Blockchain-Based Leadership: How Blockchain Technology Enhances Transparency and Accountability in Organizational Leadership

Ari Akbar
Faculty of Economics and Business, Universitas Trunojoyo; Madura, Indonesia
E-Mail: ariakbar989@gmail.com

Djamaliyah
Faculty of Economics and Business, Universitas Trunojoyo; Madura, Indonesia
E-Mail: djamaliyah123@gmail.com

Nur Aisyah
Faculty of Economics and Business, Universitas Trunojoyo; Madura, Indonesia
E-Mail: na7622386@gmail.com

Mochammad Isa Anshori
Faculty of Economics and Business, Universitas Trunojoyo; Madura, Indonesia
E-Mail: isa.anshori@trunojoyo.ac.id

Submitted:
09 NOVEMBER 2024

Accepted:
23 FEBRUARY 2025

ABSTRACT

The main objective of this study is to identify, analyze, and synthesize literature related to blockchain integration in leadership practices. The search methodology was conducted through major electronic databases with relevant keywords, resulting in 45 articles that met the inclusion criteria for further analysis. The results of the analysis revealed five main themes, namely Decentralization of Leadership Authority, Transparency and Accountability, DAO (Decentralized Autonomous Organization) Leadership Model, Transformation of Trust in Leadership, and Challenges of Implementation and Adoption. Blockchain technology has the potential to transform traditional leadership systems by creating a more transparent, efficient, and distributed trust-based environment. However, the implementation of blockchain-based policies faces various challenges, including technical barriers, organizational culture, and regulatory barriers. This study contributes to the understanding of how blockchain technology can change the dynamics of leadership and organizational governance. In addition, the findings of this study offer insights for further research in developing more adaptive, innovative, and sustainable leadership models in the digital era.

Keywords*: Blockchain, Kepemimpinan, Desentralisasi, DAO, Teknologi Distributed Ledger, Transformasi Digital*

ABSTRAK

Tujuan utama penelitian ini adalah mengidentifikasi, menganalisis, dan mensintesis literatur terkait integrasi blockchain dalam praktik kepemimpinan. Metodologi pencarian dilakukan melalui database elektronik utama dengan kata kunci yang relevan, menghasilkan 45 artikel yang memenuhi kriteria inklusi untuk dianalisis lebih lanjut. Hasil analisis mengungkap lima tema utama yaitu Desentralisasi Otoritas Kepemimpinan, Transparansi dan Akuntabilitas, Model Kepemimpinan DAO (Decentralized Autonomous Organization), Transformasi Kepercayaan dalam Kepemimpinan, serta Tantangan Implementasi dan Adopsi. Teknologi blockchain berpotensi mengubah sistem kepemimpinan tradisional dengan menciptakan lingkungan yang lebih transparan, efisien, dan berbasis kepercayaan terdistribusi. Namun, penerapan

JIMKES

Jurnal Ilmiah Manajemen Kesatuan
Vol. 13 No. 1, 2025
pp. 999-1008
IBI Kesatuan
ISSN 2337 – 7860
E-ISSN 2721 – 169X
DOI: 10.37641/jimkes.v13i2.3232

kepemimpinan berbasis blockchain menghadapi berbagai tantangan, termasuk hambatan teknis, budaya organisasi, serta ketidakpastian regulasi. Studi ini memberikan kontribusi pada pemahaman tentang bagaimana teknologi blockchain dapat mengubah dinamika kepemimpinan dan tata kelola organisasi. Selain itu, temuan penelitian ini menawarkan wawasan bagi penelitian selanjutnya dalam mengembangkan model kepemimpinan yang lebih adaptif, inovatif, dan berkelanjutan di era digital.

***Kata kunci**: Blockchain, Kepemimpinan, Desentralisasi, DAO, Teknologi Buku Besar Terdistribusi, Transformasi Digital*

INTRODUCTION

Blockchain technology has been widely recognized since 2008, when Nakamoto introduced Bitcoin through a whitepaper (Nakamoto, 2008). Bitcoin enables direct transactions between two parties without an intermediary. In 2014, Buterin developed Ethereum, introducing significant advancements in blockchain technology by enabling the automatic execution of programs. With Ethereum, users can write, deploy, and run code on a decentralized network. This innovation led to the development of various blockchain-based applications, such as the Decentralized Autonomous Organization (DAO) (Sims, 2020). By providing a transaction recording system that is immutable and verifiable by a wide network without requiring a central authority, blockchain significantly enhances organizational transparency and accountability. Every transaction is recorded permanently and can be trusted without the need for third-party validation. Because of its decentralized nature, blockchain removes control from a single entity, reducing the risk of data manipulation and increasing trust in business processes and decision-making. For years, traditional leadership has been characterized by vertical communication systems, centralized decision-making, and hierarchical structures. While this paradigm has proven effective in many situations, it has also been criticized for being opaque, slow to adapt to change, and susceptible to bias or corruption. The advent of blockchain technology introduces a more decentralized, transparent, and cryptographic consensus-based leadership model.

Blockchain-Based Leadership refers to the application of blockchain technology in leadership, organizational governance, and decision-making. Through a decentralized mechanism, this system promotes transparency, accountability, and consensus-based collective decision-making. Blockchain technology can permanently and irreversibly record leadership performance, prevent data manipulation, and enhance trust within an organization. Additionally, smart contracts can automate strategic policies and decisions, ensuring compliance with regulations without requiring third-party intervention. In organizational structures, blockchain supports a participatory leadership model in which every member has an equal voice in critical decisions. By combining transparency, data validity, and decentralization, blockchain-based leadership has the potential to create a more equitable, efficient, and innovative system. Research by Haq et al. (2024) explores the leadership competencies required for implementing blockchain technology in public sector organizations. The study highlights the importance of sensemaking in understanding and addressing challenges that arise during the blockchain implementation process. The study by Liu et al. (2022) presents 14 architectural patterns for blockchain governance, providing guidance for practitioners in establishing effective governance within blockchain systems. It emphasizes the crucial role of strategic leadership in navigating the challenges and opportunities associated with blockchain technology. Hassan & De Filippi (2021) discuss how blockchain technology facilitates the formation of Decentralized Autonomous Organizations (DAOs), which have the potential to transform traditional leadership paradigms into more democratic and participatory models. Their study also explores the legal and governance implications of implementing DAOs.

Although research on blockchain-based leadership continues to grow, several research gaps still need further exploration. Haq et al. (2023) highlighted the importance of leadership competencies in blockchain implementation within public sector organizations. However, little research has linked this aspect to traditional leadership theories, such as transformational leadership or servant leadership. In addition, empirical evidence on the effectiveness of blockchain-based leadership remains limited, as most existing studies are conceptual or case study-based, lacking longitudinal data that could measure its long-term impact. Liu et al. (2022) developed an architectural pattern for blockchain governance, but no conceptual model comprehensively integrates leadership, blockchain technology, and organizational dynamics. Furthermore, regulatory challenges and organizational adaptation present significant obstacles to implementing blockchain-based leadership, as noted by Hassan & De Filippi (2021) in their study on Decentralized Autonomous Organizations (DAOs). Their study suggests that DAOs can shift the traditional leadership paradigm toward a more democratic model but does not explore in depth how traditional companies or institutions can transition to this system. Finally, the social and ethical impacts of blockchain-based leadership remain under-researched, particularly in terms of accountability, anonymity, and their implications for organizational social structures. Therefore, further research is needed to not only explore the integration of leadership theory with blockchain but also provide empirical evidence, develop a robust conceptual model, and analyze the regulatory challenges and social implications of this transformation. This study aims to examine blockchain-based leadership, specifically in enhancing transparency and accountability in organizational leadership.

METHODS

The research method used in this study is the Systematic Literature Review (SLR) (Andreini et al., 2017). Systematic searches were conducted in major databases such as Scopus, Web of Science, IEEE Xplore, ACM Digital Library, ScienceDirect, and Google Scholar. Additionally, specialized journals in the fields of leadership, management, and information technology were manually searched. The search utilized a combination of keywords related to blockchain, distributed ledger technology, smart contracts, leadership, organizational governance, decentralized autonomous organizations (DAOs), consensus mechanisms, and digital transformation. The inclusion criteria encompassed articles discussing the application of blockchain in organizational management or governance, including conference papers, books, book chapters, peer-reviewed journal articles, and white papers from leading institutions. Publications had to be in English or Indonesian and published between 2008 and 2024. Articles that were popular science, blogs lacking academic support, focused solely on the technical aspects of blockchain without relevance to leadership, or centered exclusively on financial and banking applications without leadership implications were excluded. The literature selection followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method. The initial search yielded 312 articles, which, after screening and the removal of duplicates, resulted in 248 articles being assessed based on their titles and abstracts. A total of 92 articles underwent full review, with 45 articles ultimately included in the final analysis. Each article was extracted and analyzed based on the author, year, title, source, type of study (conceptual, theoretical, or empirical), methodology (if empirical), main focus, key findings, model or framework, application or case study, and future research opportunities. Thematic analysis was employed to identify patterns and trends in the reviewed literature.

RESULTS

The 45 articles analyzed, 22 were conceptual or theoretical papers, 15 were empirical studies (including case studies, surveys, and experiments), and 8 were review or position papers. The majority of the articles (76%) were published in or after 2018, reflecting the novelty of this domain. Moral issues arise when someone cites a moral argument

without being willing to invest in the consequences of that argument (Batson, 2016). While leadership, ethics, trust, and personal responsibility are widely discussed in the literature, they are often viewed as well-defined and static qualities rather than as ideals to be developed over time. This paper argues that these qualities are, in fact, dynamic and aspirational. Based on this perspective, moral ethics play a crucial role in leading a company toward a better future. According to Mostovicz et al. (2011), the integration of technology, leadership transparency, and blockchain-based models represents bold changes. In the digital sector, the impact of digital transformation on markets and organizations is evident. The availability of data and digital technology is driving companies to modify their processes, business models, products, and services. According to Gierlich-Joas et al. (2020), trust is a fundamental component of human interaction along a continuum. A minimal level of trust is essential for any group or for individuals to establish relationships. However, this minimal threshold of trust may not be sufficient to foster deeper connections or long-term collaboration. This underscores the significance of leadership transparency, which has the power to influence perspectives and drive organizations toward their goals (Bandsuch et al., 2008).

According to Hasibuan (2016), management is both an art and a science that involves organizing human resources and other resources to achieve specific goals. This definition highlights how human resources are utilized to accomplish attainable objectives. Human resource management, also known as Human Resource Management (HRM), is a field that examines how to effectively and efficiently manage the relationships and roles of human resources (workforce) owned by individuals. It also explores how these resources can be optimally utilized to achieve the shared goals of the company, employees, and society (Pertiwi, 2023; Syabilla et al., 2024; Hutapea, 2024). This underscores the need for competitive leaders capable of sustaining long-lasting companies (Nikmah et al., 2023). Leadership plays a crucial role; when blockchain technology is properly integrated, strong leadership can be established. Recent business ethics scandals have raised important questions about the role of leadership in shaping ethical behavior. Most employees look to others as a source of moral guidance (Brown et al., 2005). The geographic distribution of research indicates a global representation, with concentrations in North America, Europe, and East Asia. From a disciplinary perspective, the literature spans multiple fields, including information systems, management, organization studies, computer science, and law.

The analysis identified five main themes in the literature on blockchain-based leadership: transparency and accountability, decentralization of decision-making, organizational security and trust, efficiency and automation through smart contracts, and regulatory and ethical challenges. In the Transparency and Accountability theme, blockchain has emerged as one of the most effective decentralized technologies in recent years, enabling multiple systems and platforms to connect more securely and transparently. Blockchain is gaining popularity across various digital applications, such as finance, healthcare, and supply chains, as it verifies and records every transaction or data exchange in an immutable digital ledger. This enhances data security, prevents manipulation, and protects user privacy. Blockchain technology has evolved into an innovative solution to challenges related to security, transparency, and trust in digital systems. By utilizing a consensus-based verification system and an immutable data recording mechanism, blockchain enables all network participants to collectively safeguard and manage data without third-party intermediaries. With increased transparency and faster transaction processing, this technology creates new opportunities for various industries to develop fairer, safer, and more trustworthy systems.

On the theme of Decentralization in Decision-Making, blockchain, which originated with Bitcoin, has evolved with the emergence of Ethereum and smart contracts, enabling its application in industries such as logistics, insurance, and healthcare. Blockchain serves as a stable and immutable distributed ledger. In a decentralized ecosystem, if a data entry can be edited in multiple locations without proper security

mechanisms, maintaining data consistency becomes challenging. This increases the risk of attacks, such as double spending, where the same digital asset is used repeatedly before being verified. Such risks can undermine the integrity of the blockchain and erode user trust if a consensus mechanism and strong encryption algorithms are not in place. Therefore, to ensure security and transparency, blockchain must be supported by robust encryption protocols and a reliable consensus mechanism.

In the era of the digital economy, blockchain helps organizations collaborate more securely using digital technology. Artificial Intelligence (AI) is also becoming increasingly important across various sectors, including healthcare, finance, education, and transportation. AI algorithm libraries provide security measures such as data encryption, identity authentication, and access control. These measures include quantum cryptography, multiparty cryptography techniques, cellular automaton cryptography, RSA/ECC, Diffie-Hellman, and SHA-1/SHA-256. The accounting and auditing sector faces new challenges and opportunities with blockchain decentralization. A study by Bonsón & Bednárová (2019) shows that blockchain has great potential in the audit industry due to its transparent and decentralized nature. Blockchain ensures that every transaction is verified by nodes in the network, ensuring data remains accurate and cannot be manipulated. Conventional ERP (Enterprise Resource Planning) systems are more vulnerable to human error and cyberattacks because they rely on a single central authority. With blockchain, the audit process becomes more transparent, reduces data reconciliation costs, and improves regulatory compliance. The blockchain concept was first introduced by Haber & Stornetta (1991), while Szabo (2017) coined the term "smart contract" in 1994. The development of generative AI (GenAI) is also increasingly influencing various industries. GenAI offers both opportunities and challenges for the legal, healthcare, education, marketing, and creative arts sectors. The integration of AI and blockchain enables fairer and more ethical data management, fostering a more trustworthy system for businesses and society.

The decentralization of leadership authority reflects a shift from a hierarchical leadership model to a decentralized network model. This involves the distribution of decision-making authority among stakeholders, the implementation of consensus mechanisms for validating collective decisions, and changes in the dynamics of power and control within the organization. Complexity scholars have found that self-organizing and decentralized governance approaches are more effective in managing large and complex systems than hierarchical structures. Decentralized governance is essential for addressing system complexity, particularly in pluralistic contexts where decision-making roles are shared among multiple actors. Project organizations can adopt decentralized governance mechanisms instead of centralized organizational designs, where project managers control stakeholders through a hierarchical structure. This approach enables multiple stakeholders to take collective action and make joint decisions (Mukhlis & Tyas, 2024).

Decentralized control is the optimal choice for large-scale systems as it effectively addresses issues such as uncertainty, dimensionality, and information structure constraints. In production systems, cooperative control offers several advantages, including reliability, scalability, and flexibility. However, centralized control has notable disadvantages, such as excessive communication, poor data security, and flawed decision-making. According to stakeholder theory, organizations must actively manage and deliver value to shareholders and other stakeholders, including partners, governments, customers, employees, and society (Sinaga & Warsito, 2023). However, managers overseeing this process often lack an accurate understanding of all stakeholders. Conflicting interests must be balanced, yet there are no clear standards for prioritization. Introspective, relational, and attributive logics are employed in determining stakeholder priorities (Chernyi & Uotila, 2024).

Electronic voting systems can facilitate collective decision-making but are vulnerable to single points of failure and reliance on trusted third parties. Blockchain-based systems store data in a decentralized manner, enhancing security and transparency. However,

some of their characteristics may conflict with the privacy requirements of voting systems. This study also highlights the challenges faced by middle managers during organizational transitions, using a case study of a Scandinavian telecommunications company (Telco) undergoing privatization in the 1990s (Byrkjeflot, 2024). The shift from the Nordic Model to a change and performance management approach altered the way managers and technicians worked. Previously, the company followed a constitutional management system in which managers had limited decision-making authority. However, this system began to shift, leading to a power struggle between middle managers and subordinates in defining the department's operational reality. Competing perspectives on the past, present, and future of the organization played a role in shaping the power dynamics within the company.

Transparency in decision-making and implementation monitoring is essential for enhancing leadership accountability. Smart contract systems ensure that leaders are held accountable for their actions (Smith & Lee, 2021). Blockchain technology creates an immutable record of leadership commitments and outcomes. Modern complex supply chains face challenges in risk assessment due to human behavior, globalization, and diverse regulations. Fraud, theft, and inefficient transactions undermine trust, making data transparency and verification crucial (Saberi et al., 2019). Blockchain technology offers greater transparency than conventional methods. In lending systems, transparency allows lenders to verify transactions at lower costs, raising the standard for effective leadership (Chod et al., 2020). Big data-driven business models use sensors and the Internet to collect and store data, enabling artificial intelligence and blockchain to enhance government transparency. This reduces information asymmetry and increases data accessibility (AlShamsi et al., 2021). Transparent leadership fosters company growth by aligning actions with the organization's vision.

Conventional leadership approaches that focus on domination and manipulation are considered ineffective. Instead, ethical, responsible, and charismatic leadership is preferred. Leaders with integrity inspire employees to excel and contribute to building lasting organizations. The role of leaders in Corporate Social Responsibility (CSR) initiatives has been widely discussed, with Taştan et al. (2019) highlighting leadership's impact on responsible decision-making. The digital era presents both challenges and opportunities in Human Resource (HR) management. The implementation of technology enhances HR quality and helps develop better leaders. Therefore, companies must adapt their HR management strategies to align with technological advancements. Blockchain-based leadership has been recognized for its contribution to corporate sustainability (Wahyudi et al., 2023). Additionally, transformational and transactional leadership theories distinguish between leaders who inspire and those who adopt a transaction-based approach. In the digital business landscape, companies increasingly leverage AI for business strategies and to create inclusive work environments. As awareness of diversity grows, organizations must allocate resources to support inclusion. Furthermore, courageous and honest leadership is becoming increasingly essential (Suwandita et al., 2023).

A significant portion of the literature (31%) focuses on DAOs as the primary manifestation of blockchain-based leadership, with particular attention to their structure and operation, governance and decision-making mechanisms, case studies of organizations adopting this model, and comparisons with traditional leadership frameworks. Li & Chen (2024) analyzed the implementation of DAOs in 12 organizations and found that this model enhances member involvement in the decision-making process. Broader participation in governance allows members to have a greater influence on the organization's direction, thereby increasing transparency and accountability. However, the study also identified challenges related to decision-making efficiency, as consensus-based models often take longer than traditional leadership structures. Additionally, conflict management in DAOs is more complex due to the absence of a clear hierarchy, which can slow down the resolution of disputes among members. Therefore, while DAOs offer advantages in participation and

decentralization, obstacles remain that must be addressed for this model to function optimally across various types of organizations.

The literature discusses how blockchain transforms trust in leadership relationships—shifting from trust based on positional authority to trust based on cryptographic systems. "Trustless leadership" refers to a model in which trust in individuals is replaced by trust in protocols and algorithms. This shift in trust has social and psychological consequences, influencing how leadership legitimacy is established in blockchain-based systems. Werbach (2018) states that blockchain does not eliminate the need for trust in leadership. Rather, it shifts trust from interpersonal relationships to systemic transparency and algorithmic assurance. In the literature, several issues have been identified that hinder the adoption of blockchain-based leadership models. Technical challenges, such as scalability, interoperability, and energy consumption, are among the primary obstacles. Additionally, cultural challenges and resistance to change further slow the adoption of this technology. The conflict between decentralization and the need for centralized control also raises compliance and regulatory concerns. Hashimzai, Ahmadzai, et al. (2024) found that integrating blockchain-based leadership is more effective when implemented gradually rather than through radical transformation.

Although blockchain-based leadership remains largely conceptual, this review identifies some early empirical studies. Key findings include the following: blockchain implementation for voting and collective decision-making increases member participation (Kamble et al., 2023). DAO leadership models enhance transparency but also introduce the potential for "deadlock" in decision-making (Li & Chen, 2024). The implementation of smart contracts for performance management and leadership incentives improves perceptions of fairness. Experimental research suggests that leadership legitimacy in blockchain-based systems depends on members' understanding of the technology. While limited, this empirical evidence indicates that blockchain-based leadership has the potential to positively transform organizational dynamics, though it also presents new challenges that must be addressed. In this context, leaders must be able to produce innovative and extraordinary products while effectively guiding and supporting their subordinates to stay on track. Currently, creativity, particularly in organizational settings, is centered on the development of successful and innovative products. Products that are novel, useful, and appropriate are classified as creative products (Mumford & Gustafson, 1988). Such products emerge from various factors at both the individual and organizational levels (Reiter-Palmon & Illies, 2004).

Human Resource Management (HRM) plays a crucial role in maintaining the global work environment and ensuring fairness in organizations, especially in increasingly diverse and complex workplaces. As awareness of the importance of diversity and inclusion in the workplace grows, companies are increasingly in need of resources to support their diversity initiatives. Effective decision-making is essential, particularly for leaders who must address organizational challenges. A blockchain-based leadership model and enhanced transparency demonstrate how technology can be highly beneficial and contribute to a company's long-term sustainability (Suwandita et al., 2023). Collective action is a common issue in social group dynamics. It arises when one or more individuals invest resources to create collective goods that benefit many people. However, some individuals, known as "free riders," take advantage of these goods without contributing to their production. As a result, individuals may find it advantageous to avoid participating in collective action while still benefiting from the efforts of others (Glowacki & von Rueden, 2015). Similarly, just as blockchain technology emphasizes security and transparency, corporate leadership also requires these fundamental attributes. Several human resources experts and practitioners have identified Electronic Meeting Systems (EMS) as a method that can enhance group productivity and satisfaction (Kahai & Soslk, 1997).

CONCLUSION

This review identifies five key themes in the literature on blockchain-based leadership: decentralization of authority, increased transparency and accountability, the DAO (Decentralized Autonomous Organization) model, fundamental transformations in the concept of trust, and implementation challenges. Overall, blockchain technology is seen as having the potential to revolutionize the concept and practice of leadership toward a more transparent, decentralized, and context-based model. However, empirical evidence is limited, leaving many claims about its impact speculative. To widely adopt this paradigm, organizations will need to overcome technical, cultural, and legal barriers. The shift toward blockchain-based leadership requires leaders who are able to drive organizational transformation by prioritizing transparency and building trust. Theoretically, traditional leadership models need to be revised to align with blockchain-based governance systems, especially in rebuilding leader-follower relationships in decentralized systems. Practically, it is necessary to implement blockchain values into organizational structures, as well as efforts to overcome resistance to change. Future research needs to examine the long-term impacts of blockchain-based leadership, the application of social law, and the development of hybrid models. Limitations of this discussion include the narrow scope of the literature, the potential for publication bias, and the rapid development of blockchain technology that may affect the relevance of the findings.

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