

Review of Blockchain Technology

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Abstract

“One of the greatest technologies of the twenty-first century is blockchain. In technical terminology, a blockchain is a collection of time-stamped records that contain an immutable record of data and are controlled by a network of independent computers”. Cryptographic functions are used to secure and connect each of these recordings of data, known as blocks. The first actual use of blockchain is with bitcoin. Bitcoin is not the only application of blockchain technology, though. We will discuss the use of blockchain technology across many areas in this paper.

Keywords—Blockchain Technology, Decentralized Finance, Supply Chain

I. INTRODUCTION

“A distributed database of records, or public ledger, of all transactions or digital events, is what blockchain technology is”. The most well-known application of this technology is the “decentralized peer-to-peer digital currency” known as Bitcoin [10]. Bitcoin is a type of electronic cash. Bitcoin is both digital money and a method of online payment. Satoshi Nakamoto, an anonymous person or entity, designed Bitcoin in 2009 (published on January 9, 2009) [1,3]. “The blockchain is a distributed ledger that keeps track of all bitcoin transactions. It continues to rise as miners upload new blocks every 10 minutes to track the latest transactions. Every full node (i.e., every computer connected to the bitcoin network via a client) has a copy of the blockchain that is automatically downloaded when a miner joins the bitcoin network” [3]. There is a vast number of applications of blockchain technology apart from bitcoin such as digital finance, food supply chain, and, smart contract. Blockchain has many advantages, including a distributed ledger, decentralization, information transparency, tamper-proof architecture, and openness. Blockchain's evolution has been slow. Blockchain is currently split into three versions based on its applications: 1.0, 2.0, and 3.0. The three generations of blockchain are discussed in greater detail in Appendix¹ [3,5,9].

“Blockchain technology, the underlying technology for distributed ledgers, offers a ground-breaking platform for a new decentralized and transparent transaction mechanism in industries and businesses. Governments and major companies have investigated how to adapt and improve this technology in a number of application areas, including supply chain networks, design, manufacturing, and finance” [5]. The application of blockchain technology and smart contracts to supply chain management is analysed critically. The four types of barriers to the use of blockchain technology that are now available are inter-organizational, intraorganizational, technical, and external obstacles. Real business and supply chain transformation are still in their early phases [4]. The advantages of implementing blockchain in the supply chain are clear, including decreased risks to food safety, increased supply chain efficiency, expedited collaboration, and decreased carbon footprint. However, advancements are also required to maximize supply chain management [2]. The health, quality of life, and safety of people are all directly or indirectly threatened by China's major food safety issue. Many nations and regions have created and implemented the traceability system as an efficient method of managing and controlling product quality and safety [9].

Blockchain technology enables the emergence of decentralized financial services in the financial sector. These services are frequently more inventive, decentralized, interoperable, limitless, and transparent [6]. “Based on the concept of the European Credit Transfer System (ECTS), the author proposes a global blockchain-based higher education credit platform, named EduCTX”. The platform on which the system is based, the distributed P2P network system, is the open-source Ark platform. It could eventually evolve into a university-led, simple, and popular credit-grading system for higher education [8].

II. LITERATURE SELECTION PROCESS

Multiple reports from previous reports are chosen to represent connected work and the assessment. The 11 most important reports for this literature review were hand-picked and thoroughly examined.



Fig 1; Paper bifurcation according to year

III. REVIEW OF BLOCKCHAIN TECHNOLOGY

The author in [1] represents a “purely peer-to-peer version of electronic cash that would allow online payments to be sent directly from one party to another without going through a financial institution”. Satoshi Nakamoto, an anonymous person or entity, designed Bitcoin in 2009 (published on January 9, 2009) [2,4]. The technology behind bitcoin is blockchain.

According to the author of [6], Blockchain technology can bring about a new era of decentralized business models by lowering transaction costs, enlarging the scope of transactions, and enabling peer-to-peer transactions. “Decentralized finance has emerged as a result of this new paradigm, using blockchain technology to create an alternative financial system that is more decentralized, creative, interoperable, borderless, and transparent”. Entrepreneurs and creators have been experimenting with decentralized business models that would not have been feasible without blockchain technology, despite the fact that a number of issues still exist. If successful, decentralized business models could revolutionize entrenched markets and usher in a new era of innovation and entrepreneurship.

The author of [8] is a representative of EduCTX, a global blockchain-based network for higher education credit. With the use of the blockchain, the suggested platform creates a highly reliable credit and grading system for higher education. “The EduCTX platform, which is built on the open-source Ark blockchain technology, was demonstrated by the author as a proof of concept. While HEIs profit from timely data regardless of a student's educational background, students benefit from a single, clear view of their completed courses.” It is anticipated that such a system will ultimately develop into a uniform, straightforward, and widely used credit and grading system for higher education.

The adoption of blockchain in the food supply chain is represented by the author in [2]. The advantages of adopting blockchain technology in the supply chain are clear, including decreased risks to food safety, increased supply chain effectiveness, accelerated collaboration, and reduced environmental impact.

The author in [7] illustrates how decentralization of ITS(Intelligent Transport System) is possible with blockchain technology (Intelligent Transport system). “Blockchain can be used to build a secure, decentralized, and autonomous ITS environment that enables the better utilization of current ITS technology and resources, which is especially useful for crowdsourcing”.

The author of [11] illustrates how blockchain technology is being used in the healthcare industry. “The management of electronic medical records, management of the medicine and pharmaceutical supply chain, biomedical research and teaching, remote patient monitoring, and health data analytics are just a few of the many applications for healthcare that blockchain can be used for”.

S. No.	Ref. No. & Year	Findings	Author
1.	[1] 2008	“Bitcoin: A peer-to-peer electronic cash system”	Satoshi Nakamoto
2.	[2] 2018	“The impact of blockchain on food supply chain”	Tan B, Yan J Chen S Liu X.
3.	[6] 2020	“Blockchain disruption and decentralized finance”	Chen Y Bellavitis C
4.	[7] 2016	“Blockchain-based intelligent transportation systems”	Yuan Y Wang FY
5.	[8] 2018	“EduCTX: A blockchain-based higher education credit platform”	Turkanović M Hölbl M Košič K Heričko M Kamišalić A
6.	[11] 2019	“Blockchain technology in healthcare”	Agbo CC Mahmoud QH Eklund JM.

Fig 2: Summary of major findings in blockchain technology in Tabular form

IV. APPENDIX

There are Three Versions of Blockchain As depicted below:

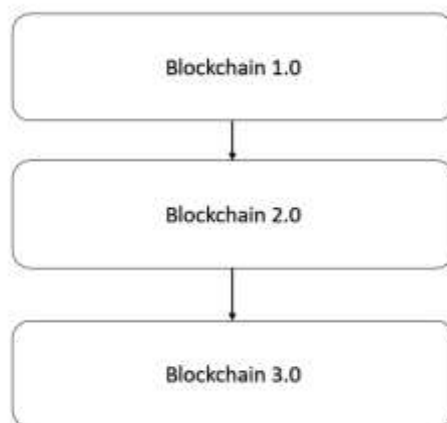


Fig 3: Different versions of Blockchain Technology

a. Blockchain 1.0(Cryptocurrency)

In 2005, Hall Finley introduced Blockchain Version 1.0, which is the first program based on Crypto money and contains DLT (Distributed Ledger Technology). This allows financial transactions to be carried out using Bitcoin and Blockchain technology (or DTL). This version is permissionless, thus any participant may conduct a legitimate Bitcoin transaction. Currency and Payments are the most common applications for this kind [3].

b. Blockchain 2.0 (Smart Contracts) -

The inefficiency of bitcoin mining in version 1.0 and the network's insufficiency for scalability led to the introduction of the new version of the blockchain. Version 2.0 now has the problem fixed as a result. This iteration of the term "blockchain" will also contain "smart contracts," expanding it beyond only cryptocurrencies. Smart Contracts, as a result, are miniature computers that live on blockchains. Free software programs on these tiny computers automatically monitor conditions including facilitation, verification, and compliance while lowering transaction costs. In Blockchain 2, Ethereum took the place of Bitcoin. Blockchain, 2.0 was able to efficiently process a high number of transactions on the public network as a result [3].

c. Blockchain 3.0 (DApps) -

After version 2, a new version with DApps (decentralized applications) was made available. The fact that a DApp's interface can be written in any language and called the backend, and that the backend code operates on a decentralized point-to-point network, makes it comparable to a normal application. Network. It makes advantage of decentralized networks for communication and storage, like Ethereum Swarm. Available decentralized applications include BitMessage, BitTorrent, Tor, Popcorn, and others [3].

IV. CONCLUSION

Due to this technology's tremendous appeal, we are already seeing its widespread implementation. This alone has the power to increase consumer confidence in these technological changes. Like any new technology, the origins of this one are not fully understood. In addition to improving tasks in existing sectors, "blockchain technology appears to have the ability to alter systems that keep track of the history of artifacts through a significantly improved, transparent ledger system".

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