



# REVIEW OF RESEARCH

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## THE POTENTIAL AND CHALLENGES OF BLOCKCHAIN TECHNOLOGY IN COMMERCIAL TRANSACTIONS

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### ABSTRACT:

*Blockchain technology is quickly becoming a game-changing invention that will have a big impact on business transactions. This paper investigates the potential benefits and underlying challenges of using blockchain technology to the domain of commercial transactions. This research explores the fundamental ideas behind blockchain technology and shows how, by doing away with middlemen and automating procedures, it may improve security, efficiency, transparency, and lower costs. Critical issues including scalability, regulatory ambiguity, interoperability, energy consumption, and the difficulties of integrating with current systems are also covered in the study.*

*This article attempts to present a balanced view on how blockchain technology can revolutionise business transactions while highlighting the challenges that must be solved for its effective adoption through the analysis of case studies and existing uses.*



**KEYWORDS:** *Blockchain Technology, Commercial Transactions, Transparency, Security, Efficiency, Cost Reduction.*

### INTRODUCTION:

Originally envisioned as the foundation of Bitcoin, blockchain technology has now developed into a game-changing invention with broad applications in a variety of sectors. Its decentralised, transparent, and unchangeable characteristics have the power to revolutionise business transactions by boosting security, cutting costs, and improving efficiency. Blockchain's promise lies in its ability to eliminate intermediaries, automate processes through smart contracts, and provide a transparent ledger accessible to all parties involved in a transaction.

In commercial transactions, the need for a trustworthy, efficient, and secure system is paramount. Traditional transaction systems, often characterized by multiple intermediaries, lengthy processing times, and vulnerability to fraud, present numerous challenges. Blockchain technology offers a compelling alternative, addressing many of these inefficiencies and risks. Its adoption in commercial transactions could lead to more streamlined supply chains, faster and cheaper cross-border payments, and robust digital identity verification systems.

However, there are obstacles in the way of a broad adoption of blockchain technology. Given that present blockchain networks find it difficult to effectively manage large transaction volumes, scalability is still a major challenge. Regulatory uncertainty poses another major challenge, with governments and institutions grappling to create frameworks that both foster innovation and protect users. Interoperability between different blockchain platforms is also critical to ensure seamless integration and data exchange. Furthermore, blockchain's high energy consumption—especially for proof-of-work (PoW) consensus mechanisms—raises concerns about sustainability and the environment.

This research looks at the two aspects of blockchain technology in commercial transactions: the challenges that need to be solved to realise the technology's potential to fundamentally revolutionise the industry. This article attempts to give a thorough knowledge of how blockchain might alter business transactions and what needs to be done to overcome the barriers to its adoption by looking at present uses, case studies, and developing trends.

### OBJECTIVE OF THE RESEARCH:

- 1) To conduct a detailed analysis of the potential benefits and challenges associated with using blockchain technology in commercial transactions.
- 2) To look at the ways that blockchain technology might improve the efficiency, security, and transparency of business transactions. To assess the scalability issues faced by current blockchain networks and potential solutions to address these limitations.
- 3) To present and analyze case studies of successful blockchain implementations in commercial transactions to illustrate practical applications and benefits.

### LITERATURE REVIEW:

- 1) **Swan, M. (2015):** In "Blockchain: Blueprint for a New Economy," Swan explored the broader applications of blockchain beyond cryptocurrencies. This work highlighted the potential of blockchain to revolutionize various sectors, including finance, supply chain management, and digital identity verification, by enhancing transparency and reducing costs.
- 2) **Tapscott, D., & Tapscott, A. (2016):** "Blockchain Revolution: How the Technology Behind Bitcoin Is Changing Money, Business, and the World" provided a comprehensive overview of blockchain technology's potential to transform industries. The authors emphasized blockchain's ability to increase efficiency and trust in commercial transactions through its decentralized nature.
- 3) **Risius, M., & Spohrer, K. (2017):** "A Blockchain Research Framework: What We (don't) Know, Where We Go from Here, and How We Will Get There" in *Business & Information Systems Engineering* offered a critical analysis of the existing blockchain literature. The authors identified key challenges such as scalability, regulatory issues, and the need for standardization, which are crucial for blockchain's adoption in commercial transactions.
- 4) **Underwood, S. (2016):** "Blockchain Beyond Bitcoin" in *Communications of the ACM* explored the broader applications of blockchain technology. Underwood highlighted the interoperability challenges and the need for regulatory frameworks to support blockchain's integration into various sectors, including commercial transactions.

This literature review highlights the evolution of blockchain research, focusing on both its transformative potential and the significant challenges that need to be addressed for its successful adoption in commercial transactions.

### RESEARCH METHODOLOGY:

Using a combination of qualitative and quantitative methodologies, the current study provides a comprehensive analysis of the advantages and disadvantages of using blockchain technology in commercial transactions. A literature study, case studies, surveys, and expert interviews are all part of the technique to collect information from a range of sources.

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### **The Potential and Challenges of Blockchain Technology in Commercial Transactions:**

Blockchain is a decentralised, distributed ledger system that records transactions across several computers while ensuring data confidentiality, privacy, and integrity. Important features include decentralisation, consensus techniques, and cryptographic security. Applications for blockchain technology may be found in voting systems, healthcare, financial services, and real estate. It also offers advantages including security, transparency, efficiency, cost savings, and traceability. Challenges include scalability, regulatory uncertainty, interoperability, and energy consumption. However, blockchain technology continues to evolve, with innovations in consensus mechanisms, privacy enhancements, and integration with other technologies like AI and IoT expected to expand its applications across various industries. The future outlook for blockchain technology is expected to see continued efforts to address scalability, regulatory, and interoperability challenges.

Blockchain technology's decentralisation, transparency, efficiency, security, traceability, and worldwide reach have the potential to completely transform business interactions. Its ledger system is transparent, allowing all participants to view transactions, reducing fraud and enhancing trust. Smart contracts automate processes, eliminating intermediaries and reducing transaction times and costs.

Traceability is crucial in supply chain management, as blockchain records allow for detailed tracking of goods throughout the supply chain. Companies can use blockchain to provide consumers with verifiable proof of a product's authenticity and ethical sourcing, enhancing brand trust.

Global reach allows for cross-border transactions, making them faster, cheaper, and more accessible. Decentralization reduces the risk of data manipulation and enhances overall system security. However, challenges include scalability issues, such as transaction speed and network congestion, regulatory uncertainty due to lack of clear regulations, regulatory divergence, and platform compatibility.

Regulatory uncertainty arises from the absence of comprehensive regulatory frameworks globally, which can complicate cross-border transactions and the implementation of blockchain solutions. Interoperability is another challenge, as various blockchain platforms may not be compatible with each other, hindering seamless integration across industries. Standardization is still in progress, posing challenges for widespread adoption and integration.

Another issue is energy consumption, as many blockchains employ Proof-of-Work (PoW) techniques that demand a lot of processing power and burn a lot of energy. Although there is continuous development, other consensus methods such as Proof-of-Stake (PoS) have not yet gained general acceptance. Privacy concerns include pseudonymity risks and data protection challenges due to the immutable nature of the ledger.

Despite these obstacles, continuous research and development work to resolve them in order to open the door for a wider use of blockchain technology in business dealings. Innovations in energy-efficient consensus procedures, scalability solutions, legal frameworks, interoperability standards, and privacy protection strategies are needed to fully achieve blockchain's potential to revolutionise corporate transactions.

### **Potential Benefits of Blockchain in Commercial Transactions:**

Blockchain technology offers numerous benefits in commercial transactions, including enhanced security, increased transparency, reduced costs, improved efficiency, traceability and auditability, global accessibility, decentralization and resilience, innovative business models, compliance and regulatory benefits, and customer trust and loyalty. Transactions on a blockchain are secured using cryptographic techniques, ensuring data integrity and reducing fraud. Transparency is achieved through a distributed ledger, reducing disputes and building trust among parties involved.

By removing middlemen and using smart contracts to automate procedures, transaction fees and operating expenses are decreased. Smart contracts speed up transaction times and increase overall efficiency by enabling the automated execution of preset conditions. For businesses like supply chain management, where tracing the origin and flow of items is critical, traceability and auditability are vital.

Global accessibility is achieved through peer-to-peer transactions across borders, facilitating international trade and financial transactions. Decentralization and resilience enhance system resilience and reduce the risk of downtime or disruption. Innovative business models like tokenization of assets, decentralized finance (DeFi), and fractional ownership can democratize access to financial services and assets.

Compliance and regulatory benefits are simplified by blockchain's transparent and auditable nature, enabling real-time monitoring and reporting. Blockchain technology can also improve customer trust and loyalty, making businesses leaders in innovation and responsible data handling. As the technology matures and addresses current challenges, its adoption is expected to grow across various industries.

### **Applications of Blockchain in Commercial Transactions:**

Blockchain technology has applications across many industries and business ventures. Financial services, healthcare, real estate, legal and intellectual property, insurance, retail and e-commerce, automotive and manufacturing, energy trading, grid management, digital identification and KYC, and energy trading are important industries where blockchain may be used.

In financial services, blockchain can streamline cross-border payments, automate trade finance processes, and facilitate faster and cheaper remittance transfers by eliminating intermediaries. Blockchain makes it possible for products to be tracked from beginning to finish in the supply chain, increasing transparency and lowering counterfeiting. Smart contracts can automate inventory tracking and management, optimizing supply chain efficiency.

Blockchain technology has the potential to securely share and retain patient medical records in the healthcare industry while upholding privacy and data integrity. In real estate, smart contracts can facilitate faster and more transparent property transactions, reducing disputes over property ownership and history.

In legal and intellectual property, blockchain can automate the execution and enforcement of legal agreements, timestamp and authenticate intellectual property rights, and prevent plagiarism and piracy. In insurance, blockchain can accelerate claims processing, reduce administrative costs and fraud, and improve transparency and accuracy in underwriting processes.

In retail and e-commerce, blockchain can provide supply chain transparency, enable consumers to verify product origin and authenticity, manage loyalty programs more efficiently, and track the origin and authenticity of automotive parts. Blockchain technology offers the potential to completely transform the utility and energy sectors by facilitating peer-to-peer energy trading and improving grid efficiency via decentralised control and monitoring.

Blockchain technology may improve business interactions in a variety of industries by increasing trust, efficiency, security, and transparency. As the technology matures and scalability challenges are addressed, its adoption is expected to grow, revolutionizing traditional business processes.

### **Challenges of Blockchain in Commercial Transactions:**

Blockchain technology, while promising, faces several challenges in commercial transactions. These consist of cost, regulatory uncertainty, interoperability, privacy, speed, efficiency, and environmental effect. Scalability is a big problem since existing blockchain systems, like as Ethereum and Bitcoin, have limits on the amount of transactions they can handle at once and how quickly they can do it. This causes delays and extra expenses. Speed and efficiency are also critical for real-time transaction processing applications. Cost is another significant challenge, as blockchain networks can be costly to set up and maintain, and transaction fees can vary.

Regulatory uncertainty arises as blockchain technology operates across international borders, posing challenges in regulatory compliance. Interoperability between blockchain platforms is limited, making it difficult for different blockchains to communicate and collaborate effectively. Privacy and

security remain challenges, with public blockchains being pseudonymous and private blockchains facing different challenges in data confidentiality and access control.

The sustainability of blockchain technology is a matter of worry because to the substantial energy consumption of proof-of-work consensus techniques, which in turn raises worries about its influence on the environment. User experience and education are also critical, as blockchain introduces new concepts and complexities that may be challenging for users to understand and adopt.

Since the legal frameworks governing digital assets, smart contracts, and decentralised autonomous organisations (DAOs) are still developing, governance and legal difficulties are a result of the decentralised governance structures employed by blockchain networks. Adoption may be hampered by stakeholder resistance to change and worries about the stability and maturity of blockchain solutions.

Continuous innovation, research, and cooperation between regulators, technology developers, and industry stakeholders are required to overcome these obstacles.

### CONCLUSION:

Blockchain technology holds immense promise for revolutionizing commercial transactions across various industries. Its potential is to improve confidence between parties participating in transactions as well as security, transparency, and efficiency. By leveraging decentralized networks and smart contracts, blockchain can reduce costs, streamline processes, and enable new business models. But before blockchain is widely used, there are a number of issues that must be resolved. Scalability problems, unpredictability in regulations, interoperability challenges, privacy and security concerns, environmental effects, and the requirement for infrastructure modifications and user education are a few of these. Overcoming these challenges will require continued innovation, collaboration among stakeholders, and advancements in blockchain technology itself. Despite these hurdles, ongoing research and development efforts are paving the way for blockchain to fulfill its potential in transforming commercial transactions. As the technology matures and addresses its limitations, it has the potential to redefine how businesses operate, collaborate, and transact in the digital age. Embracing blockchain responsibly and strategically could lead to significant benefits for economies, industries, and society as a whole.

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