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Digital Transformation of Notary Deed Minutes Towards Electronic Format with the Utilization of Blockchain Technology for Efficiency and Security of Data Storage

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ABSTRACT

The increasing urgency for secure and efficient legal document management has driven the notary sector to undergo digital transformation, particularly in converting physical notarial deed minutes into electronic formats. This study addresses the critical problem of physical document vulnerabilities, including storage limitations, data manipulation, and high operational costs. The objective of this research is to analyze the potential of blockchain technology in enhancing the efficiency, security, and legal reliability of electronic notarial deed storage. Using a normative legal research method, this study applies statutory and analytical approaches to examine Indonesia's legal framework, including the Notary Law, the Electronic Information and Transactions Law, and the Personal Data Protection Law. The results reveal that while current regulations partially support digitalization, there are legal gaps that hinder blockchain adoption for official notarial use. Nonetheless, blockchain offers substantial benefits, such as decentralized and tamper-proof data storage, transparency through audit trails, and cost-effective document management. The study concludes that regulatory updates and comprehensive technical training for notaries are essential for successful implementation. Integrating blockchain into the notarial system can significantly enhance legal service modernization and public trust. This transformation supports Indonesia's broader efforts toward a transparent and globally adaptive digital legal infrastructure.

INTRODUCTION

The development of digital technology in recent decades has brought about major changes in various sectors of life, including the legal field (Flyverbom et al., 2019). Digitalization has driven the modernization of the legal administration system through the application of information technology that allows the legal process to be faster, more transparent, and more efficient. (Agung, 2018) Various innovations such as e-court, e-litigation, electronic signatures, and smart contracts have begun to be adopted in legal practices in various countries. This transformation is not only limited to using electronic documents as a substitute for physical documents, but also includes fundamental changes in data governance, legal evidence, and dispute resolution mechanisms that are more adaptive to the times. (Putra, 2022) Digitalization in the legal field is inevitable in responding to the demands of modern society that require access to easier, faster, and more reliable legal services. (Purnomo, 2020)

In the context of notaries, digitalization has become an important concern along with the increasing need for safer and more efficient document management. The notary profession, which has so far been synonymous with large amounts of physical files, faces the challenge of

adapting to digital technology to improve services to the public. (Dewi, 2019) One form of adaptation is the transformation of notarial deed minutes from physical form to electronic form. In addition to making it easier to record and search for data, this change also opens up opportunities for integration with blockchain technology to strengthen the security and authenticity of documents. (Gunawan, 2021) Thus, the legal world, especially the notary sector, can no longer be separated from the digitalization that demands the application of technological innovation in every aspect of its operations.

Notarial deed minutes stored in physical form offer a serious challenge to storage space requirements. As the number of deeds made each year increases, the need for adequate archive space increases exponentially. It is not uncommon for notary offices to have to provide a special room with a large capacity just to store deed minutes that must be maintained for decades. (Hartono, 2021) This condition not only requires a large investment in the procurement and maintenance of archive space but also hinders operational efficiency because searching for certain documents can be very time-consuming and troublesome. In the long term, this burden of physical storage space can be a major obstacle for notaries in carrying out their administrative duties effectively.

In addition, storing the minutes of the deed in physical form is very vulnerable to various risks of loss, damage, or manipulation. Factors such as fire, flood, pest attack, or simply human negligence can damage these important documents. On the other hand, the threat of data manipulation is also a concern, where physical documents are easier to falsify or change without a clear trace, especially if the document security system is not tight. (Rahman, 2020) This condition certainly raises serious legal issues, considering that the minutes of the deed are authentic evidence that has high legal force. Loss or damage to the minutes of the deed not only harms the parties concerned but also tarnishes the credibility and integrity of the notary as a public official.

No less important, managing the physical minutes of the deed archives also requires very high costs in the long term. These expenses include the costs of providing space, maintaining archives, physical security, and labor to manage and organize documents. In addition, in many cases, notaries must follow certain standards regarding document archiving, such as room temperature settings and multi-layered security systems, all of which require ongoing financial investment. Amidst demands for operational efficiency and developments in information technology, this conventional management model is becoming increasingly irrelevant and inefficient.

In this modern era, demands for efficiency, speed, and security in various aspects of public and private services are increasing, including in the notary sector. The public now expects faster access to legal documents, more efficient management, and better data security guarantees. Conventional processes that take a long time to search for and process physical documents are considered no longer by the needs of the instant era. In addition, the risk of losing or damaging physical documents is a concern. In this context, digitizing deed minutes is a necessity so that the notary profession remains relevant and can provide excellent service. Digital transformation is not just about following trends in technology, but rather an urgent need to ensure operational efficiency, improve service quality, and protect valuable legal data.

The drive to carry out digital transformation in the notary sector not only comes from practical needs but is also reinforced by various government regulations and policies that

support the digitalization of legal administration. Various laws and regulations in Indonesia, such as the Electronic Information and Transactions Law (UU ITE) and regulations related to electronic signatures, have paved the way for legal recognition of electronic documents. The government is also encouraging the acceleration of digitalization in the public service sector through various programs such as SPBE (Electronic-Based Government System). Within this framework, notaries are expected to be able to adapt to digital technology without reducing the principles of caution and legal responsibility inherent in their positions. The implementation of digital transformation in the notary sector is an integral part of national efforts to build a more modern, transparent, and trusted legal ecosystem. (Setiawan, 2019)

One technology that has great potential in supporting digitalization in the notary sector is blockchain. Blockchain is a decentralized data storage system that allows for transparent and permanent recording of information. Any changes made in the blockchain system are automatically recorded in a blockchain that cannot be changed or deleted without the consent of the entire network. This characteristic provides a very high level of data security, reduces the risk of document manipulation or forgery, and ensures data authenticity at all times. In addition, decentralization in blockchain eliminates dependence on a single data storage party, thereby minimizing the potential for data loss due to centralized system failures. (Sujatmiko, 2019) These features make blockchain an ideal solution for the storage and management needs of electronic deed minutes.

The blockchain in other sectors has proven its effectiveness in increasing data security and transparency. For example, in the digital land certificate project, blockchain is used to permanently record land ownership rights, reduce land mafia practices, and speed up the land administration process. Another example is the implementation of blockchain in the e-voting system, which allows the general election process to run transparently and is almost impossible to manipulate. The success of this technology in various fields is clear evidence of the potential of blockchain in increasing the reliability of legal data storage systems, including in the digitization of notary deed minutes. (Sutanto, 2021) By adopting this technology, the notary world not only follows technological developments but also strengthens the foundation of law based on trust and integrity in the digital era.

The implementation of blockchain technology in the management of electronic notary deed minutes is a very relevant solution to overcoming various conventional archival problems. With its decentralized nature, blockchain ensures that every stored deed minute has data integrity that cannot be changed or manipulated so that the authenticity of the document is maintained at all times. Blockchain-based storage also speeds up the process of recording, verifying, and searching for documents, eliminating the need for large physical archive space, while reducing long-term maintenance costs. In addition, transparency in blockchain allows for a clear audit trail of every activity related to documents, increasing accountability and public trust in notary institutions. With these advantages, blockchain integration not only increases efficiency and security but also brings notary practices into a more modern legal ecosystem that is responsive to the challenges of global digitalization. (Wibowo, 2021)

Despite having many advantages, the adoption of blockchain technology in the legal system, especially in storing notarial deed minutes, also presents its challenges. One of the main challenges is regulatory readiness, where the current legal framework may not fully accommodate the use of blockchain as a legitimate medium for storing legal documents. In

addition, adequate understanding and technical readiness are required from notaries to operate blockchain-based systems correctly and safely. On the other hand, the adoption of this technology opens up great opportunities to build a more adaptive, trusted, and efficient legal system, encouraging the birth of innovation in notarial practice. With the support of appropriate policies, ongoing education, and cross-sector collaboration, the implementation of blockchain in electronic deed minutes can be an important milestone in the transformation of national law towards a more advanced digital era.

Previous research has addressed the digital transformation of the legal sector, including the adoption of e-court systems, electronic signatures, and smart contracts (Putra, 2022; Gunawan, 2021). While these studies have highlighted the potential of digital tools, few have specifically focused on the integration of blockchain technology for storing notarial deed minutes in Indonesia. This presents a research gap in understanding how blockchain can be leveraged not only to digitize documents but also to reinforce their authenticity, permanence, and legal integrity.

This study offers a novel perspective by proposing a blockchain-based framework for managing electronic notarial deeds. Unlike conventional digital storage, blockchain ensures immutability, decentralized verification, and transparent audit trails. The novelty of this research lies in analyzing the legal, technical, and regulatory implications of implementing blockchain within the Indonesian notarial context—an area still underdeveloped in the literature.

The objective of this study is to examine the potential and challenges of blockchain implementation in the digitization of notarial deed minutes, focusing on legal compliance, data security, and operational efficiency. The research further aims to assess how this transformation can align with Indonesia's legal frameworks and public policy directions. The benefit of this research is to provide recommendations that support a secure and efficient notary ecosystem, while contributing to the broader discourse on legal modernization in developing countries.

METHOD

This study uses a normative legal method, namely focused legal research on applicable legal norms. The approaches used include a statutory approach and an analytical approach. The statutory approach is carried out by examining various regulations related to notaries, digitalization of legal documents, and the use of blockchain technology in the legal system, such as the Notary Law, the Electronic Information and Transactions Law (UU ITE), and other related regulations. Meanwhile, the analytical approach is used to study and analyze legal concepts related to data protection, the validity of electronic documents, and how blockchain technology can be integrated into the notarial legal system, considering applicable legal principles. The data sources used in this study consist of secondary data that includes primary legal materials, such as laws and regulations, as well as secondary legal materials, such as literature, scientific journals, previous research results, and related articles. The data collection technique is carried out through library research, namely by collecting and reviewing various legal materials and relevant documents that support the analysis. The data analysis technique is carried out qualitatively, by interpreting and reviewing the contents of relevant legal norms, then drawing logical conclusions based on systematic legal arguments. Through this method,

it is hoped that the research can provide a deep understanding of the urgency and mechanism of blockchain implementation in the digitization of notarial deed minutes.

RESULT AND DISCUSSION

Legal Regulations Regarding the Digitalization of Notarial Deed Minutes and the Utilization of Blockchain Technology in the Notary System in Indonesia

The development of information technology has changed many aspects of life, including in the notary field. To support digitalization in this field, Indonesia has issued various regulations that provide a legal basis for the management of legal documents electronically, including notarial minutes. One of the main legal bases governing notaries is the Law of the Republic of Indonesia Number 2 of 2014 concerning the Position of Notary. The law not only regulates the functions and duties of notaries but also technological developments that can be adopted in the notarial process. Although this law does not explicitly discuss the digitalization of notarial minutes, the existence of regulations related to electronic signatures and electronic documents provides space for the integration of technology in the world of notaries.

One of the regulations that is very relevant to support digitalization in notary is Law of the Republic of Indonesia Number 11 of 2008 concerning Information and Electronic Transactions which was later amended by Law Number 19 of 2016 (UU ITE). The ITE Law is the main legal umbrella that provides the basis for the recognition of electronic transactions and electronic signatures in Indonesia. Article 5 of the ITE Law states that "Electronic information and/or electronic documents that constitute legal evidence". This provides a clear legal basis for the recognition of electronic documents, including minutes of deeds made electronically by a notary. Article 11 of the ITE Law also explains that an electronic signature made using an electronic system whose validity has been verified has the same legal force as a signature on a physical document.

Furthermore, Article 13 of the ITE Law emphasizes that "A valid electronic signature can be used to sign electronic documents that have the same legal force as a signature on a physical document". This provision provides a strong legal basis for using electronic signatures on documents made by a notary, including minutes of deeds. With the recognition of electronic signatures, the digitization of notarial deeds is increasingly possible because electronic signatures can be used to guarantee the authenticity and validity of documents without having to use physical documents.

In addition, Government Regulation of the Republic of Indonesia Number 82 of 2012 concerning the Implementation of Electronic Systems and Transactions also provides further guidelines regarding the implementation of electronic systems that can be applied in the creation and storage of electronic documents in Indonesia. This PP regulates technical provisions related to the implementation of electronic systems that are safe and meet legal requirements, as well as the recognition of electronic systems in transactions, including in terms of storing and archiving documents generated by electronic systems. Article 59 of this regulation emphasizes that the implementation of electronic systems must meet established standards and be legally accountable.

In addition, it is important to highlight the latest developments in Law Number 27 of 2022 concerning Personal Data Protection (UU PDP), which provides regulations regarding the protection of personal data, including data contained in electronic documents. This law

further strengthens the protection of data contained in electronic notary deed minutes, by requiring parties who organize and manage personal data to follow data protection principles, such as consent, security, and supervision.

The storage of electronic documents in notarial practice in Indonesia is regulated by several regulations that aim to ensure the security, reliability, and legal recognition of documents stored digitally. One important regulation governing the storage of electronic documents is Government Regulation of the Republic of Indonesia Number 82 of 2012 concerning the Implementation of Electronic Systems and Transactions. This regulation regulates in detail how electronic systems must be organized, including aspects of secure electronic data storage that meet the standards set by the government. Article 59 of this PP emphasizes that the implementation of electronic systems must pay attention to the integrity, security, and accessibility of data. This provision is important in the context of notarial law, where documents such as minutes of deeds must be stored in a manner that guarantees their authenticity and security.

In addition, Article 31 of PP 82/2012 explains that "Electronic system organizers must maintain and protect the electronic data they store so that it is not damaged, lost, or misused". This provision regulates the obligations of parties managing electronic document storage systems, including notaries or institutions that provide electronic minute storage services, to ensure that stored documents remain safe from digital threats such as data destruction or manipulation. This regulation also includes regulations related to data security through the use of security systems that meet national and international standards.

Another relevant regulation is the Regulation of the Head of the National Archives of the Republic of Indonesia (ANRI) Number 5 of 2019 concerning Electronic Archives Management. This regulation regulates the procedures and mechanisms for managing electronic archives, which must be implemented by institutions that organize archives, including notaries. Article 2 of this regulation stipulates that "Electronic archives must be managed by the principles of archives, which include management and storage in a legal, authentic, and accountable form." In the context of notaries, this means that the storage of minutes of deeds in electronic form must be carried out with procedures that guarantee the authenticity and integrity of the documents and can be legally accounted for.

The Decree of the Minister of Law and Human Rights of the Republic of Indonesia Number M. HH-01.AH.11.02 of 2016 concerning the Electronic Archives Management System for Notaries also provides further guidelines for the management of electronic archives in the notary sector. Article 5 of this Ministerial Decree states that "Notaries are required to use an integrated and secure electronic archive management system, which can be easily accessed by authorized parties." This stipulates that notaries, in carrying out their duties, must use an adequate system for storing digital archives, and ensure that the system is secure and meets applicable data management requirements.

Besides, to ensure its security, the electronic document storage system is also required to comply with strict data security procedures. The security not only includes the management of the electronic system itself but also the protection of personal data contained in the document, following Law Number 27 of 2022 concerning Personal Data Protection. Article 26 of the PDP Law states that "Electronic system organizers are required to ensure that the personal data they store is secure and cannot be accessed by unauthorized parties." Thus, minutes of deeds storage

containing personal data of related parties must be carried out with adequate security measures, such as encryption and strict access control.

The authenticity and authentication of electronic documents are important aspects of the Indonesian legal system, especially about notarial practices. In this case, electronic signatures and electronic certificates are the main instruments to guarantee the authenticity and authentication of electronic documents, including notarial deed minutes that are stored digitally. The regulation on electronic signatures is regulated in detail in Law of the Republic of Indonesia Number 11 of 2008 concerning Electronic Information and Transactions (UU ITE) which was later amended by Law Number 19 of 2016. Article 11 of the ITE Law states that "A valid electronic signature has the same legal force as a signature on a physical document". This confirms that documents signed electronically using a valid signature have the same legal force as documents signed manually.

To ensure the validity of an electronic signature, Article 12 of the ITE Law adds that "An electronic signature must be accompanied by an electronic certificate issued by an Electronic Certificate Provider that has been registered and recognized by the state." This electronic certificate functions as a tool to verify the identity of the party providing the electronic signature, as well as guarantee the integrity of the signed document. This electronic certificate is provided by an Electronic Certification Service Provider (PLSE) that has been registered and recognized by the Indonesian Government. In the context of notaries, the use of electronic certificates is crucial to ensure that every electronic signature on the minutes of a notary deed is valid and legally accountable.

Apart from regulations regarding electronic signatures, regulations regarding electronic document security are also regulated in various other regulations. Government Regulation of the Republic of Indonesia Number 82 of 2012 concerning the Implementation of Electronic Systems and Transactions stipulates that electronic system organizers are required to guarantee the security of data stored and processed in electronic systems. Article 59 of this PP states that "Electronic system organizers are required to ensure the integrity, confidentiality, and security of electronic data and protect electronic data from interference or manipulation." This security includes technical measures such as encryption, user authentication, and strict access control to protect electronic documents from potential damage, loss, or misuse.

Besides, in managing personal data contained in electronic documents, Indonesia has also issued Law Number 27 of 2022 concerning Personal Data Protection (UU PDP). This law provides a strong legal basis for protecting personal data contained in electronic documents, including notarial deed minutes containing personal data of related parties. Article 26 of the PDP Law stipulates that “Electronic system organizers are required to ensure that the personal data they store is secure and cannot be accessed by unauthorized parties.” This provision is particularly important in notaries, where notarial deed minutes often contain sensitive personal information. Therefore, every electronic document storage system, including in notarial practice, must meet high-security standards to protect such personal data.

In addition to Article 26, Article 27 of the PDP Law also states that “Electronic system organizers must ensure that any personal data stored can be accessed, updated, and deleted by applicable legal provisions.” It means that data contained in digital notarial deed minutes must be managed carefully, including the rights of individuals to access and correct their personal

data, as well as the obligation to delete such data upon request or after a certain period of time in accordance with applicable regulations.

To further ensure the security and authenticity of documents, the PDP Law also requires notification to data owners in the event of a personal data breach. Article 38 of the PDP Law states that "In the event of a personal data leak, the electronic system organizer is required to immediately notify the data owner and the authorities within 72 hours after learning of the incident." It is significant to ensure that the data in electronic documents, such as minutes of deeds, is protected from potential leaks or misuse that could harm the parties involved.

Blockchain technology offers various opportunities to increase efficiency, security, and transparency in the storage and verification of notarial minutes. The main advantage of blockchain lies in its decentralized nature and transparency which allows every transaction, including the creation and change of notarial deeds, to be recorded in a ledger that cannot be manipulated (Wulandari, 2020). It can reduce the risk of data forgery or manipulation, which is a major problem in managing physical or electronic documents in the notary field. However, although blockchain has great potential, its implementation in the Indonesian legal system is still constrained by limitations in existing regulations (Yulianto, 2020). Currently, Indonesian law does not fully recognize blockchain technology as a legitimate means of storing and verifying legal documents, including notarial deed minutes. Therefore, regulations governing the use of blockchain in the notarial context need to be clarified and adjusted to accommodate these technological changes.

To enable the adoption of blockchain in the Indonesian legal system, changes to several laws and regulations may be needed. For example, Law Number 2 of 2014 concerning the Position of Notary which regulates the procedures for making and storing notarial deeds, does not yet cover the use of blockchain technology for storing or verifying deeds. In addition, the Electronic Information and Transactions Law (UU ITE) which provides the legal basis for electronic documents and electronic signatures needs to be considered in the context of blockchain, because the basic principles in blockchain, such as decentralization and consensus require adjustments in the existing legal framework. For this reason, collaboration between the government, regulators, and stakeholders in the notary sector is needed to formulate clear regulations regarding the use of blockchain, considering the reliability, security, and validity of documents produced by this technology. A progressive and adaptive regulatory approach will pave the way for the integration of blockchain technology into the Indonesian legal system, ensuring that the notary system remains relevant and secure in the digital era.

Challenges Faced in the Implementation of Blockchain Technology for Electronic Storage of Notarial Deed Minutes

The application of blockchain technology in the electronic notarial deed minutes storage system offers revolutionary potential to increase efficiency, security, and transparency in notarial practice. However, although this technology promises various advantages, several challenges need to be overcome so that its adoption can be realized successfully in Indonesia. These challenges involve various aspects, ranging from existing regulatory constraints, and issues related to data security and privacy, to the technical complexity encountered by notaries and related parties. Apart from that, blockchain adoption also requires a paradigm shift in the existing legal and administrative system, which often relies on traditional methods.

The application of blockchain technology in electronic notarial deed minutes storage brings various potentials but also presents several challenges that must be faced, especially related to existing regulations, data security issues, and other technical aspects. One of the main challenges is the limitations of existing legal regulations. Until now, the laws and regulations in Indonesia have not fully covered or accommodated blockchain technology in the context of storing and verifying legal documents, including notarial deeds. For example, Law Number 2 of 2014 concerning the Position of Notary which regulates the procedures for making, storing, and ratifying notarial deeds still focuses on physical documents. This means that the application of blockchain technology as an alternative for storing notarial deeds has not yet received clear legal legitimacy. For this reason, adjustments and updates are needed in existing regulations so that blockchain technology can be legally recognized as a tool that can be used to manage legal documents. This process certainly requires cooperation between regulators, legal practitioners, and relevant stakeholders to create a legal basis that supports the application of this new technology (Bey, 2024).

The next challenge is related to data security and privacy. In the context of a notary, personal data contained in the minutes of notarial deeds, such as the identities of the parties involved in the agreement, has a high level of confidentiality. The use of blockchain in storing deed documents can present challenges related to the management of personal data contained in the system. Although blockchain offers high-security thanks to encryption and a decentralized system, there are concerns about the possibility of data leakage if this technology is not implemented carefully. The Personal Data Protection Law (UU PDP) enacted in 2022 protects personal data, including data contained in digital notarial documents. In this case, blockchain must operate within a legal framework that ensures that the right to access personal data is maintained, and no party can misuse the stored information (Burhanuddin, 2020).

The complexity of blockchain technology is also a significant challenge in adopting this technology for storing notarial minutes. Blockchain is a fairly complex technology and requires in-depth understanding to be implemented properly. Notaries, who have been working with physical documents and traditional administrative systems, may have difficulty understanding and operating blockchain-based systems. In addition, the implementation of blockchain technology requires strong infrastructure and adequate technical support, which are currently not fully available in Indonesia, especially in areas with less access to technology (Febyanti, 2023). Therefore, it is important for the government and related agencies to provide sufficient training for notaries and other related parties, so that they can manage blockchain-based systems properly. In addition, the development of adequate infrastructure, such as servers and hardware capable of supporting blockchain storage effectively, needs to be a priority in the adoption process of this technology.

The issue of interoperability with existing systems is also a major challenge in implementing blockchain. In Indonesia, most notary document storage and management systems are still based on traditional systems, such as physical archives or digital storage systems are not integrated with blockchain technology (Kamran, 2024). Therefore, efforts need to be made to integrate blockchain with existing storage systems, so that the transition process can run smoothly and not disrupt existing operations. Another challenge is the difference in data formats used by traditional and blockchain systems, which can trigger compatibility issues. The regulation and development of technical standards that facilitate integration

between these two systems must be considered immediately to ensure the blockchain can function synergistically along with the systems without technical barriers.

In addition to regulatory and technical challenges, there are social and cultural challenges that must be faced. Indonesian society, especially those directly involved in notarial practices, may have a level of distrust of new technologies such as blockchain, especially when it comes to legal documents that have high value. Public trust in the validity and integrity of documents stored electronically may still be low, given the habits and perceptions that tend to lean towards the manual system that has existed so far. (Kencana, 2023) Therefore, changes in public perception and belief in blockchain-based systems need to be carried out through socialization, education, and real evidence of the reliability of this technology. This is important so that the public can accept and understand that blockchain can be a safer and more transparent solution for managing notarial documents.

The issue of scalability and implementation costs are also major challenges in blockchain adoption. Storing notarial deeds involves a very large and growing volume of data. (Mirzajanovna, 2024) Therefore, blockchain technology must be able to accommodate the need for large amounts of data storage efficiently and affordably. Blockchain implementation requires significant costs, both for infrastructure development, system maintenance, and training of the human resources involved. These costs can be a major obstacle, especially for notary agencies that have limited budgets. Although blockchain promises efficiency in the long term, these cost and scalability challenges must still be carefully considered to ensure that the implementation of this technology can run sustainably without adding a heavy financial burden to the notary system.

Urgency of Blockchain Technology Implementation in the Digitalization of Notarial Deed Minutes to Increase Data Storage Efficiency and Security

Blockchain technology can provide significant improvements in terms of the security and reliability of storing notarial minutes. In traditional systems, data stored in physical or even digital form is often vulnerable to the risk of forgery, loss, or manipulation. Blockchain, with its decentralization and strong encryption characteristics, overcomes these problems more efficiently. Every transaction or data change in the blockchain is recorded in a sequentially connected and encrypted block, creating an immutable trail. This makes data in the blockchain very difficult to manipulate or change without detection. Thus, blockchain offers a higher level of reliability to maintain the authenticity and integrity of notarial minutes compared to conventional storage systems.

Another advantage of blockchain is the consensus mechanism implemented to ensure that every data entered into the network has been verified and approved by several distributed parties, which reduces the risk of error or fraud. In the context of notarial minutes, this means that every change or update made to the document can be tracked very clearly and transparently, and verified by authorized parties, such as notaries or authorized institutions. This encryption and consensus technology provides an additional layer of protection against data manipulation and loss, which is a major challenge in traditional storage systems. With blockchain, data security and reliability can be ensured, creating a more secure and reliable storage system.

The application of blockchain in the storage of notarial deed minutes can significantly speed up the process of archiving and searching for documents. In traditional systems,

archiving and searching for notarial deeds requires a lot of time and effort, because the process is often done manually or using a centralized database, which can hinder accessibility and efficiency. With blockchain, the entire document storage process can be done digitally in a decentralized network, allowing for faster and more efficient access. Notaries or authorized parties can access data directly without having to go through bureaucracy or time-consuming storage systems. This certainly reduces the time required for searching and archiving, thereby increasing operational efficiency in the notary system.

In addition, the application of blockchain can also reduce operational costs associated with physical storage and archive management in traditional systems. Managing physical documents requires large storage space, physical protection to avoid damage, and additional costs for long-term archive management and maintenance. In a blockchain-based system, these documents can be stored digitally, which not only reduces the need for physical storage space but also reduces the maintenance and security costs required. Blockchain allows data to be stored in a decentralized manner with a high level of security, making archive management cheaper and more efficient. Thus, blockchain not only offers a faster but more cost-effective solution for managing notarial deed minutes.

Blockchain offers a much-needed transparency solution in constructing, storing, and managing notarial deeds. In traditional systems, transparency is often limited, and changes or revisions to documents can be difficult to track, opening up opportunities for manipulation or error. Blockchain, with its open and decentralized nature, allows any changes made to the deed minutes to be recorded in an immutable and publicly traceable form, providing full visibility into the entire process. Every transaction that occurs within the blockchain network will be recorded in a ledger that can be accessed by authorized parties, ensuring that every step in document management can be checked directly. This makes blockchain a useful tool for increasing transparency in the notary system.

In addition, blockchain's ability to provide a clear and detailed audit trail is an important feature that increases accountability in the notary system. Any changes or updates to the minutes of the notary deed are permanently recorded in the network, and every party involved in the process can be seen in the transaction history. This audit trail provides legal certainty and security for interested parties, such as notaries, clients, and other third parties. It increased transparency of public trust in the notary system, because every document and change made can be accounted for clearly and transparently. Thus, blockchain not only offers technical efficiency but also supports the principle of accountability which is very important in global law and administration.

Blockchain plays an important role in supporting the modernization of the legal system and state administration in the digital era. This technology enables the management of legal documents and administrative data more efficiently, transparently, and securely. In the notary system, the use of blockchain can replace traditional paper-based storage methods with faster and more affordable digital solutions. The creating, verifying, and storing notary documents can be conducted in a safer environment, with almost zero possibility of data manipulation or loss. In a broader context, blockchain can also be the foundation for the digitization of various other legal systems, such as land ownership certificates, permits, and legal contracts, which are increasingly being adopted by developed countries. Thus, this technology supports countries

like Indonesia to catch up in administrative and legal aspects, making them better prepared to face global challenges in the digital era.

In addition, blockchain also has the potential to help Indonesia adapt to the rapid development of global technology in legal data management. By utilizing this technology, Indonesia can ensure that the management of state legal data is at international standards, as well as improve operational efficiency and transparency in various legal and administrative sectors. Blockchain can strengthen the national legal system by increasing public trust in the data management system and reducing the potential for data misuse or manipulation. This progress supports the integration of the Indonesian legal system with the international legal system that increasingly prioritizes digital technology in data management, allowing the exchange of legal information between countries to be easier and more secure.

The implementation of blockchain is urgently needed to meet the demands of regulations related to the storage of electronic documents and the protection of personal data, especially in the context of notaries. Along with the development of international regulations regarding the protection of personal data, such as the General Data Protection Regulation (GDPR) in the European Union, Indonesia also needs to adopt technology that can support compliance with these regulations. Blockchain, with its transparent and decentralized nature, allows for the recording and storage of personal data more safely and securely, thus meeting the standards set by the Personal Data Protection Law in Indonesia. The use of blockchain will ensure that personal data contained in notarial deed minutes can be well protected, and allow for tighter oversight of how the data is managed and accessed by authorized parties.

In addition, blockchain allows Indonesia to more easily comply with international standards in the management and protection of legal data. This technology, with features such as encryption and accessible audit trails, provides a high level of protection for the legal data being managed. Compliance with international standards in the protection of legal data improves Indonesia's position in the global legal framework, strengthening the credibility of the Indonesian legal system in the eyes of the international community. With the adoption of blockchain, Indonesia can be an example for other countries in terms of integrating technology in the management of legal data, increasing openness and accountability in the country's legal system, and opening up opportunities for international partnerships in the fields of law and administration.

The key challenges in implementing blockchain in the notarial system are technical issues related to the understanding of technology by legal practitioners, as well as the readiness of the supporting infrastructure. Many notaries and other related parties may not be familiar with how blockchain technology works, which requires an in-depth understanding of encryption, consensus, and decentralized data management. In addition, not all regions in Indonesia have a digital infrastructure that is strong enough to support this technology. Other challenges include regulatory issues that have not fully accommodated the use of blockchain in the legal system, as well as uncertainty regarding the legal recognition of documents stored using this technology. Therefore, these challenges must be faced with planned and systematic steps, to ensure the adoption of blockchain technology runs effectively.

Solutions to these challenges include the development of better infrastructure, as well as training and education for legal practitioners, especially notaries, on how to use and the benefits of blockchain in the notary system. This training can be done through special education

programs or collaboration with higher education institutions to produce professionals who are skilled in blockchain technology. Apart from that, legal regulations and policies need to be adjusted to ensure the recognition of documents stored with blockchain and to address issues related to privacy and data protection. The government and related institutions need to update existing regulations to cover this new technology, as well as ensure that the blockchain system can operate harmoniously with the existing legal system.

CONCLUSION

The implementation of blockchain technology in the digitization of notarial deed minutes has great potential to improve efficiency, security, and transparency in the notarial system in Indonesia. With the decentralized and encrypted nature of blockchain, this technology can reduce the risk of forgery, manipulation, and data loss that often occurs in traditional storage systems. Blockchain also offers efficiency in the process of archiving and searching documents, as well as reducing operational costs related to physical storage and archive management. The application of this technology can support the modernization of the Indonesian legal and administrative system, as well as facilitate integration with international legal systems, which in turn increases public trust in the notarial system.

To achieve the success of blockchain implementation in the notarial system, it is important to draft regulations that support and clarify the legal recognition of digital documents stored with blockchain technology. In addition, training for legal practitioners, especially notaries, must be carried out so that they understand and can apply this technology effectively. The government and related institutions also need to strengthen digital infrastructure throughout Indonesia to support the widespread implementation of blockchain. With collaborative efforts between the government, private sector, and the legal community, blockchain technology can be an optimal solution to improve the quality and integrity of the notarial system in Indonesia. As a suggestion, future research should focus on pilot implementation studies of blockchain-based notarial systems in selected regions to evaluate practical challenges and assess stakeholder readiness before full-scale national adoption.

REFERENCES

Flyverbom, M., Deibert, R., & Matten, D. (2019). The governance of digital technology, big data, and the internet: New roles and responsibilities for business. *Business & Society*, *58*(1), 3–19.

Agung, R. &. (2018). *Big Data, Kecerdasan Buatan, Blockchain, dan Teknologi Finansial di Indonesia.* Jakarta: Direktorat Jenderal Aplikasi Informatika Kementerian Komunikasi Dan Informatika.

Bey, E. F. (2024). Regulatory reform of the storage of notary protocols as a national archive in Indonesia. *Journal of Law and Regulation Governance, 2*(5), 215-222.

Burhanuddin, B. S. (2020). Notary responsibility on electronically stored client data: Challenges and developments. *International Journal of Multicultural and Multireligious Understanding, 7*(8), 741-749.

Dewi, L. &. (2019). Pengesahan Dokumen Digital dalam Transaksi E-commerce. *Jurnal Hukum dan Teknologi, 6*(2), 87-98.

Febyanti, D. S. (2023). The legal consequences of heirs not submitting the notary protocol to the regional supervisory board. *Jurnal Ilmu Kenotariatan, 4*(2), 119-129.

Gunawan, A. (2021). Tantangan Digitalisasi Profesi Notaris di Indonesia. *Jurnal Hukum dan Teknologi, 7*(3), 56-67.

Hartono, W. &. (2021). Peran Notaris dalam Melindungi Transaksi Digital. *Jurnal Hukum dan Bisnis Digital, 8*(1), 23-35.

Kamran, M. R. (2024). Notary's responsibility in the exercise of authority as an authentic deed official. *Journal of Law and Sustainable Development, 12*(4), 3342.

Kencana, V. S. (2023). The urgency of electronic notary protocol storage in e-notary perspective. *International Journal of Social Science and Human Research, 6*(8), 4712-4720.

Mirzajanovna, K. M. (2024). The importance of notarial activity in protecting the rights of individuals and legal entities. *The American Journal of Political Science Law and Criminology, 6*(3), 51-56.

Purnomo, Y. (2020). Legalitas Dokumen Elektronik dalam E-commerce. *Jurnal Hukum dan Teknologi Informasi, 10*(4), 56-67.

Putra, A. &. (2022). Blockchain dan Smart Contracts dalam Transaksi Digital. *Jurnal Teknologi Hukum, 10*(4), 56-67.

Rahman, H. (2020). Kepatuhan Notaris terhadap UUITE dalam Transaksi Digital. *Jurnal Hukum Elektronik, 8*(2), 34-47.

Setiawan, D. (2019). Praktik Notaris di Era Digital: Tantangan dan Peluang. *Jurnal Hukum dan Praktik Kenotariatan, 11*(2), 23-35.

Sujatmiko, R. (2019). Tantangan Hukum Blockchain dalam Transaksi Digital. *Jurnal Hukum Ekonomi Digital, 5*(2), 23-36.

Sutanto, A. (2021). Transformasi Peran Notaris di Era Digital: Tantangan dan Peluang. *Jurnal Hukum Ekonomi Digital, 9*(4), 99-112.

Wibowo, S. (2021). Perkembangan Blockchain dan Implikasinya Terhadap Hukum Notaris di Indonesia. *Jurnal Hukum Siber, 9*(1), 78-92.

Wulandari, M. &. (2020). Penerapan Tanda Tangan Elektronik dan Blockchain dalam Profesi Notaris. *Jurnal Hukum dan Teknologi Informasi, 6*(2), 88-102.

Yulianto, F. (2020). Peran Notaris dalam Pengesahan Transaksi Digital. *Jurnal Notariat Digital, 5*(2), 44-59.