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Legal and Ethical Implications of Blockchain Use in Business Transactions

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A B S T R A C T

Blockchain technology has brought significant transformations across various industrial sectors due to its transparent, secure, and efficient characteristics. However, its decentralized, transparent, and immutable nature poses legal challenges, particularly concerning personal data protection and ethical use. In Indonesia, the Personal Data Protection Law (UU PDP) and the Electronic Information and Transactions Law (UU ITE) serve as the primary legal frameworks regulating personal data protection. One major issue is the potential conflict between the permanent nature of blockchain and the right to data erasure as stipulated in the UU PDP. Additionally, ethical challenges such as privacy violations, unequal access to technology, and environmental impacts are critical issues that need to be addressed. Dispute resolution in blockchain transactions also faces unique complexities due to blockchain's immutable nature, requiring innovative approaches such as blockchain-based arbitration and smart contract arrangements. Therefore, a specific legal framework and mechanisms are needed to support the safe and responsible development of blockchain while respecting legal principles, ethics, and data protection. Collaboration among governments, businesses, and technology developers is essential to ensure that blockchain can be implemented inclusively and sustainably.

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INTRODUCTION

In recent decades, the business world has undergone significant transformation, largely driven by rapid advancements in information and communication technology. These changes have profoundly influenced how companies conduct transactions and interact with consumers. One of the technological innovations currently reshaping the paradigm of business transactions is blockchain. Initially known as the foundational technology behind digital currencies such as Bitcoin, blockchain has evolved beyond the financial sector and is now entering various industries such as logistics, education, government, healthcare, and more (Comert, 2020). With its revolutionary nature, this technology holds immense potential to enhance efficiency, security, transparency, and the resilience of information systems across various business sectors.

Essentially, blockchain is a digital ledger system that stores data in blocks, which are then sequentially linked to form a continuous chain (Utomo, 2022). Each block contains details of transactions that have been verified by various participants within the network. Once recorded, this information becomes immutable and resistant to manipulation. This makes blockchain a highly secure and transparent technology, offering protection against data tampering and reducing the risk of fraud (Fitriani et al., 2024). Moreover, blockchain operates within a decentralized framework, meaning that no single entity has full control or authority over the network. In a blockchain ecosystem, transactions can occur directly between the involved parties without the need for intermediaries such as banks, regulatory bodies, or notaries. This not only reduces transaction costs but also minimizes delays often encountered in traditional systems.

Although blockchain offers remarkable solutions to enhance efficiency, its application in the business world presents several challenges, particularly in terms of legal and ethical considerations, which cannot be overlooked. One primary issue is the legal validity and legitimacy of transactions conducted via blockchain. In traditional business systems, transactions are recognized and guaranteed by authorized third parties, such as financial institutions, governments, or legal authorities. However, within the decentralized framework of blockchain, there is no central authority to verify or ensure the validity of transactions recorded on the network. Blockchain also raises challenges concerning the protection of intellectual property rights (IPR). On one hand, blockchain offers a more secure and transparent way to record and protect various intellectual property rights, such as copyrights, patents, and trademarks (Hutagalung et al., 2024). While the use of blockchain enhances transparency in tracking and documenting these rights, concerns persist regarding how intellectual property rights can be accounted for and enforced within the framework of existing legal systems (Sajidin, 2021).

In addition to legal challenges, ethical issues also require significant attention. One of the most prominent ethical concerns is the privacy of personal data. The high level of transparency in blockchain, where every transaction can be traced by all participants in the network, is one of its key advantages (Ihsan, 2022). While this transparency enhances accountability and reduces the risk of

fraud, it also raises serious concerns regarding privacy. Personal data recorded on the blockchain cannot be altered or deleted, potentially infringing on individuals' rights to protect their personal information. Although some modern blockchain systems employ encryption techniques to safeguard user identities, there remain risks regarding the extent to which privacy can be preserved in a fully decentralized and transparent system. This becomes a critical issue for countries with stringent data protection regulations, such as those outlined by the European Union's General Data Protection Regulation (GDPR).

Given the various legal and ethical challenges, it is crucial to conduct an in-depth analysis of the legal and ethical implications of blockchain usage in business transactions (Kawengian, 2024). This research aims to provide a more comprehensive understanding of how blockchain technology interacts with existing legal systems and how ethical principles can be applied in a world increasingly influenced by blockchain technology. This study is expected to make a significant contribution to the development of legal and ethical frameworks that can be implemented in the ever-evolving business landscape. As part of the global effort to create a legal system that is more adaptive to technological advancements, this research will offer policy recommendations to support the safe, ethical, and sustainable implementation of blockchain in business transactions.

LITERATURE REVIEW

In Indonesia, the legal framework related to blockchain has not been fully regulated by law. As a result, the use of blockchain in transaction processes still lacks clear legal certainty, particularly in resolving potential issues that may arise in such transactions. With the rapid advancement of technology, the law is required to innovate to keep pace with these developments. This is essential to anticipate potential violations that may occur in the implementation of blockchain technology across various sectors.

Blockchain is essentially a digital recording system that stores data in interconnected blocks, where the data is stored permanently. Although this technology offers numerous benefits for all parties involved, there are significant challenges that need to be addressed, particularly in its implementation in Indonesia. One of the main challenges is related to the right to data deletion, also known as the right to be forgotten. This issue is crucial given the nature of blockchain, which does not allow data to be altered or deleted once it has been recorded. Thus, a balanced solution is needed between technological advancements and the protection of individual privacy rights.

Research on blockchain has been conducted by several researchers, including:

1) Fradhana Putra Disantara and Febri Falisa Putri, who discussed "The Application of Blockchain in Government Systems." This study highlights the potential of blockchain in improving transparency and bureaucratic efficiency while identifying the legal and ethical challenges that need to be addressed for its implementation in Indonesia.
2) Sylvia Mufarrochah and Elsa Assar, who focused on "Data Security in Blockchain Technology." Their research emphasizes the importance of

developing regulatory frameworks to ensure user data protection, particularly in the financial and blockchain-based business sectors.

3) Mitasari et al. (2022), who explored "The Potential and Challenges of Blockchain Implementation in Indonesia." This study provides recommendations for promoting blockchain adoption across various sectors, including the importance of harmonizing laws with this emerging technology.

These studies provide valuable insights into the potential, benefits, and challenges of blockchain implementation. However, further in-depth research is needed to address specific challenges related to the legal and ethical contexts in Indonesia. This study aims to address two main legal issues: first, what are the legal implications of using blockchain in business transactions? Second, how does the ethical aspect play a role in the use of blockchain in business transactions? By addressing these issues, this research is expected to contribute to the development of legal and ethical frameworks that support the safe, transparent, and sustainable implementation of blockchain in Indonesia.

METHODOLOGY

The research method employed by the author is a normative legal research method, focusing on positive law in the form of legislation. This study reviews and analyzes statutes and other legal provisions. The data sources used include primary legal materials, such as Law No. 27 of 2022 on Personal Data Protection and Law No. 1 of 2024 on the Second Amendment to Law No. 11 of 2008 on Electronic Information and Transactions (ITE). Additionally, the research incorporates secondary legal materials obtained from various books, journals, and articles relevant to the research topic. The data collection method applied is library research, involving the reading, review, study, and comprehension of the collected sources, such as laws, books, journals, and both legal and non-legal articles related to the research topic. The data analysis is conducted qualitatively by connecting and comparing the available sources with the author's perspectives, which are then presented narratively through descriptive language.

RESULTS AND DISCUSSION

Legal Implications of Blockchain Use in Business Transactions on Personal Data Protection

Blockchain technology has brought significant innovations across various industrial sectors due to its transparency, security, efficiency, and its ability to manage data in a decentralized manner (Sirait, 2024). As a decentralized technology, blockchain has led to a major transformation in many business sectors. This technology allows data to be recorded on a network spread across multiple nodes without the need for a central authority (Bernal Bernabe et al., 2019). However, the transparent, immutable, and permanent nature of blockchain also presents legal challenges, particularly concerning personal data protection.

Di Indonesia, perlindungan data pribadi diatur melalui Undang-Undang Nomor 27 Tahun 2022 The Personal Data Protection Act (UU PDP) serves as the primary

legal framework for regulating the rights of data subjects and the obligations of data controllers. In addition, Law No. 11 of 2008 on Information and Electronic Transactions (UU ITE) and its amendments provide the legal basis for the operation of reliable and secure electronic systems. In this context, blockchain presents potential conflicts with several key principles outlined in the UU PDP, such as the right to erasure, the right to be forgotten, and the principle of centralized and accountable data control.

One significant implication of using blockchain is the difficulty in ensuring the right to data erasure as regulated under Article 36 of the Personal Data Protection Act (UU PDP). In blockchain technology, the data recorded in blocks cannot be deleted or altered without affecting the entire chain. This could potentially conflict with the data subject's right to request the deletion of their personal information. A common case encountered is when personal data is recorded in a blockchain-based transaction, and that data remains permanently stored in the network, even if the data subject requests deletion. Moreover, public blockchains allow data within the network to be accessed by many parties without a clear authorization mechanism, which may violate Article 17 of the UU PDP. This article mandates data controllers to protect the confidentiality and integrity of personal data. In the context of a public blockchain, it becomes challenging to determine who is responsible for the security of the data, as no single entity controls the entire process. The Electronic Information and Transactions Law (UU ITE) also presents additional challenges. In Article 15, paragraph (1), electronic system operators are required to ensure the security and confidentiality of the electronic data they manage. The transparency of blockchain, which allows data to be visible to all network participants (nodes), could potentially violate this principle if personal data is exposed excessively.

Given these challenges, a more specific legal approach is required to accommodate the unique characteristics of blockchain. Future regulations should consider hybrid mechanisms, where blockchain can continue to be used efficiently without disregarding the rights of personal data protection. Furthermore, access control based on encryption, the implementation of private or permissioned blockchains, and the application of data anonymization systems could serve as solutions to bridge the gap between technological needs and compliance with data protection regulations. As technology continues to evolve, collaboration between the government, business actors, and technology experts will be crucial to ensure that blockchain implementation is carried out safely, innovatively, and in accordance with the applicable legal principles in Indonesia.

The Role of Ethical Aspects in Blockchain Use for Business Transactions

Blockchain has become a revolutionary technology that is transforming the way businesses operate. With its transparent, decentralized, and secure nature, blockchain offers great potential to enhance transaction efficiency and reduce the risk of fraud.(Arnadi Chairunnas et al., 2024). However, alongside these advantages, a number of ethical challenges have emerged that must be addressed to ensure this technology is implemented responsibly.

The role of ethical aspects becomes increasingly important in this context, considering that the implications of blockchain affect not only business efficiency

but also human values, justice, and privacy. One of the main ethical issues is the protection of individual privacy (Purba & Pramadjaya, 2024). Blockchain is often designed to record information permanently and make it accessible to network participants. In public blockchain systems, recorded data is open, meaning that anyone can view the transactions that occur (Hutagalung et al., 2024). This creates the potential for privacy violations, especially if someone's personal data is recorded on the network without clear consent or is used beyond its original purpose. Ethics in the use of blockchain demand data protection mechanisms that go beyond mere legal compliance and respect individuals' rights to the confidentiality of their personal information. For example, implementing encryption technologies, data anonymization, or private (permissioned) blockchains can be ethical solutions to mitigate these risks. Fair access to blockchain technology is also a significant ethical concern. Not all individuals or organizations have sufficient resources to adopt this technology. Small businesses, developing countries, or technology-disadvantaged communities may face barriers in utilizing blockchain. This inequality can exacerbate the global economic gap, where those with greater access to technology tend to dominate the market. Therefore, it is essential for business players and technology developers to design inclusive blockchain solutions, such as lowering technology adoption costs, providing training, or creating platforms that are more accessible to diverse groups. Honesty and integrity in blockchain use are equally important ethical aspects. Blockchain is designed to reduce fraud risks through transparency and immutable transaction records. However, this technology can still be misused for unlawful purposes, such as money laundering, terrorist financing, or investment fraud schemes. Ethical considerations demand that business actors ensure the use of blockchain is not solely aimed at increasing profits but also supports justice and prevents activities harmful to society. Steps such as implementing know-your-customer (KYC) and anti-money laundering (AML) principles on blockchain platforms can help mitigate these risks. Blockchain also has ethical implications for environmental sustainability. The consensus process in public blockchains, such as proof-of-work, requires significant computational power, often consuming large amounts of energy (Tarmizi, 2024). This energy consumption is not only costly but also has a significant environmental impact. Business actors utilizing blockchain technology must consider their environmental responsibility by transitioning to more efficient consensus mechanisms, such as proof-of-stake, or using renewable energy to support blockchain operations. To ensure blockchain is used ethically in business transactions, collaboration between various parties, including technology developers, regulators, business players, and society, is necessary. Developing a specific code of ethics for blockchain use can serve as a guide to addressing emerging ethical dilemmas. Additionally, effective oversight and open dialogue about the social impact of this technology must be continuously pursued to ensure blockchain contributes positively to society.

By integrating ethical, legal, and technological principles, blockchain holds great potential to create a more fair, transparent, and sustainable business ecosystem. The application of this technology must focus not only on efficiency

and profitability but also on broader social responsibilities to support sustainable and inclusive development

Dispute Resolution in Blockchain Transactions

Dispute resolution in transactions utilizing blockchain technology has become an increasingly important topic, given the growing adoption of this technology across various sectors. While blockchain offers greater transparency, security, and reliability compared to traditional systems, dispute resolution remains a challenge. This is primarily due to the decentralized nature of blockchain, where no central authority controls the network or the transactions that occur (Habibah, 2024). Every transaction conducted on a blockchain, as recorded in smart contracts, is immutable and cannot be altered or reversed once recorded. Consequently, if disputes arise regarding the rights or obligations of the parties involved, resolution through traditional mechanisms, such as courts, becomes more complex and often inefficient.

Dispute resolution in blockchain transactions can involve several approaches that adopt the principles of decentralized technology itself. One increasingly implemented method is blockchain-based arbitration systems. In this system, a neutral third party acts as a mediator or arbitrator, but the dispute resolution process is conducted electronically with the support of technology. This allows the parties involved to resolve disputes without being tied to the lengthy procedures of traditional courts. Blockchain-based arbitration can expedite dispute resolution due to its automated and efficient nature. Additionally, decisions resulting from such arbitration can be directly enforced on the blockchain network, reducing the time required to implement the decision. However, while this technology enables faster and more cost-effective resolutions, courts still play an essential role in enforcing arbitration outcomes within the formal legal framework. Aside from arbitration systems, it is crucial to ensure that smart contracts used in blockchain transactions include clear provisions for dispute resolution. Given the immutable and irreversible nature of blockchain transactions once recorded, all parties must explicitly agree on the procedures to be followed in the event of a contract breach or discrepancies in fulfilling the obligations stated in the contract. Smart contracts should incorporate dispute resolution mechanisms, such as mediation steps or arbitration procedures accessible to the parties without resorting to prolonged formal legal processes. In this context, parties can decide whether they want to use local or international dispute resolution mechanisms, depending on the jurisdiction they choose and the nature of the transaction. Dispute resolution in blockchain transactions also relies on the existence of a clear legal framework that governs the rights and obligations of the parties. In many countries, including Indonesia, electronic transaction laws, such as the Information and Electronic Transactions Law (ITE), need to be updated to include more detailed regulations on how blockchain transactions and smart contracts can be governed and how disputes arising from them can be resolved. Without clear legal regulations, it will be difficult for parties to enforce their rights in blockchain-based transactions, increasing the potential for disputes.

Dispute resolution in blockchain transactions requires a more innovative and efficient approach that aligns with the characteristics of this technology. The use of blockchain-based arbitration systems and the creation of more detailed and clear smart contracts regarding dispute resolution will greatly help reduce the potential for conflicts that may arise (Megawati et al., 2023). On the other hand, the existence of a clearer and more comprehensive legal framework will ensure that blockchain transactions not only run smoothly but also remain fair for all parties involved. Technology and regulation must work together to create an effective and reliable dispute resolution system in the blockchain world

CONCLUSION AND RECOMMENDATION

Although blockchain technology offers significant innovation across various industry sectors, legal challenges related to personal data protection remain a major issue, especially in Indonesia. The transparent, immutable, and permanent nature of blockchain has the potential to conflict with principles outlined in the Personal Data Protection Law (UU PDP) and the Electronic Information and Transactions Law (UU ITE), such as the right to data erasure and the protection of personal data confidentiality. Therefore, a more specific legal approach is needed to align blockchain use with personal data protection regulations, such as access control based on encryption, the use of private blockchains, and the implementation of data anonymization. Collaboration between the government, business stakeholders, and technology experts is essential to ensure the secure, innovative, and compliant application of blockchain in Indonesia.

From an ethical standpoint, blockchain raises concerns regarding privacy, unequal access to technology, and the potential for misuse in illegal activities. Additionally, blockchain systems that utilize proof-of-work as a consensus mechanism also have environmental impacts due to high energy consumption. Approaches such as proof-of-stake, data anonymization, and the development of more user-friendly blockchains can serve as solutions to address these challenges.

Dispute resolution in blockchain transactions requires a specific approach due to the immutable nature of data once recorded. Blockchain-based arbitration systems and the formulation of smart contracts with clearer provisions can help reduce the potential for conflicts. Additionally, more targeted and in-depth regulations need to be developed to ensure that blockchain transactions align with principles of fairness and efficiency.

ADVANCED RESEARCH

In writing this article the researcher realizes that there are still many shortcomings in terms of language, writing, and form of presentation considering the limited knowledge and abilities of the researchers themselves. Therefore, for the perfection of the article, the researcher expects constructive criticism and suggestions from various parties

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