

BLOCKCHAIN APPLICATIONS BEYOND CRYPTOVALUTA: A LITERATURE PERSPECTIVE ON THE USE OF BLOCKCHAIN TECHNOLOGY

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Abstract

Blockchain applications beyond cryptovaluta make it clear that this technology has a wide range of promising applications in various industry sectors. Blockchain is known for its decentralised, transparent, and secure nature, so its use can improve operational efficiency and reduce the risk of fraud. The study highlights various implementations of blockchain such as in supply chain management, where the technology can ensure authenticity and smooth flow of goods, as well as in healthcare systems that enable secure storage and exchange of patient data. However, the adoption of blockchain technology also faces obstacles such as immature regulations, challenges in compatibility between systems, and cost and technical complexity. Further research and infrastructure support are needed to overcome these barriers. Despite these challenges, blockchain's potential advantages make it one of the key innovations that has the opportunity to redefine the way various industries operate in the future.

Keywords: Blockchain Application, Cryptovaluta.

Introduction

Blockchain technology was first introduced as the basis of cryptocurrencies, particularly Bitcoin, by Satoshi Nakamoto in 2008. Blockchain allows for secure, transparent, and intermediary-free transactions through the use of a decentralised ledger.

Blockchain technology is a decentralised and digitally distributed record-keeping system, the existence of which was first introduced in the context of cryptocurrencies such as Bitcoin. A blockchain consists of a series of sequentially connected blocks, where each block contains a number of transactions that have been verified by the network. Each new block that is formed must refer to the previous block, forming a chain that cannot be altered or deleted. This ensures the security and integrity of the data, as any changes that want to be made to one block will affect the entire chain, requiring majority approval from the network (Muciaccia & Lopopolo, 2022).

The main advantages of blockchain technology include transparency, reliability, and security. Blockchain eliminates the need for intermediaries in transactions, as all participants in the network have a copy of the same ledger, which is updated

automatically. In addition, the use of cryptographic algorithms ensures that the data in the blockchain cannot be changed without detection. This makes blockchain not only attractive for the financial world, but also offers solutions for a variety of other industries, where data integrity and transparency are required, such as in supply chains, voting systems, medical records, and smart contracts (Victor, 2021).

Over time, the potential uses of blockchain began to be explored in sectors beyond finance and cryptocurrency, such as supply chain, healthcare, government, and education.

The transformational potential of blockchain technology is based on a number of fundamental characteristics, such as decentralisation, transparency, security, and immutability. Various studies and literature have highlighted how this technology can be used to improve efficiency, reduce costs, and create trust in complex, multi-stakeholder ecosystems. For example, in the supply chain, blockchain can be used to trace the origin of products, ensure quality, and minimise fraud. In the healthcare sector, blockchain offers a way to securely store and share patient data, preventing data from being lost or misused (Iovane & Rapuano, 2021).

However, while there is a lot of potential, the adoption of blockchain technology beyond cryptocurrency still faces a number of significant challenges. These include technical issues such as scalability and interoperability, as well as regulatory and legal issues. In addition, a lack of deep understanding and resistance to change are also barriers to the adoption of blockchain in various industries (Agdere ., 2024)

Therefore, this study aims to provide a comprehensive overview of blockchain applications beyond cryptocurrency by reviewing existing literature. By understanding the developments, potentials, as well as challenges, it is expected to provide stakeholders with better insights on how this technology can be effectively adopted and implemented in various industry sectors.

Research Methods

The study in this research uses the literature method. The literature research method is a research approach that involves the collection, analysis, and synthesis of various written sources, such as books, journal articles, reports, and other documents relevant to the research topic. The purpose of this method is to identify, assess, and interpret existing findings in order to develop a comprehensive understanding of the topic. This process usually involves a systematic search, selection of credible sources, and critical of the information found (Adlini et al., 2022) ; (Raco, 2018) . Literature research methods are important for identifying gaps in previous research, providing theoretical foundations, and supporting or challenging hypotheses proposed in new studies. Results from desk research are often used as a basis for further research or to inform practice and policy within a particular field (Sugiyono ., 2010)

Results and Discussion

Blockchain Applications in Various Sectors

The finance and banking sector is one of the first areas to utilise blockchain technology extensively. With blockchain, financial transactions can be conducted more quickly, securely, and transparently. The system enables peer-to-peer transactions without the need for traditional intermediaries such as banks to verify transactions, which reduces costs and speeds up the process. In addition, blockchain can enhance security through cryptographic technology, which makes it almost impossible to falsify or alter transaction data that has been recorded (Held, 2024).

Blockchain can revolutionise supply chain and logistics by providing full visibility into every step of a product's journey, from the manufacturer to the end consumer. Every transaction or movement of goods is recorded in an immutable distributed ledger, providing a transparent and accurate track record. This helps in preventing fraud, improving efficiency, and ensuring product quality and regulatory compliance. For example, companies can track the storage conditions of temperature-sensitive products to ensure product integrity, such as food or pharmaceuticals (Keesmaat et al., 2022).

In the healthcare sector, blockchain can be used to store and manage electronic medical records (EMRs) securely and efficiently. Patients, doctors, and relevant agencies can have access to such information with the appropriate permissions, reducing medical errors and improving care coordination. The technology also enables secure and transparent traceability of medicines on the market, helping to combat counterfeit medicines and ensure compliance with Health regulations (Linden & Shirazi, 2023).

In the property and real estate business, blockchain can be used to record sales transactions and ownership transfers in a more transparent and secure way. It can reduce the risk of fraud and eliminate the need for lengthy and bureaucratic documentation processes. Smart contracts can be used to automate various aspects of transactions, such as payments and transfers of ownership, which occur automatically when agreed conditions are met. This helps speed up transactions and ensure compliance with agreements (Bruschi et al., 2022).

Governments and public institutions can utilise blockchain to improve efficiency and transparency in various public services. For example, blockchain can be used to verify the validity of identity documents, process elections in a way that is transparent and cannot be manipulated, and manage aid distribution more efficiently. In addition, by using blockchain for tax recording and reporting, governments can improve accuracy and transparency in public financial management (Giordano, 2021).

Blockchain technology has great potential to transform various industry sectors in ways never thought possible, thanks to its ability to provide greater security, transparency, and efficiency.

In addition to the sectors already mentioned, blockchain technology also has potential implementations in energy, education, and the arts. In the energy sector, blockchain can support decentralised energy distribution systems, allowing users to buy and sell excess energy on a peer-to-peer basis using smart contracts. In education, blockchain can be used to store and verify academic credentials and professional certifications that are more resistant to forgery. Whereas in the art world, especially digital art, blockchain supports the concept of clear ownership and authentication of artworks through unique crypto tokens, or often called NFTs (non-fungible tokens) (Sabry, 2021).

As such, Blockchain offers a new approach to managing and sharing data in a more secure, transparent, and efficient manner. Its implementation has gone beyond the financial sector, expanding into many other fields that benefit from the data integrity it offers. However, blockchain adoption still faces a number of challenges, including regulation, system interoperability, and the need for adequate infrastructure. However, as the technology develops and regulations become more favourable, blockchain has the potential to transform many aspects of our lives, increasing trust and efficiency in business and administrative processes across various sectors.

Blockchain Implementation Advantages and Challenges

Blockchain brings a number of significant advantages in various sectors. One such advantage is transparency. Since every transaction that occurs on a blockchain network is recorded in a system that is accessible to all participants, it increases the level of information disclosure and accountability. In addition, blockchain also has superior security features. Transactions are immutable, and the data recorded in the blockchain is very difficult to hack or manipulate. This reduces the risk of fraud and increases trust in the system (Callens, 2021).

Another advantage of blockchain implementation is operational efficiency. Blockchain-based systems can reduce reliance on intermediaries and third parties, speed up transaction processes, and reduce operational costs. For example, in the financial industry, blockchain enables fast cross-border fund transfers and low costs compared to the traditional banking system. The technology also supports smart contracts features that automatically execute agreed terms when certain conditions are met, reducing the need for manual documentation and human intervention (Mintas ., 2023)

However, despite its many advantages, blockchain implementation also faces a number of challenges. One of the biggest challenges is the issue of regulation. As blockchain is a relatively new technology, many countries do not yet have a clear

regulatory framework to govern its use. This creates uncertainty for companies looking to adopt this technology, as well as potential legal issues related to data protection and privacy (Milan, 2022).

In addition, blockchain also faces challenges related to scalability and interoperability. Public blockchain networks, such as Bitcoin and Ethereum, can suffer from limitations in terms of transaction speed and capacity, which can become an obstacle when transaction volumes grow. Interoperability between various blockchain platforms also needs to be improved so that different systems can communicate and operate together smoothly. In addition, the adoption of these technologies often requires major changes to existing infrastructure and processes, which can be difficult and costly (Campo, 2021).

Overall, while blockchain offers many advantages, including security, efficiency, and transparency, significant challenges in the areas of regulation, scalability, and interoperability need to be addressed. As the technology continues to evolve and regulations become more supportive, it is expected that blockchain will be able to realise its full potential to transform various industries and economic activities.

Conclusion

From the perspective of the literature on the use of blockchain technology beyond cryptocurrencies, it can be concluded that blockchain has great potential to revolutionise various industries beyond the context of cryptocurrencies. Applications of blockchain in areas such as supply chain, healthcare, finance, and government show that the technology can improve the efficiency, security, and transparency of operational processes. For example, in the supply chain, blockchain can provide better end-to-end oversight, reduce the risk of counterfeiting, and increase trust between business actors. In the healthcare sector, blockchain can facilitate the secure and efficient exchange of patient data, and ensure the integrity and security of medical records.

However, the literature also highlights a number of challenges in adopting blockchain technology in various sectors. These include unclear regulatory issues, the need for interoperability between different systems, and the complexity and costs associated with blockchain implementation. Nonetheless, as the research and development of this technology continues to grow, as well as more awareness and support from government and industry, it is expected that blockchain will mature and be ready for widespread adoption across various applications. This potential makes blockchain a technology of the future that can have a positive and significant impact in various aspects of life.

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