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THE CURRENT REVIEW OF BLOCKCHAIN TECHNOLOGY AND ITS SUSTAINABILITY

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ABSTRACT

The blockchain is a distributed technology for handling information and transactions that was initially created for the Bitcoin cryptocurrency. Since the notion of blockchain technology was first proposed in 2008, interest in it has grown. Blockchain is gaining popularity because of its primary advantages, which include security, anonymity, and data trustworthiness without requiring a third party to manage transactions. As a result, it opens up new research areas, particularly when considering technical difficulties and constraints. To compile all pertinent studies on blockchain technology, we carried out a methodical mapping investigation in this study. Our goal is to comprehend, from a technical standpoint, the current research subjects, issues, and future directions related to blockchain technology.41 original publications from our scientific databases. The findings indicate that more than 80% of the articles concentrate on the Bitcoin system, with fewer than 20% covering other blockchain uses, such as smart contracts and licensing. Most of the related research has focused on identifying and addressing the privacy and security flaws of blockchain technology, although the efficacy of many of the suggested fixes has not been well tested. Numerous other issues pertaining to the sustainability of blockchain technology as a whole, such as throughput and latency, remain unexplored. Researchers are given suggestions for future research directions based on the outcomes of this study.

Keywords:- Methodology, Research Gaps in Blockchain Research, research directions for Blockchain, Cryptocurrency, Bitcoin

1. INTRODUCTION

The exchange of currencies between individuals and businesses is often centrally managed and overseen by an outside entity. A bank or credit card company must act as an intermediary to facilitate a secure online payment or currency transfer. A transaction also results in a fee from the credit card or bank institution. The same procedure is used in a number of other industries, including software, gaming, and music. Instead of the two main entities engaged in the transaction, the transaction system is usually centralized, with all data and information being handled and maintained by a third-party organization. To address this problem, blockchain technology has been developed. To address this problem, blockchain technology has been developed. Blockchain technology attempts to create a decentralized system in which data and transactions are regulated by no outside entity.

A system of distributed databases called blockchain keeps an ever-expanding list of data records that are verified by the nodes that are a part of it. Each financial transaction performed to date can be found in the data, which are kept in an open ledger. Since blockchain operates on a decentralized platform, no intermediary entity is needed. Every transaction that has ever been performed in the blockchain is shared and accessible to every node. Comparing the system to centralized transactions involving a third party, this feature increases transparency. Furthermore, because every blockchain node is anonymous, it is safer for other nodes to validate the transactions. The first application to use the digital ledger was Bitcoin.

The first application to use distributed ledger technology was Bitcoin. With the help of Bitcoin, cryptocurrencies now have a decentralized marketplace where users can trade and purchase products using virtual cash. Blockchain appears to be a good option for performing cryptocurrency-based transactions, but certain technological issues and constraints still need to be researched and resolved. High transaction integrity, security, and node privacy are required to thwart attacks and attempts to sabotage blockchain transactions [1]. Furthermore, computing power is needed for Cryptocurrency transaction verification.

2. CHALLENGES AND LIMITATIONS

Bandwidth: The Bitcoin network can currently handle issues at a maximum throughput of 7 tps (transactions per second). The social network has 5,000 transaction processing points, while the VISA has 2,000 transaction processing points. The processing speed of the network powered by blockchain must increase when the regularity of transactions increases to comparable values.

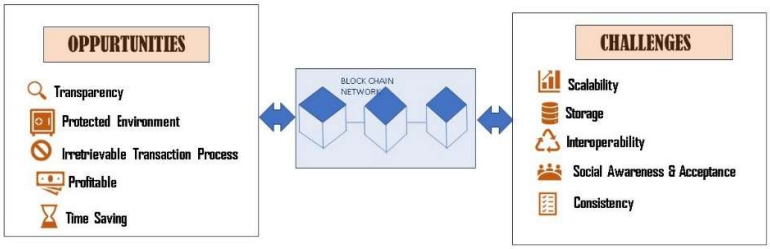

Figure 1: Block Chain Network Opportunities and Challenges

Delay: At the moment, it takes approximately ten minutes to finish a single Bitcoin transaction to provide a transaction block with adequate security. More time must be spent on a block to achieve security efficiency since it must be more cost-effective than double spending attacks. Successfully spending money more than once leads to double-spending [9]. To prevent double spending, Bitcoin verifies each transaction added to the blockchain to ensure that the transaction's inputs have not been used before [9]. Therefore, latency is now a major problem in blockchain. To preserve security, creating a block and validating the transaction should take only a few seconds. It takes only a few seconds to wrap up a transaction using VISA OR MASTERCARD.

Capacity and speed: As of February 2020, a blockchain in the Bitcoin network can have a size of more than 50,000 MB. Achieving VISA throughput levels would allow the blockchain to grow by 214 PB annually. A new block is created every ten minutes, and the Bitcoin community thinks that a block can have a size of 1 MB. As a result, the maximum amount of transactions that may be processed is limited (500 transactions on average in a single block)

[11]. It will be necessary to resolve the size and bandwidth issues if the blockchain is to be able to handle additional transactions.

Privacy: A 49% assault is possible on the present blockchain. A 49 percent attack would give one organization complete control over the majority of the network's mining hash rate, giving them the ability to alter the blockchain. More investigations into security are required to solve this security flaw.

3. METHODOLOGY

For this investigation, a systematic mapping investigation was chosen as the research method. An overview of a research area, a determination of whether research evidence exists, and an estimation of the volume of proof are the objectives of a systematic mapping study [2]. We employ the methodical mapping procedure outlined by Dierksmeier C, and Seele P [13] in this investigation. To find pertinent studies, we additionally employ the principles for a systematic literature review provided by Ante L, Sandner P, and Fiedler I [2]. Since our objective was to examine the current literature on blockchain technology, we decided to employ a methodical mapping technique as our research methodology. The mapping studies and findings will assist us in identifying and mapping potential research gaps as well as blockchain technology-related research fields.

4. RESEARCH GAPS IN BLOCKCHAIN RESEARCH

Several significant research gaps were found. The first gap is that there is currently no research in the literature on issues such as versioning, hard forks, numerous forks, latency, throughput, versioning, size and bandwidth. There is a significant study void here, and future studies are needed. Because the present blockchain applications are rather tiny in size, these topics may not be the most fascinating ones for researchers at present. Currently, Bitcoin is the most extensive blockchain solution. The transaction volume in Bitcoin is far lower than that in, for example, the VISA. However, if blockchain solutions become widely used in the future and transaction volume significantly increases—for example, tens of millions of transactions—further study, e.g., measures against delay, volume and the amount of data you and squandered resources, must be conducted to guarantee sustainability.

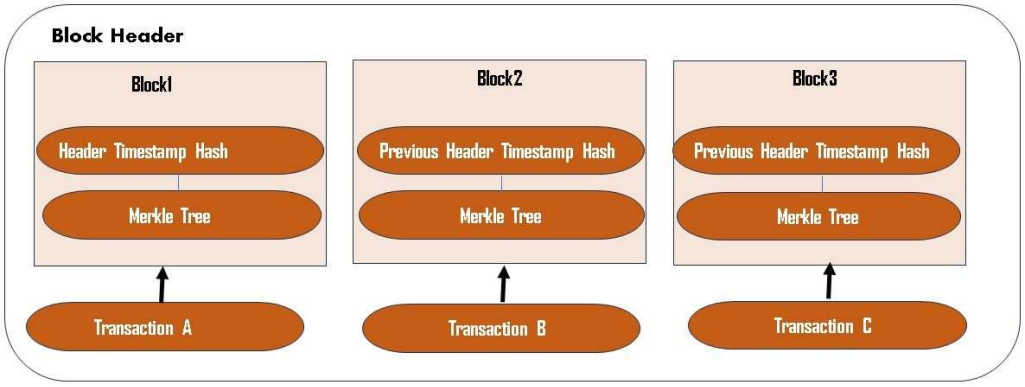

Figure 2: Block Header Representations

The dearth of usability research constitutes the second research gap. Only articles that addressed usability from the viewpoint of the user—rather than the developer, as proposed by

Ashta A; andBiot-Paquerot G [3]—were found. For example, the challenge of utilizing the Bitcoin API has not yet been answered. Future research and improvements are required for this purpose. This might lead to further uses and improvements for the Bitcoin ecosystem.

The fact that most recent research has been conducted in the Bitcoin context rather than in other blockchain ecosystems represents the third research gap. Further research, such as on smart contracts, is necessary to broaden our understanding beyond cryptocurrencies. Although the concept of blockchain was initially introduced in the context of cryptocurrencies, it can be applied in a multitude of other contexts. Because blockchain can disclose and develop better models and possibilities for conducting transactions in multiple industries, research into the potential applications of blockchain in other contexts is important.

The lack of excellent papers in journal-level publication channels represents the fourth research gap. Currently, seminars, symposiums, and conferences publish the majority of research findings. Reputable journals with an emphasis on blockchain are needed.

RESEARCH DIRECTIONS FOR BLOCKCHAIN

It is satisfying to see where blockchain research is headed, but it is unclear where it will go in the future. However, as a cryptocurrency, Bitcoin has drawn much interest, and every day, more people trade and purchase Bitcoins. As a result, there is a good chance that Bitcoin will be a significant study issue in the future and that industry and academics will be interested in conducting additional research on the subject from both a technological and business standpoint.

However, we believe that future studies will also look at other potential uses of blockchain technology in addition to Bitcoin and other cryptocurrencies. A few studies on the potential applications of the IoT, smart properties, smart contracts, and licensing in the blockchain context have been published. We think that this kind of research will be very important in the future and may even be more fascinating than cryptocurrencies. Using a decentralized environment, such as sharing virtual property, might be a game-changing way for businesses to market their goods. Keeping this in mind, we firmly feel that blockchain technology will lead to a substantial quantity of new research as it becomes more widely utilized by the business community and academics.

Increased adoption of blockchain solutions by a greater number of users will also affect the amount of study done on technological obstacles and restrictions. Future scalability-related issues and restrictions will require further investigation due to the growing sizes and user bases of different blockchain. Furthermore, as new methods for disrupting and attacking blockchain are developed, the security and privacy of blockchains will continue to be a research focus. Despite the fact that blockchain technology is relatively new, much research has already been conducted in every area of the problem, including distributed systems and security (e.g., multilevel authentication mechanisms and energy-efficient resource management for distributed systems-,). Adopting tested methods and taking a deeper look will hasten the process of resolving the present issues and constraints of blockchain technology.

CONCLUSION

Bitcoin is a cryptocurrency that works on blockchain technology. All transactions take place in a decentralized setting and are publicly available through a public ledger. Ensuring anonymity, security, privacy, and transparency for all users is the aim of blockchain

technology. These characteristics, however, present a number of technological difficulties and constraints that must be overcome.

Conflict of interest statement:

Manuscript title: THE **CURRENT REVIEW OF BLOCKCHAIN TECHNOLOGY AND ITS SUSTAINABILITY**

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