blockchain-primarily based definitely IoT systems depend upon an allotted ledger shape supported via consensus algorithms, cryptographic techniques which consist of elliptic curve cryptography (ECC), Merkle hash trees, and public key infrastructure (PKI) to make certain cozy records storage and controls. |
| Tim K. Mackey, Tsung-Ting Kuo, Basker Gummadi, Kevin A. Clauson, George Church, Dennis Grishin, Kamal Obbad, Robert Barkovich and Maria Palombini. (2019) [35]. | USA. | Blockchain is a shared allotted virtual ledger era that can better facilitate records control, provenance and protection, and has the capability to convert healthcare. This iterative studying technique is repeated until a consensus predictive version for all friends is identified. Blockchain era can cope with the difficulty of health- care records silos which might be | This conceptual framework highlights blockchain's role in overcoming healthcare information silos by means of permitting patient-focused and open health information trade via secure consensus mechanisms. By means of helping relied on information sharing and iterative consensus-primarily based definite models, blockchain can increase patient-driven healthcare, precision treatment, and more inexperienced |

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| | | employer-centric and not affected individual-centric thru permitting open health records alternate markets driven thru patients. The best benefits of blockchain are but to be realized. But, the consequences of an achievement and failed blockchain pilots will in the long run lead to the promise of affected individual-driven healthcare systems inside the shape of open health records markets and precision remedy, sooner or later venture the affected individual. | healthcare ecosystems, regardless of cutting-edge challenges and ongoing pilot implementations. |
| Yujin Han 1, Yawei Zhang 2, Sten H. Vermund 3. (2022) [36]. | USA, China. | Compared with traditional paper-based scientific records, virtual health records are extensively used due to their performance, safety, and decreasing records redundancy. EHRs despite the fact that appear negative interoperability and privacy problems are unresolved. Blockchain is database storage the use of encrypted blocks of records prepared in chains for entry to as a distributed ledger protocol. Privacy and safety of blockchain manner encrypting the records stored inside the block with hash features, which includes the SHA-256 encryption set of rules. It permits sufferers with one-stop purchasing to get entry to their scientific histories and takes the load of lifetime scientific records stewardship from healthcare vendors. | This conceptual framework offers blockchain as a secure allotted ledger that uses encrypted, hash-based mechanisms which consist of SHA-256 to shield health records. via allowing secure, unified get right of access to clinical histories, blockchain enables patient-centered records control whilst lowering the lengthy-time period records control burden on healthcare groups. |
| Rashikala Weerawarna, Shah J. Miah1, Xuefeng Shao 1. (2022) [37]. | Australia. | Blockchain has emerged as a broadly used statistics machine era presently because of its effectiveness as an intermediary-loose platform. Even as the use of blockchain in numerous fields, which incorporates finance, delivery chains, healthcare, education, and strength intake, is more and more permitting the improvement of net- | This conceptual framework highlights blockchain adoption as being formed through key elements which includes massive data control, regulatory frameworks, and application layout. Addressing gaps related to organizational goals, technological capability, applicability, and regulatory supervision is crucial for advancing blockchain implementation, specially inside the |

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| | | enabled “allotted databases,” there aren't many exploratory studies to be had to offer a knowledge of ways the sphere is progressing. The precept worries in this implementation technique are the economic large records, guidelines, and applications. Scientific studies have diagnosed approaches to shut the gaps inside the software environment of finance blockchains from the perspectives of business enterprise necessities, era, applicability, law, and supervision for enhancing the finance area. | financial region. |
| Samreen Mahmood, Mehmood Chadhar, Selena Firmin (2023) [38]. | Australia. | With the development of generation, cybersecurity has acquired big significance in research. Cybersecurity troubles are growing exponentially during precise sectors jogging within the commercial enterprise company international. The researcher focuses on a growing mission to document the preliminary literature length, become aware about gaps, and suggest research agendas therefore for future implications. The principal motive of this scoping assessment is to determine the length, scope, and gaps within the current literature on cybersecurity disturbing conditions in BCT. Our consequences show that the maximum of the study pattern is that famous cybersecurity disturbing conditions in BCT extraordinary without pointing to any particular company place. | This conceptual framework focuses on identifying and reading cybersecurity disturbing situations within the blockchain era (BCT), emphasizing the want to map modern-day-day research, pick out gaps, and manual future research instructions. The framework highlights that modern-day research in large elements cope with brand new cybersecurity problems in blockchain in preference to place-specific disturbing situations, indicating the want for extra centered and contextualized research. |
| Huma Saeed, Hassaan MalikID, Umair Bashir, Aiesha Ahmad, Shafia Riaz, Maheen Ilyas, Wajahat Anwaar Bukhari, | Pakistan. | Blockchain technology (BCT) has emerged in the last decade and brought some of the hobby inside the healthcare place. Pfizer become the number one pharmaceutical company to apply RFID “e-pedigree” to make sure that sufferers and clinical medical | This conceptual framework positions blockchain-primarily based protocols and clever contracts as devices for securing healthcare information, making sure to deliver chain authenticity, and helping compliance with information privacy policies which incorporate HIPAA. through enhancing transparency and trust |

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| Muhammad Imran Ali Khan (2023) [39]. | | doctors need to accept as true with the delivery and abilities in their flagship treatment, Viagra, after figuring out it as one in all their most counterfeited drugs. The ones can be without delay tackled by designing blockchain protocols in managing healthcare records that can be enforceable by smart-settlement and compliant with facts and privacy safety guidelines, for instance, clinical medical insurance Portability and duty Act. The consequences have been used, to sum up, present day-day facts on applications of blockchain interior the ideal place of hospital therapy. | in medical information and pharmaceutical delivery chains, blockchain lets in safer and further dependable healthcare structures. |
| Sudhanshu Joshi, Manu Sharma (2023) [40]. | India, Australia. | The big use of Blockchain technology (BT) in worldwide locations which might be developing remains in its early ranges, necessitating a similarly whole assessment of the usage of green and adaptable strategies. The literature facilitates the argument that virtual eras have the capability to seriously improve the delivery of healthcare offerings and help population health manipulate in public healthcare. EHRs are a part of the newly developing “virtual health” enterprise, which objectives to beautify public offerings thru the usage of dealing with net-enabled databases.in step with data technology Act, any com- promise of private data want to bring about compensation for the sufferer .Scalability is an pinnacle difficulty for blockchain in health-care, as present day structures aren't capable of deal with the huge quantities of data and transactions which might be typically positioned in healthcare structures. | This conceptual framework highlights blockchain as a permitting virtual era for handling virtual health information and improving public healthcare services through cozy, internet-primarily based databases. At the same time, the framework recognizes key annoying situations which consist of information privacy guidelines and scalability obstacles, which affect the effectiveness and destiny implementation of blockchain-primarily based healthcare systems. |
| Anthony | USA, Nigeria, | Blockchain programs in the U.S.'s | Blockchain technology offers a |

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| Anyanwu, Samuel Onimisi Dawodu, Adedolapo Omotosho, Odunayo Josephine Akindote, Sarah Kuzankah Ewuga. (2023) [41]. | Lagos, USA, Abuja. | government systems, analyzing its effectiveness in public control and governance. Blockchain generation, initially delivered because of the truth underlying infrastructure for cryptocurrencies, has garnered a giant hobby for its capability to transform numerous sectors, consisting of presidency systems. Centralized identity systems can be liable to statistics breaches and identity theft. It's vital to cope with annoying situations which incorporate scalability, interoperability, and regulatory frameworks to ensure the responsible and effective deployment of this transformative generation. The transformative capability of blockchain generation in the realm of presidency systems in the U.S. is easy, as this assessment has endeavored to illustrate. From its foundational thoughts of decentralization and cryptographic safety to the several programs explored in identity management, voting systems, delivery chain traceability, and public finance, blockchain has emerged as a disruptive stress reshaping the landscape of governance. | decentralized and cryptographically comfortable framework which can enhance transparency, accept as authentic with, and perform in U.S. authority's systems. This conceptual framework positions blockchain as a technique for weaknesses in centralized governance systems, mainly in identity control, vote casting, delivery chain traceability, and public finance. At the same time as its transformative ability in public management is obvious, powerful adoption is based upon addressing key traumatic conditions which consist of scalability, interoperability, and regulatory compliance to make certain responsible and comfortable implementation. |
| Sergi Lopez-Sorribes, Josep Rius-Torrento, Francesc Solsona-Tehas (2023),[42]. | Spain. | Bitcoin was created in 2008 because of the truth the first decentralized cryptocurrency, providing an innovative data control generation, which have become later named blockchain. It ensured data validation without intervention from intermediaries. Because of this Litecoin can manage extra transactions constant with 2d, making it extra appropriate for small transactions. Now unlike Bitcoin, which makes use of SHA-256, Primecoin has become the first cryptocurrency with a non-hash | Blockchain technology originated with Bitcoin in 2008 as a decentralized gadget for validating records without intermediaries, laying the muse for numerous cryptocurrency designs. This conceptual framework highlights how variations in consensus mechanisms and cryptographic algorithms, collectively with SHA-256 in Bitcoin, quicker transaction dealing in Litecoin, and pinnacle-tremendous variety–primarily based consensus in Primecoin, display blockchain's adaptability. The ones variations display blockchain as a bendy technological framework that can be |

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| | | cash consensus mechanism. Primer Coin's consensus mechanism is based totally completely mostly on searching and verifying strings of top numbers, which includes the bit-dual and Cunningham string. This truth has introduced the usage of blockchain as a method to awesome problems, or as an opportunity functionality in an awesome generation. | tailored to cope with numerous transaction dreams and computational capabilities past virtual distant places. |
| Abdelhamid, Mohamed & Sliman, Layth & Djemaa, R. & Salem. (2024),[43] | Tunisia, France, Italy. | Blockchain technology lets in decentralized report-retaining through dispensed ledgers shared all through peer-to-peer networks. This text offers an entire evaluation of modern-day-day solutions, designed to cope with the blockchain stressful conditions. Blockchain community assault is sort of just like exclusive dispensed community attacks, which represents any violation of the community protocols. the capability packages of synthetic intelligence (AI) in blockchain technology. This detection set of recommendations set up the compatibility of new statistics and discarded suspicious entries, thereby enhancing the community's fault tolerance for the subsequent consensus phase. The blocks mined every 2d increase the volume of statistics, as an prevent end result, the pruning technique is probably used regularly. For example, deep reading algorithms can classify Blockchain buddies' hobby patterns routinely through reading massive quantities of statistics, collectively with transaction and communique statistics, to understand patterns and classify the hobby of numerous buddies. Within the future, the fusion of blockchain with synthetic intelligence (AI) has the capability to create a slew of new blockchain-associated improvements. | Blockchain technology permits decentralized record preservation through allocated peer-to-peer ledgers but faces challenges which include network attacks, scalability, and fault tolerance. This conceptual framework positions artificial intelligence as a supportive layer for blockchain by means of the usage of enhancing attack detection, records validation, pruning, and consensus ordinary performance through strategies which includes deep getting to know and pattern analysis. The combination of AI with blockchain strengthens network protection and ordinary performance, highlighting a promising direction for future blockchain enhancements. |

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| Hanjie Wu, Qian Yao, Zhenguang Liu, Butian Huang, Yuan Zhuang, Huayun Tang, Erwu Liu. (2024) [44]. | China. | As a modern-day technology for reinforcing authenticity, protection, and hazard management, blockchain is being notably followed in change and finance structures. The proper abilities of blockchain, which includes immutability and transparency, allow new business fashions of allocated facts, garage, factor-to-factor transactions, and decentralized impartial companies. Blockchain makes use of cryptography technology to make certain the safety and privacy of facts. What we're particularly worried about right here are hash capabilities and public- non-public key encryption algorithms. A blockchain-primarily based charge system is a virtual foreign exchange performed using allocated ledger technology that could offer simply decentralized, fast, and transparent pass-border charge offerings. A securities buying and promoting platform is a digital platform specially designed for buying and promoting stocks and other securities merchandise. Currently, blockchain technology has infused new energy into financial transactions. The digitized and decentralized securities enterprise will bring about some other financial infrastructure revolution. | Blockchain technology complements security, authenticity, and threat manipulation in economic structures through its immutable and obvious distributed ledger. This conceptual framework emphasizes blockchain's use of cryptographic strategies, which includes hash functions and public-private key encryption, to permit cozy, decentralized, and green peer-to-peer transactions. By means of supporting digital payment structures and securities shopping for and promoting systems, blockchain is reshaping economic infrastructure, promoting faster, obvious, and more dependable skip-border and investment transactions. |

## 5. Discussion

Analysing these litterateurs that has both, major advantages and minor disadvantages in all predominant Industries which, seemingly is a vast implementation on legitimacy, real-time operations for health care, and various other aspects that is an ease for living in today's date. As blockchain is being developed it is vastly utilized, analysed and also is implementing to be advanced day-by-day, the

probability of human relying on blockchain in the future in higher than that of now due to high security, genuine entity, legitimacy and several additional and alternate benefits.

It is evident from the reviewed literature that blockchain technology has some benefits in a specific domain, if applied in a context-aware sense. In financial environments, it helps in fast transaction settlement, cost reduction, along with increased transparency due to a smaller number of intermediaries [11].

Within the medical field, healthcare solutions focus on secure data sharing as well as patient-focused access control. For medical solutions, blockchain technology supports the immutable storage of private medical data, allowing for secure access using cryptography. In the governance field, blockchain technology promotes accountability and transparency using public, verifiable records of activities, hence ensuring the prevention of fraud and unauthorized changes [10]. Digital Threat Investigator, an authorized distributed ledger based on Hyperledger Fabric, is where forensic evidence metadata is kept on Stem. This is an attempt to provide integrity and audit services for the collected evidence [29].

While being specifically concerned about healthcare, sometimes or most of the times medical emergencies need immediate treatment for which blockchain technology becomes a critical tool as it helps in maintaining real-time medical records, IoMT (Internet of Medical Things) connected with blockchain provides real-time safety for patients who especially are in high risk or facing critical medical conditions, storing immutable fingerprint data and records.

Data integrity, access control, data logging, data versioning, and non-repudiation are the primary justifications for the use or adoption of blockchain technology in the healthcare industry [31]. Blockchain is being regarded as a game-changing tool for the life sciences and healthcare. Additionally, it might strengthen initiatives to advance "open science," which would allow for the mobilization of scientific information and data through cooperative networks, transparency, accessibility, and reproducibility [35]. Blockchain privacy and security include using hash functions, like the SHA-256 encryption algorithm, to encrypt the data recorded in the block. Blockchain is shielded from outside tampering by cryptographic hashes, which are strong one-way functions that make it very difficult to reverse the plain text from the hash value [36].

Maintaining the evidence chain of custody correctly is one of the most important parts of a digital inquiry since it could result in unresolved contradictions, endangering the evidence's admissibility in

court [25]. Digital forensics and IoT forensics are highly dynamic fields of application. In typical forensics, integrity checks are made on static storage, and this could prove inadequate for a large-scale deployment scenario such as the Internet of Things environment. The introduction of the blockchain-based forensics model addresses this challenge by putting the data on a tamper-proof, distributed storage mechanism, with evidence metadata and access related transactions recorded on a transparent, immutable ledger [26]. IoT terminal: comprises all IoT-based terminal devices, which are the most basic sources of large amounts of data. Smart switches, smart routers, and other devices with data concentration capabilities are examples of IoT centralized devices. The regulatory section is made up of industry partners and IoT enterprise representatives. Law enforcement organizations (police and courts) make up the judicial department, which has the authority to investigate and examine the evidence kept [30].

As accountability and transparency is an association of blockchain due to its immense features including smart contracts, time stamping and other such that properties which can be a subject to assurance for civilians to trust the authority and Government sources in numerous measures taken by the Government in order to run a trusted and secure nation. Such advanced use of this can be seen in aspects such as secure and verified voting, managing genuine records (land registration or official documents), reducing corruption, provide transparency, and other legally accountable data or information required for implementing into the Government to acquire betterment of nation and attain secure and trust worthy leadership as well.

Government duties and processes can be properly managed and provided as a new role to be assigned according to Blockchain. Compared to the intrinsically expensive and risky existing architectures, Blockchain networks offer more secure, flexible, and reasonably priced ones. Benefits from using Blockchain technology include increased operational effectiveness, reduced costs, increased transparency, and increased public trust. In addition to fulfilling the needs of contemporary citizens, being capable of provide transparent and accountable governance lays a basis for a more inclusive and stable democracy [41].

Ensuring security and integrity for the evidence. Automate the management of the chain of custody. Real-time forensic evidence tracking can improve traceability and transparency. To guarantee that only authorized users may access forensic records, implement Role-Based Access

Control (RBAC). This solution uses permission Blockchain technology to integrate an unchangeable Blockchain that is written under Hyper-ledger Fabric. Additionally, it announces evidence metadata and has safe API s and automatic CoC verification [20]. A smart contract is a computer program that is able to carry out transactions and access Blockchain blocks and records server. Every CCTV device is connected to the Blockchain with the unique hashed key value. Every node sends the periodic metadata to store on the Blockchain along with the video and image data. The membership service provider (MSP) assigns a unique key to each peer of the system [28]. Two layers form up the two-level Blockchain system for effective crime evidence management, which is run by hot and cold Blockchains. Investigation and identity data are handled by the hot Blockchain with frequent transaction fluctuations. Throughout the criminal investigation process, digital crime evidence that doesn't need to be altered are kept on the cold blockchain [17]. Weidt and Silva's and Torres-Carrion et al.'s guidelines act as models for the SLR framework of tools, technologies, and processes utilized in 3D crime scene reconstruction [18]. The healthcare sector could undergo numerous changes as a result of technologies like AI, CV, and BC. Here, BC ensures that all the medical records are stored and sent in a safe, unaltered manner, enhancing data integrity, privacy, and interoperability [21]. Mass calamities rarely affect a single country in our global society. The facilities management of a catastrophe or incident that results in a death toll that surpasses a community's resources and response capacity is known as the DVI (Disaster Victim Identification) procedure. Every human remains obtained from a disaster scene are examined at a DVI center, where PM data is collected by examining the unidentified body [22]. The state-of-the-art crime detection techniques now in use only detect crimes; they do not notify the local law enforcement authorities of the identified crime. end-to-end system that uses surveillance technology to identify crimes and notifies local law enforcement organizations of the crime's location.

## 6. Limitations

1. Scalability Limitations: How scalable a blockchain system can be, supporting a large number of transactions per second without affecting performance, scalability, or decentralization, is one of the most challenging areas for this technology.

2. Energy Use and the Problem of Sustainability: There are some variations that are considered “consensus algorithms,” such as Proof of Work (PoW), that are very energy-intensive and cause significant sustainability issues because they use massive amounts of

power.

3. Integration of Legacy Systems: One of the major barriers that can lead to less adoption of blockchain software in organizations is the difficulty involved in integrating these applications into existing traditional systems or "legacy systems."

4. Interoperability Across Platforms: Various blockchain platforms function independently with distinct protocols. This leads to a lack of ease of communication between the platforms.

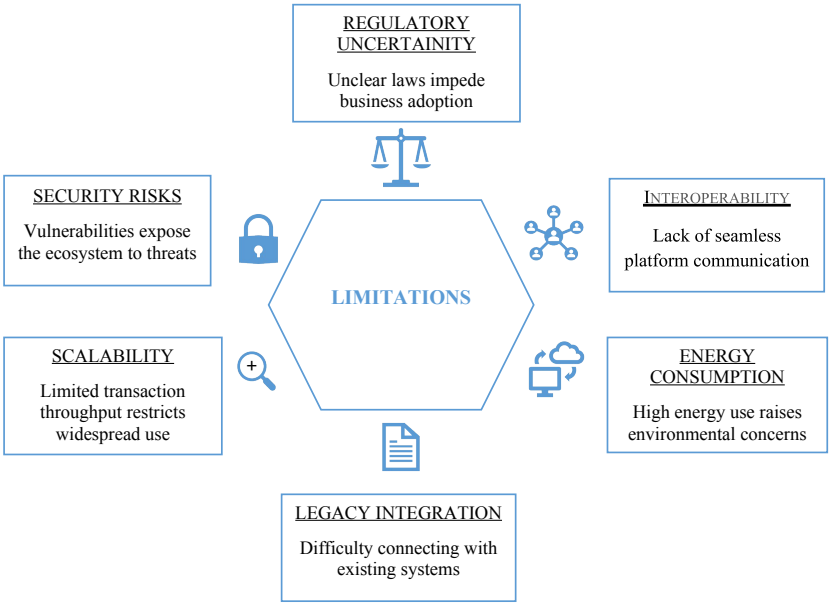


Figure 3: Flow chart on limitations

**Scalability**:

Since blockchain technology is still in its infancy, there are certain difficulties in putting it into

practice. For the purpose of consensus and block validation, the full blockchain must exist; hence, all previously approved transactions must be kept in order to validate new transactions, which necessitates a significant amount of storage [32].

**Security:**

In spite having a number of security measures that make it impervious to assault, blockchain technology is not flawless, and thus there are certain security risks.

• The Majority Attack (51% Attacks): To foster mutual trust, the blockchain uses a distributed consensus mechanism. There is a 51% vulnerability in this consensus technique.

• Privacy leakage: Because users join anonymously, only utilize generated addresses for transactions rather than their true identities, and can create several addresses to prevent information leakage, blockchain is regarded as a very secure technology [32].

**Private key security**:

Mayer (2016) claims that the Elliptic Curve Digital Signature Algorithm (ECDSA) is used by Ethereum and Bitcoin to authorize payments. However, there is a flaw in the ECDSA scheme that allows attackers to retrieve the users' private keys because there is not enough randomization in the signature process. The absence of rules and guidelines is one of the main obstacles to blockchain implementation for many companies [32].

## 7. Future Opportunities

In the blockchain technology integrated with any scope, the Scalable and efficient consensus methods can be applied and used in real-time contexts, this aspect may be one of the concerns of future research. Permissioned blockchains and consortium blockchains offer hopeful future alternatives in regulated sectors. There is also a need for research on privacy-preserving methods that include zero-knowledge proofs and secure off-chain storage. A large pilot project and a legal framework for the new technology will offer decisive proof of blockchain technology applications in various sectors [27]. Large-scale applications in a variety of financial domains, including banking, capital markets, Internet finance, and related industries, are possible with blockchain technology. Fintech and blockchain technology's deep integration will remain a promising area of study. Additionally, they will make it possible for businesses and sectors to coordinate data and communicate information instantly [33]. The report examines unresolved issues and possible paths

for blockchain IoT system research. The writers of this review study thoroughly evaluated numerous attacks on blockchains as well as blockchain security vulnerabilities using real-world examples. Additionally, while exploring these difficulties in a number of ways, this study looked at the various security flaws, vulnerabilities, and attacks that prevent blockchain technology from being further used [34].

## 8. Conclusion

The increasing graph on blockchain every year and the numerous benefits associated with it is a proof for how blockchain works and how it is beneficiary in various domains. When various domains/fields put together can focus on the increasing utilization on blockchain as a secure and trustworthy platform for users across the world. This review also focuses on the core aspects of blockchain considerably the pillars of this technology – security, decentralization, immutability, consensus…The impact of blockchain is in high wallet users that is in high stakes, blockchain also has a profound built of blockchain all around the world. All the three versions of the blockchain–blockchain 1.0, blockchain 2.0, and blockchain 3.0 are visual of increasing stakes/users.

The present review focus was on the use of blockchain technology in the fields of finance, healthcare, governance, digital forensics, IoT forensics, and IoT ecosystems. The results show that the decentralized and immutable characteristics of blockchain technology are useful for improving trust, integrity, and transparency in digital systems [12]. Though blockchain technology cannot solve all kinds of problems, proper use of the technology will be highly beneficial for improving security and accountability in various sectors [6]. Future research work related to scalability, privacy, and regulatory aspects will play a vital role in unlocking the entire potential of blockchain technology [14]. An interconnected multi-blockchain hierarchical structure with internal linkages is another study option, even though vertical and horizontal scaling of a blockchain system can help with scalability issues. Further work is needed in the future to make blockchain industrial applications more effective, scalable, and safe [12]. An interconnected multi-blockchain structure with internal linkages is another study option, even though vertical and horizontal scaling of a blockchain system can help with scalability issues. Further work is needed in the future to make blockchain industrial applications more effective, scalable, and safe [19].

In conclusion to the entire paper, this review is on the growth and considerable reasons for growth of blockchain in the past years that occurred which was introduced and implemented into multiple fields/Industries which ultimately drew attention of stake holders as it has immense advantages and is a great contribution, to people all across the globe. This is a review on the evolution of blockchain –growth across Industries, that one technology which gained trust, built security, and grew a better system in not only one domain but in many. We have examined review papers to attain more precise knowledge on blockchain in various fields and give an outcome for the improvement in technologies and Industries as blockchain has improved.

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