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BLOCKCHAIN TECHNOLOGY IN MARKETING: A SYSTEMATIC REVIEW OF ITS POTENTIAL FOR TRANSPARENCY, TRUST, AND DATA SECURITY

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Abstract

This systematic review explores the potential applications of blockchain technology in marketing and its impact on data security, trust, and transparency. The study employs strict criteria, exhaustive search techniques, and techniques for data extraction and analysis. Exploring blockchain in marketing is vital because traditional marketing tactics are criticised for lacking transparency, trust, and data security. The review identifies research areas that concentrate on blockchain's potential to improve stakeholder trust, transparency, and data security in marketing. The results are important for scholars, marketers, and policymakers because they shed light on the benefits, difficulties, and constraints of using blockchain in marketing practises. The paper covers blockchain ideas including decentralisation, cryptography, and consensus procedures while highlighting the technology's advantages for marketing, such as increased transparency and data protection. The use of case studies to demonstrate how blockchain might improve marketing transparency includes supply chain tracking and verified advertising transactions. Concerns about scalability and data security are also covered in the review, which emphasises the significance of regulatory frameworks and standardisation. It discusses how immutability, decentralised consensus, and smart contracts on the blockchain might increase confidence among marketing stakeholders. Blockchain's decentralised architecture, cryptographic techniques, privacy protection mechanisms, and transparency all place an emphasis on data security. In order to fully realise the potential of blockchain in marketing, challenges and prospective applications, such as scalability and integration, are reviewed. Overall, the evaluation offers a thorough analysis of blockchain's marketing applications, including its benefits, drawbacks, and the need for additional study and use.

Keywords: Blockchain technology, Marketing, Transparency, Trust-building, Data security

1. Introduction

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The potential of blockchain technology to alter a number of industries, including marketing, has attracted a lot of interest recently (Demirkan, S. et al., 2020; Lu, 2019; Viriyasitavat and Hoonsopon, 2019). Blockchain's transparent and decentralised structure presents opportunities to improve data security, trust, and marketing operations' transparency. In order to gain knowledge about blockchain technology's possible uses and ramifications, this systematic review will investigate the body of existing literature on the subject. This review attempts to advance understanding of the opportunities and difficulties related to using blockchain in marketing practises by synthesising the existing research.

1.1. Background and Rationale for Studying Blockchain Technology in Marketing

Transparency, trust, and data security are common challenges for traditional marketing strategies. The demand for creative solutions has increased as a result of problems like deceptive advertising, data breaches, and privacy issues. In order to overcome these difficulties, blockchain technology offers a revolutionary solution. According to Dinh et al. (2018), it has the ability to provide transparent, safe, and reliable marketing operations thanks to its distributed ledger, cryptographic methods, and smart contract capabilities. It is therefore essential to research how blockchain technology is used in marketing in order to uncover any potential advantages and offer suggestions for how to use it effectively (Adiguzel, S., 2021).

1.2. Problem Statement and Research Questions

A thorough understanding of the possible effects of blockchain technology on transparency, trust, and data security in marketing is required in order to address the issue discussed in this systematic study. A comprehensive review that focuses explicitly on the implications of blockchain technology for marketing is required, despite the fact that there is a growing corpus of literature on the technology's applications across several industries.

The following research inquiries serve as the basis for this review:

1. How has marketing practises' transparency been improved through the use of blockchain technology?
2. What mechanisms does blockchain offer to promote trust among participants in marketing activities?
3. How can blockchain technology enhance the security and privacy of customer data during the marketing process?

This review seeks to provide an overview of the present state of research, highlight knowledge gaps, and provide recommendations for future investigations by addressing these research questions.

1.3. Significance of the Study

For researchers, marketers, and policymakers interested in maximising the potential of blockchain technology in marketing, this comprehensive review is of utmost significance. This review intends to offer insights into the different applications of blockchain for boosting transparency, trust, and data security in marketing by compiling and analysing the existing literature. The results of this study will help to improve understanding of the advantages, difficulties, and restrictions of blockchain integration in marketing practises. In addition, this review will point out areas in need

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of more study, opening the door for future research and the development of knowledge in this quickly developing sector.

2. Methodology

The extant literature on blockchain technology in marketing is synthesised in this systematic review using a strict and organised methodology. The systematic review approach, inclusion and exclusion criteria, search strategy, data sources, and data extraction and analysis techniques are a few of the methodology's essential elements.

2.1. Explanation of the Systematic Review Approach

To ensure a thorough and objective investigation of the literature, a systematic review technique is used. This strategy involves the methodical identification, selection, and evaluation of studies that are pertinent to the current research topics. A more robust and trustworthy study is produced by following a predetermined methodology since it reduces potential biases and subjectivity in the review process (Tricco et al., 2018).

2.2. Inclusion and Exclusion Criteria for Selecting Relevant Literature

To decide which papers are eligible for this review, specific inclusion and exclusion criteria are defined. Based on the research objectives and the review's particular focus, the criteria are established. Studies that study the use of blockchain technology in marketing and its implications for transparency, trust, and data security may include empirical research, conceptual papers, case studies, and reviews. The review excludes studies that don't fit the predetermined criteria.

2.3. Search Strategy and Data Sources

A thorough search strategy is created to find pertinent studies. Using relevant keywords linked to blockchain technology and marketing, several electronic databases, including academic journals, conference proceedings, and specialised repositories, are searched. To ensure thoroughness, manual reference searching is also done inside selected studies. In order to ensure that the literature is current and relevant, the search strategy is made to retrieve research that was published during the last ten years.

2.4. Data Extraction and Analysis Methods

Data extraction entails systematically extracting pertinent information from chosen studies. This contains information about the author(s), publication year, research design, blockchain marketing applications, trust-building processes, transparency mechanisms, data security measures, and significant conclusions. After the data has been extracted, it is synthesised and examined to find recurring themes, trends, and gaps in the literature. The type and features of the included studies will determine whether the analysis uses qualitative or quantitative techniques, such as thematic analysis or meta-analysis.

3. Blockchain Technology: Concepts and Principles

Blockchain technology, which was developed by Satoshi Nakamoto in 2008, is a decentralized and distributed digital ledger that enables secure and transparent transactions. According to Tapscott, D., and Tapscott, A. (2016), it functions on the tenets of decentralisation, immutability, transparency, and cryptographic security. Blockchain is fundamentally a chain of blocks, each of which comprises a collection of transactions (Antonopoulos, A. M., 2014). In order to create a

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continuous and impenetrable chain, these transactions are cryptographically connected to the previous block (Gorkhali, A. et al., 2020; Xia et al., 2017; Zhang and Chen, 2020).

Blockchain is a decentralised technology, which means it doesn't rely on a single central authority but rather a network of computers (called nodes) to function. Because of this decentralisation, the network is protected from censorship and single points of failure because no single entity has control over the entire system. In order to guarantee the accuracy and legitimacy of the data kept on the blockchain, blockchain also uses cryptographic techniques including hashing and digital signatures (Tapscott, D., and Tapscott, A. (2016). According to Puthal et al. (2018), the fundamental elements of blockchain include blocks, transactions, and consensus processes. A collection of transactions and other important data are stored in blocks. The exchange of money or data between users on the blockchain is represented by transactions. Each transaction is checked, timestamped, and appended to a block (Christidis, K., and Devetsikiotis, M., 2016).

The integrity of the blockchain is maintained in large part by consensus procedures. These procedures allow network members to concur on the legitimacy of transactions and the sequence in which they are added to the blockchain. Proof of Work and Proof of Stake are two types of consensus techniques. While PoS relies on users staking their cryptocurrency holdings to confirm transactions, PoW requires users to solve challenging mathematical problems in order to validate transactions (Nakamoto, S., 2008; Eyal, 2017).

Blockchain technology has huge marketing possibilities. By offering a decentralised and auditable record of transactions and interactions, blockchain technology can improve transparency in marketing practices. According to Hammi, M. T. et al. (2018), it enables stakeholders, including customers, to confirm the legitimacy and accuracy of marketing claims, fostering greater responsibility and minimising fraudulent actions. Blockchain can also help with product traceability, enabling transparent supply chains and thwarting counterfeiting. Blockchain also offers the potential to improve data security and privacy in marketing activities by offering a decentralised infrastructure for data storage and verification, giving people more control over their personal information (Tapscott, D., and Tapscott, A., 2016; Subramanian, 2017).

4. Transparency in Marketing through Blockchain

Enhancing transparency is one of the main benefits of blockchain technology for marketing. Marketers can use blockchain to create a decentralised and auditable record of transactions and interactions, enabling stakeholders, including customers, to confirm the veracity and integrity of marketing promises. According to Li, J. et al. (2017), blockchain makes it possible to trace advertising expenditures, assuring campaign transparency and reducing fraud. In addition, it can make it easier to establish transparent supply chains, which allow customers to identify the origins of items and guarantee sustainable production (Mencias et al., 2018). The effective use of blockchain technology for marketing transparency is demonstrated by a number of case studies and examples. As an example, IBM and Walmart worked together to establish a blockchain-based system that records the supply chain of food goods and enables customers to confirm the provenance, quality, and safety of the products they buy (Tapscott, D., and Tapscott, A. (2016). Consumers have more trust and confidence because to this open supply chain solution. Platforms

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like AdEx use blockchain technology to build a decentralised ecosystem that is transparent and open for the advertising sector. This reduces the need for middlemen and allows advertisers and publishers to connect directly and perform verifiable ad transactions (Li, J. et al., 2017).

Blockchain has a lot of potential for marketing transparency, but there are also many obstacles and constraints. For widespread adoption, there is a vital need to solve the scalability of blockchain networks and the speed of related transaction processing. As blockchain maintains data by default immutably, preserving data privacy while keeping openness also poses a challenge (Lee and Yang, 2018). To ensure legal compliance and compatibility between various blockchain platforms, regulatory frameworks and standardisation difficulties must also be resolved (Beverungen, D., et al., 2021).

5. Trust-building in Marketing through Blockchain

By establishing visible and unchangeable systems for data sharing, verification, and collaboration, blockchain technology has the ability to increase trust among marketing players. In marketing, trust is essential because it affects consumer decision-making, brand loyalty, and the overall success of marketing initiatives. Blockchain offers a decentralised and tamper-proof platform for performing transactions and exchanging information, addressing trust-related challenges in marketing (Iansiti, M., and Lakhani, K. R., 2017; Notheisen, B. et al., 2017). The application of smart contracts is a crucial component of blockchain that improves trust. Self-executing contracts, or "smart contracts," are agreements that take effect when certain criteria are met and are kept on the blockchain. Due to the terms and conditions being inscribed in the blockchain and being transparent to all participants, smart contracts enable the execution of marketing transactions with better efficiency and dependability (CFE, C., 2023). This lessens the need for middlemen and lowers the chance of fraud or non-compliance. Building customer trust through marketing is also made possible by the immutability of blockchain records. Without the agreement of the network's users, data that has been recorded on the blockchain cannot be changed or tampered with. As a result, there is an auditable trail of all dealings and communications, which improves accountability and transparency (Sanchez-Corcuera, R., et al., 2019). Customers and other stakeholders are more likely to believe marketers' claims when they can verify their veracity and authenticity thanks to immutable records on the blockchain.

Furthermore, trust-building is greatly aided by blockchain's decentralised structure and consensus procedures. As there is no need for a centralised authority thanks to the decentralised network, there is less chance of prejudice or manipulation (Iansiti, M., and Lakhani, K. R., 2017). To further increase trust in the system, consensus procedures like Proof of Work and Proof of Stake make sure that transactions are approved and verified by the majority of network users. Marketers can create trust-building mechanisms that improve the credibility and dependability of their operations by utilising blockchain technology. These processes, which all help to create a more reliable marketing environment, include the usage of transparent and auditable records, smart contracts, and decentralised consensus.

6. Data Security in Marketing through Blockchain

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According to Gu et al. (2018), blockchain technology has a lot of potential for improving data security in marketing operations. In today's digital world, data breaches, fraud, and unauthorised access pose serious dangers to businesses and customers. This makes data security a top priority. By offering a decentralised and irreversible ledger that guarantees the integrity and privacy of data, blockchain can address these issues (Sanchez-Corcuera, R., et al., 2019). The decentralised nature of blockchain contributes to improved data security. Data leaks and hacking are possible with traditional centralised systems because all of their data is kept in one place. As opposed to this, blockchain runs on a network of nodes, with each node keeping a copy of the blockchain. The risk of a single point of failure is decreased thanks to this distributed architecture, which also makes it very difficult for attackers to take over the entire network (Tapscott, D., and Tapscott, 2016).

In order to secure data, blockchain also uses sophisticated cryptography methods. Cryptographic hashes are used to link data stored on the blockchain to earlier transactions and encrypt it. As a result, the data is guaranteed to be genuine and authentic, making it tamper-resistant (Nakamoto, S., 2008). Additionally, cryptographic keys can be used to restrict access to data on the blockchain, enabling fine-grained permission settings and boosting privacy (Sanchez-Corcuera, R., et al., 2019). Systematic privacy protections are also improved in blockchain-based data management systems. Zero-knowledge proofs, as an illustration, make it possible to verify data without revealing the actual data itself. This can be especially useful in marketing campaigns where it's important to communicate private consumer data while maintaining client confidentiality (CFE, C., 2023). Blockchain lessens the risk of unauthorised access and data leaks by utilising privacy-preserving measures.

Data security in marketing is further enhanced by blockchain's transparency and auditability. Blockchain enables transparent and verifiable transactions while protecting anonymity. According to Christidis and Devetsikiotis (2016), this transparency makes it possible for all parties to monitor the flow and use of data, which encourages accountability and lessens the risk of fraudulent acts. As a result of its decentralised architecture, cryptographic methods, privacy protection features, and transparency, blockchain technology has the potential to improve data security in marketing. Marketers may protect sensitive information, stop data breaches, and win customers' trust by utilising these features.

Table 1: Key Findings on Transparency, Trust, and Data Security in Marketing with Blockchain Technology

Study	Key Findings

Puthal et al., 2018	• Offers a general introduction to the ideas and values underlying the blockchain, such as its decentralised and open nature, cryptographic principles, and consensus methods. • Demonstrates the advantages of blockchain for marketing, including improved traceability, transparency, and data security. • Explains the difficulties and potential uses of blockchain in marketing, including scalability, system integration, and research needs in particular marketing fields. • Focuses on the necessity of stakeholder cooperation and education in order to realise the full potential of blockchain in marketing.
Li et al., 2017	• Demonstrates using case studies and real-world examples how blockchain technology may improve marketing transparency through supply chain tracking and verified advertising transactions. • Discusses the drawbacks of blockchain, such as scalability issues and privacy issues with user data, and emphasises the necessity for regulatory frameworks and standardisation.
Hammi et al., 2018	• Examines how decentralised consensus, smart contracts, and immutability of blockchain technology might promote trust among marketing stakeholders. • Explores the potential advantages of blockchain in fostering trust while highlighting the significance of trust in marketing.
Gu et al., 2018	• Examines how blockchain technology can improve marketing data security. • Highlights the decentralised design, cryptographic methods, privacy safeguards, and openness of blockchain as elements that support data security.

Sanchez-Corcuera et al., 2019	• Explains how blockchain technology might help marketing data be more securely stored. • Investigates the blockchain's immutability, decentralised design, and cryptographic security as tools for preserving customer data during marketing campaigns.
Demirkan, S. et al., 2020	• Highlights the possible uses and effects of blockchain technology in marketing. • Draws attention to how blockchain technology might improve marketing practices' use of openness, trust, and data security. • Emphasises the importance of the additional study to examine blockchain's potential in several marketing fields.
Lu, 2019	• Investigates the advantages and difficulties of applying blockchain technology to marketing. • Shows how blockchain may improve marketing initiatives' openness, trust, and data security. • Underscores the need for additional research to fully examine the use of blockchain in marketing and points up knowledge gaps.
Viriyasitavat and Hoonsopon, 2019	• Explores how blockchain technology might be used in marketing. • Explains how blockchain may improve marketing practises' openness, trust, and data security. • Underlines the need for additional research and development in this field while identifying the difficulties and restrictions of blockchain in marketing.

7. Challenges and Future Directions

Blockchain technology has a lot of potential for marketing, but there are a lot of issues that prevent it from being widely used and adopted. The scalability of blockchain networks is one of the main issues. The network may encounter performance restrictions as the volume of transactions and

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users on the blockchain grows, including longer processing times for transactions and greater transaction prices (Sanchez-Corcuera, R., et al., 2019). To ensure that blockchain can support the volume and speed required for marketing activities, scalability challenges must be addressed.

The integration of blockchain technology with current platforms and marketing systems presents another challenge. Traditional centralised systems have a strong foundation in many marketing operations, including customer relationship management, advertising, and data analytics. Blockchain integration into these systems calls for thorough planning, teamwork, and technological know-how (Iansiti, M., and Lakhani, K. R., 2017). To enable smooth integration between blockchain and current marketing infrastructure, standards and interoperability frameworks must also be defined.

There are still unsolved questions and untapped potential in the use of blockchain in some marketing domains. A lot more research is required to determine how blockchain will affect other aspects of marketing, such as customer data management, loyalty programmes, and influencer marketing, even though there are notable examples of its potential in areas like supply chain transparency and the verification of digital advertising (Sanchez-Corcuera, R., et al., 2019). The knowledge base surrounding blockchain in marketing can be further expanded by understanding the potential advantages, difficulties, and implementation techniques in these domains.

The implementation of blockchain presents significant barriers and challenges that must be solved in order to fully realise its marketing potential. To build shared standards, rules, and governance frameworks that can direct the moral and responsible use of blockchain technology, cooperation among industry stakeholders—including marketers, technologists, and policymakers - is crucial (Tapscott, D., and Tapscott, A. (2016). Additionally, promoting an atmosphere of education and awareness can assist allay worries and improve understanding among marketers about the advantages and restrictions of Blockchain (Gatteschi, V. et al., 2018). A number of issues need to be resolved even if blockchain technology holds enormous promise for data security, transparency, and trust in marketing. There are challenges that demand more investigation and joint efforts, including scalability, integration with current systems, and research gaps in particular marketing domains. Blockchain can be efficiently used to transform marketing procedures, boost client trust, and spur innovation by overcoming these obstacles and taking advantage of upcoming research prospects.

8. Conclusion

The thorough investigation of the marketing applications of blockchain technology yields a number of important conclusions and contributions. The assessment examined blockchain's ideas and tenets, emphasising its decentralised structure, cryptographic foundations, and essential elements including blocks, transactions, and consensus mechanisms. The evaluation also looked at how blockchain may improve data security, trust-building, and openness in marketing practices. The literature review's key finding is that blockchain technology has the potential to revolutionise marketing transparency. Blockchain can offer a transparent and auditable platform for tracking and validating marketing operations, such as supply chains, ad campaigns, and customer data management, by using its decentralised and immutable nature (Hasan, H. R., and Salah, K. (2018).

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The increased accountability, decreased fraud, and increased stakeholder trust results from this transparency.

The review also found that blockchain can significantly contribute to marketing trust-building. Blockchain improves the dependability and authenticity of marketing transactions through mechanisms like smart contracts and immutable records, reducing the need for middlemen and boosting transparency. By guaranteeing the integrity and security of data, the adoption of cryptographic methods and decentralised consensus also helps to strengthen trust. According to the literature review, blockchain provides reliable procedures for protecting sensitive marketing data. Blockchain technology's decentralised architecture, use of cryptographic hashing, and encryption techniques reduce the likelihood of data breaches, unauthorised access, and tampering (Zhang et al., 2017). Additionally, privacy protection methods are offered by blockchain-based data management systems, allowing marketers to share and use data while upholding people's right to privacy.

These findings have important ramifications for both marketing theory and practice. Expanding knowledge of blockchain technology and its possible marketing uses are some theoretical implications (Zyskind, G., and Nathan, O., 2015). Future studies might build on the examined literature to investigate and create theoretical frameworks that include blockchain technology into marketing theories and models.

Practically speaking, the results imply that marketers should think about implementing blockchain technology to improve openness, reliability, and data security in their operations. But it's important to pay close attention to issues like scalability, system integration, and the requirement for industry-wide standards. To create best practices and regulatory frameworks that support responsible and ethical usage of blockchain in marketing, marketers should interact with technical experts and policymakers.

The systematic assessment concludes by highlighting the enormous potential of blockchain technology in marketing for data security, transparency, and relationship-building. Blockchain has the potential to change marketing strategies, increase customer trust, and promote innovation by utilising its special qualities. To fully realise the advantages of blockchain technology in the marketing sector, further study and cooperation between academics, businesses, and government are required.

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