



RESEARCH ARTICLE

The Influence of the Implementation of Electronic Land Certificates on Legal Certainty in Banking Credit in Indonesia

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ABSTRACT

Indonesia's digital transformation includes the implementation of electronic land certificates to enhance the efficiency and security of land administration. However, there are still challenges related to legal certainty and acceptance by the banking sector, particularly in the context of using this certificate as collateral for loans. This research aims to analyze the impact of implementing electronic land certificates on legal certainty in the banking credit process and to evaluate the readiness of the banking sector to adopt this technology. The research method used is normative legal research with an approach based on legislation, conceptual, and comparative. Data were collected through a literature review that included legal regulations, policy documents, and related literature. Despite the legal recognition of electronic land certificates, banks still encounter difficulties in accepting them as collateral, mainly because of worries about digital security and potential risks in the execution of collateral rights. Comparative studies with other countries, such as Singapore and Australia, show that the successful implementation of electronic land certificates requires strong regulations, adequate technological infrastructure, as well as socialization and increased trust from banking institutions. The implications of this research indicate the need for further harmonization between legal regulations and technology, as well as policy support to ensure the effective and sustainable implementation of electronic land certificates in the banking credit sector.

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INTRODUCTION

In recent decades, digitalization has become one of the most significant global trends affecting various aspects of life, including the legal system and public administration. The development of information and communication technology has encouraged many countries to adopt digital technology to improve efficiency, transparency, and accountability in the delivery of public services. One of the prominent initiatives in this transformation is the digitization of the land administration system, which enables the electronic management of land certificates.

Electronic land certificates, or e-certificates, are legally recognized digital documents adopted to replace physical land certificates. The implementation of electronic certificates aims to reduce fraudulent practices, expedite the verification and registration process of land, and minimize the risk of document storage errors.¹ In various countries, such as Estonia, Singapore, and Australia, digital land administration systems have successfully improved the reliability and legal certainty of property transactions.

¹ Dr Hj Elza Syarief, "Analysis of the Implementation of Digitalization of Registration and Issuance of Land Certificates: Agrarian Law Perspectives in Indonesia," *International Journal of Sciences* 56, no. 1 (2021), <https://www.gssrr.org/index.php/JournalOfBasicAndApplied/article/view/12376>.

Agrarian reform in Indonesia is part of the government's efforts to create a more just, efficient, and transparent agrarian resource management system. From the beginning, agrarian reform aimed to address land distribution inequalities, reduce agrarian conflicts, and provide legal certainty to the community regarding land ownership.² As part of the agrarian reform and modernization of public services, Indonesia has begun implementing electronic land certificates as a response to this global demand. This is evidenced by the issuance of government policy on the implementation of electronic land certificates through the Regulation of the Minister of Agrarian Affairs and Spatial Planning/Head of the National Land Agency of the Republic of Indonesia Number 1 of 2021 concerning Electronic Certificates. With the implementation of electronic land certificates, the government aims to expedite the land registration process, reduce convoluted bureaucracy, and address various issues that have occurred in the conventional system, such as duplicate certificates or fake land certificates. In addition to enhancing legal certainty for landowners, this policy also aims to boost trust in property transactions, particularly when it comes to credit guarantees in the banking sector. With digitalization, it is expected that the entire land administration process will become more transparent, accountable, and nationally integrated, in line with Indonesia's efforts to create a more modern and responsive legal infrastructure to the challenges of globalization.

In banking practice, collateral in the form of legally valid and recognized land certificates is a fundamental requirement for banks to mitigate risks in credit provision. Land certificates not only serve as legitimate proof of property ownership but also become legally and economically valuable guarantees for the bank, especially in determining the eligibility and amount of credit to be granted to the debtor.³ If the debtor fails to meet payment obligations, the existence of land certificates guarantees the bank a strong legal right to take over and sell the collateral to cover the losses. Without a valid certificate, the risk to the bank increases, as issues such as ownership disputes, double certificates, or forgery can lead to uncertainty in the collateral execution process.⁴ Therefore, banking heavily relies on valid and secure land certificates as the primary basis for credit risk management, which in turn contributes to the overall stability of the financial system.

While the implementation of electronic land certificates promises numerous benefits, including enhanced efficiency and security in land administration, it also presents several issues that necessitate additional attention. One of the main issues faced is how the implementation of electronic land certificates affects legal certainty in the context of bank credit provision. Legal certainty regarding collateral is crucial in the banking credit system to mitigate default risk and guarantee the execution of collateral in case of default. However, questions arise regarding the readiness of the banking sector and the legal system to fully accommodate land certificates in digital format, particularly concerning the legal validity and reliability of the technology used. In addition, technical constraints such as the potential for cyber attacks, data vulnerabilities, and differing interpretations of regulations between agencies can also affect banking trust in this system.

This research aims to comprehensively examine the impact of the implementation of electronic land certificates on legal certainty in the provision of banking credit in Indonesia. Legal certainty plays a crucial role in influencing credit-granting decisions in the banking sector, particularly when land serves as collateral. With the presence of electronic land certificates, the Indonesian government hopes to increase efficiency and security in land data management, which in turn will strengthen banking confidence in the legality and validity of these certificates as credit guarantee instruments.

² F Sumarja, Ade Firmansyah, and Pradipta Wijonugroho, "Agrarian Reforms in Indonesia: A Pleasure," in *Proceedings of The International Conference on Environmental and Technology of Law, Business and Education on Post Covid 19, ICETLAWBE 2020, 26 September 2020, Bandar Lampung, Indonesia* (Proceedings of The International Conference on Environmental and Technology of Law, Business and Education on Post Covid 19, ICETLAWBE 2020, 26 September 2020, Bandar Lampung, Indonesia, Bandar Lampung, Indonesia: EAI, 2020), <https://doi.org/10.4108/eai.26-9-2020.2302580>.

³ Elmas Dwi Ainsiyah and Imman Yusuf Sitinjak, "The Authority of Land Deed Official in Binding Processes in the Bank in Indonesia," *Research, Society and Development* 9, no. 8 (August 6, 2020): e986986936, <https://doi.org/10.33448/rsd-v9i8.6936>.

⁴ Bima Setoaji, . Sulistyandari, and Siti Kunarti, "Validity of Land Rights Transfer Based on Debt with Collateral of Land Certificate under Indonesian Law," *Problems of Legality*, no. 160 (March 30, 2023): 284–303, <https://doi.org/10.21564/2414-990X.160.269672>.

This research also seeks to examine how the banking sector perceives the policy of digitizing land certificates and the impact this change has on credit-granting procedures. Specifically, this study will evaluate the legal protection that electronic land certificates can offer, comparing them to conventional land certificates, and pinpoint potential implementation challenges. Expect the results of this research to significantly contribute to the development of better regulations and practices in the use of electronic land certificates, particularly in the context of banking financing, thereby enhancing the stability of the national financial system.

RESEARCH METHOD

This study employs normative legal research methods, which include a statutory approach, a conceptual approach, and a comparative approach. Normative legal research was chosen because of its focus on the study of legislation and legal principles related to the implementation of electronic land certificates in the banking credit system. The statutory approach is used to examine the applicable legal provisions, such as Law Number 5 of 1960 on the Basic Agrarian Law, the Regulation of the Minister of Agrarian Affairs and Spatial Planning/Head of the National Land Agency of the Republic of Indonesia Number 1 of 2021 on Electronic Certificates, as well as banking sector regulations. The conceptual approach is used to understand legal concepts, such as legal certainty and the validity of collateral in the context of electronic land certificates. A comparative approach is applied to compare the implementation of electronic land certificates in other countries that have advanced further in the digitalization of land administration, such as Singapore and Australia.

The data used in this research consists of secondary data obtained through a literature study. The sources of secondary data include legislation, scientific journals, books, legal documents, and previous research results relevant to the study topic.⁵ Primary legal data, such as laws and government regulations related to land administration and banking regulations, will be systematically identified and analyzed. Additionally, legal documents related to the implementation of electronic land certificates and digitalization policies in the land sector will be the main focus of data collection.

Data analysis is conducted using qualitative methods, where the collected data is interpreted in depth based on applicable legal principles.⁶ This analysis process involves the evaluation of the harmonization of regulations related to the implementation of electronic land certificates in the banking system and its implications for legal certainty. The comparative approach is also used to analyze regulatory and practical differences in various countries to provide policy recommendations for strengthening the legal system in Indonesia. The obtained data is analyzed by considering the alignment between existing regulations and practical needs in the banking sector, particularly regarding the use of electronic land certificates as credit collateral.

DISCUSSION

The influence of electronic land certificates on legal certainty in banking credit in Indonesia

The digital transformation in Indonesia includes the implementation of electronic land certificates to enhance efficiency, transparency, and legal certainty in land administration.⁷ In the context of bank credit, legal certainty regarding collateral, especially land, becomes an essential factor influencing the credit-granting decisions by financial institutions. The government expects electronic land certificates to replace conventional land certificates, offering various advantages such as speedy verification processes, data security, and seamless integration with other digital systems.

⁵ Lucy Kinski, "Data and Methodology," in *European Representation in EU National Parliaments*, by Lucy Kinski, Palgrave Studies in European Union Politics (Cham: Springer International Publishing, 2021), 81–115, https://doi.org/10.1007/978-3-030-53313-7_3.

⁶ Pradeep M.D., "Legal Research- Descriptive Analysis on Doctrinal Methodology," *International Journal of Management, Technology, and Social Sciences*, December 6, 2019, 95–103, <https://doi.org/10.47992/IJMTS.2581.6012.0075>.

⁷ Nur Hidayani Alimuddin, "Implementasi Sertifikat Elektronik Sebagai Jaminan Kepastian Hukum Kepemilikan Hak Atas Tanah Di Indonesia," *SASI* 27, no. 3 (October 7, 2021): 335, <https://doi.org/10.47268/sasi.v27i3.509>.

However, the impact of electronic land certificates on legal certainty in banking credit is not without significant challenges, both in terms of legal and technical infrastructure. One of the most important issues is the legal validity of electronic certificates in the context of disputes. Although regulations in Indonesia have recognized electronic land certificates as valid documents, banks tend to show caution in accepting them as collateral. The main concern lies in the lack of strong legal precedents related to the resolution of land disputes guaranteed by electronic certificates, as well as potential issues in executing collateral rights in the event of loan defaults. Legal certainty remains incomplete in this case, particularly when the integrity of digital data is under scrutiny or cyber attacks pose a risk.

Additionally, this research revealed that Indonesian banks and land agencies still need to improve their level of technological infrastructure readiness. The bank needs assurance that the electronic land certificate system has adequate security standards, both in terms of data protection and resilience against digital manipulation. If these risks are not well managed, there will be concerns related to fraud, certificate duplication, or loss of digital data, which could undermine the banking sector's confidence in using electronic certificates as credit collateral.⁸ Therefore, the successful implementation of electronic land certificates in the banking credit system not only requires clear legal recognition but also reliable and secure digital infrastructure support.

A comparative study with other countries such as Singapore and Australia reveals that the implementation of electronic land certificates in those countries runs more smoothly due to more detailed regulatory support and mature digital infrastructure. For instance, Singapore's e-Titles system has demonstrated effectiveness due to its integration with the digitally interconnected legal and banking ecosystems. This provides strong legal guarantees and easy access for banks to verify the legal status of mortgaged land. The success in those countries shows that to achieve optimal legal certainty, Indonesia needs to strengthen the regulatory framework that governs not only the validity of electronic land certificates but also the clear law enforcement procedures in cases of disputes or collateral execution.

Furthermore, this research underscores the significance of strengthening banking capabilities to effectively navigate this digital transformation. Banks need to be actively involved in the process of drafting regulations and implementing electronic land certificates, so they can adapt well to these changes. Training and updating internal systems in the banking sector have become essential to ensure that banks have effective mechanisms for assessing risks and the validity of electronic certificates as credit collateral. In this case, collaboration between the government, land agencies, and the banking sector is key to achieving successful implementation.

This research found that although electronic land certificates offer many opportunities to improve efficiency and legal certainty in credit provision, the expected legal certainty has not yet fully materialized.⁹ There is an urgent need to strengthen regulations, build better technological infrastructure, and enhance the banking sector's trust in this system. Without strong legal guarantees and adequate technological readiness, electronic land certificates may not yet fully replace conventional certificates as reliable collateral instruments in banking credit in Indonesia.¹⁰ Therefore, deeper reforms, both in terms of law and technology, are necessary to support this transition toward a safer and more efficient digital era in land administration.

⁸ Mega Adi Kusuma, Parman Sukarno, and Aulia Arif Wardana, "Security System for Digital Land Certificate Based on Blockchain and QR Code Validation in Indonesia," in *2022 International Conference on Advanced Creative Networks and Intelligent Systems (ICACNIS)* (2022 International Conference on Advanced Creative Networks and Intelligent Systems (ICACNIS), Bandung, Indonesia: IEEE, 2022), 1–6, <https://doi.org/10.1109/ICACNIS57039.2022.10055114>.

⁹ Hassanain Haykal, Johannes Ibrahim, and Shelly Kurniawan, "Building Sharia Law Banking System in Global Economic Development Under Local Wisdom Basis," *Revista de Gestão Social e Ambiental* 18, no. 7 (April 4, 2024): e05465, <https://doi.org/10.24857/rgsa.v18n7-001>.

¹⁰ Sriono Sriono et al., "Legality of Execution of Collateral Based on Electronic Mortgage Certificate in Bank Credit Agreement," *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences* 4, no. 1 (January 14, 2021): 15–27, <https://doi.org/10.33258/birci.v4i1.1532>.

Acceptance of land certificate digitalization policy by the banking sector and its impact on credit granting procedures

The implementation of electronic land certificates in Indonesia's land administration system is an important step in supporting modernization and agrarian reform, but its success heavily depends on the acceptance of this policy by the banking sector, which plays a central role in credit financing. The Diffusion of Innovations Theory by Davis and Rogers proposes the Technology Acceptance Model (TAM) as one theoretical approach to analyze the acceptance of new policies by financial institutions. These two theories provide a relevant framework for understanding how banks, as end-users, respond to new technologies in terms of efficiency, security, and legal certainty, as well as how these innovations can affect their internal procedures, particularly in the context of credit provision.

Perceived usefulness and perceived ease of use are two main factors that greatly influence users' acceptance of technology, according to Davis.¹¹ Banks must persuade themselves that electronic land certificates will yield tangible benefits, including enhanced efficiency in the verification process, expedited loan applications, and decreased administrative risks like certificate forgery or duplication. If these benefits are clearly visible, then banks will be more likely to accept and adopt this system in their credit procedures. However, if banks feel that electronic land certificates do not provide substantial improvements compared to conventional certificates, or if the use of this digital system is considered complex and burdensome, then the acceptance of this policy will encounter obstacles. At this point, it is important for the government to provide training and technical support to banks, as well as to build infrastructure that facilitates the integration of these digital systems with the banks' internal processes.

Furthermore, the characteristics of the innovation itself, such as relative advantage, compatibility, complexity, trialability, and observability, influence the acceptance of innovations like electronic land certificates, according to Rogers' Diffusion of Innovations Theory.¹² Banks will be more receptive to this innovation if they can clearly see its relative advantages compared to the previous system, if the system is compatible with existing procedures, and if the bank can gradually test the new system without having to fully commit right away. In this case, the gradual introduction of electronic land certificates and testing in the banking sector is key to building trust. If banks can directly observe the successful implementation of this technology in other institutions without many operational hurdles, they will find it easier to accept and integrate electronic certificates into their systems.

However, in practice, this research found that the acceptance of electronic land certificates by the banking sector in Indonesia still faces several challenges. Concerns about digital security and potential associated risks, such as cyberattacks that could compromise data integrity, are among the main obstacles. Banks prioritize the protection of highly sensitive data, such as land certificates, as explained by the Information Security Theory. The government must equip the electronic land certificate system with strict security protocols, including data encryption and strong authentication mechanisms, and establish a clear legal framework for data recovery in the event of a security incident, to secure full trust from the banking sector.

The impact of this limited acceptance on the credit-granting procedure is very significant. In the current banking credit system, banks rely heavily on the verification of land certificates as collateral, demanding assurances of their strong legal validity and seamless execution.¹³ A faster and more reliable verification process can enhance credit-granting efficiency and reduce the time required for

¹¹ Zakaria Issa Saleh, Omar Zakaria Saleh, and Othman Zakaria Saleh, "Technology Acceptance Model Based on Needs, Social Influence and Recognized Benefits," in *2020 International Conference on Innovation and Intelligence for Informatics, Computing and Technologies (3ICT)* (2020 International Conference on Innovation and Intelligence for Informatics, Computing and Technologies (3ICT), Sakheer, Bahrain: IEEE, 2020), 1-6, <https://doi.org/10.1109/3ICT51146.2020.9311961>.

¹² Ping Yu, "Diffusion of Innovation Theory," in *Implementation Science*, by Frances Rapport, Robyn Clay-Williams, and Jeffrey Braithwaite, 1st ed. (London: Routledge, 2022), 59-61, <https://doi.org/10.4324/9781003109945-16>.

¹³ Kartina Pakpahan, Azharuddin Azharuddin, and Leviyanti Leviyanti, "Problems Of Implementation Of Electronic Land Certificate Arrangements As Debt Guarantee," *Prophetic Law Review* 4, no. 1 (June 1, 2022): 70-91, <https://doi.org/10.20885/PLR.vol4.iss1.art4>.

credit approval. However, if banks are still hesitant to accept electronic land certificates, they tend to conduct additional verifications or even request physical documentation to support them. This will actually prolong the procedures and reduce the efficiency expected from digitization.

Furthermore, the assessment of credit risk can also be impacted by restricted acceptance. Banks, being conservative institutions in risk management, need assurance that using electronic land certificates as collateral won't hinder their ability to execute collateral rights in the event of default.¹⁴ If they feel that the electronic certificate system is not yet fully secure or supported by adequate regulations, banks may lower the collateral value or impose stricter additional requirements for borrowers using electronic certificates as collateral. This can hinder innovation in the banking sector and contradict the main goal of digitalization, which is to facilitate access to credit.

The banking sector's acceptance of electronic land certificates is crucial for the successful implementation of this digitalization policy in the banking credit system. The Technology Acceptance Model and Diffusion of Innovations provide a theoretical framework that can help understand these dynamics, but in practice, factors such as digital security, legal validity, and infrastructure readiness play a key role. Therefore, we must persist in strengthening the legal and technical framework to ensure banks fully accept the digitization of land certificates, thereby enhancing the credit granting procedures in Indonesia.

Comparison of legal protection between electronic land certificates and conventional certificates: challenges and implementation potential

The transition from conventional land certificates to electronic land certificates raises a number of important questions regarding the legal protection of ownership rights and guarantees in credit transactions. Law Number 5 of 1960 concerning the Basic Agrarian Law regulates the principle of legal certainty, which is a crucial element in the protection of land ownership rights in Indonesian agrarian law. Legal experts like Fitzgerald and Harsono assert that a robust and reliable registration system supports the validity of ownership documents, thereby ensuring legal certainty in land administration.¹⁵ In the conventional system, physical land certificates have long been considered valid proof of land ownership and have become a reliable guarantee instrument for the banking sector.¹⁶ With the advent of digitalization, new challenges arise regarding the validity and legal protection of electronic land certificates that replace conventional certificates.

In the context of electronic land certificates, one of the main challenges faced is how to provide legal protection equivalent to conventional certificates. In his positivist legal theory, Hans Kelsen emphasized that a higher regulation's legitimate procedure establishes the validity of a legal norm.¹⁷ It's true that electronic land certificates are recognized by Indonesian government rules, like Regulation of the Minister of Agrarian Affairs and Spatial Planning/Head of the National Land Agency of the Republic of Indonesia Number 1 of 2021 concerning Electronic Certificates. However, there are still problems with how they are used in the field, especially in the banking sector, that make it hard for these certificates to be valid in legal transactions. Banks in Indonesia generally still show a preference for physical certificates because they are easier to verify visually and have a clearer legal precedent in terms of enforcing collateral rights. In addition, conventional land certificates offer psychological security due to their tangible physical form, making them considered more reliable in transactions.

¹⁴ Irwan Haryowardani, "Legal Regulation On The Implementation Of Electronic Certificates," *International Journal Of Humanities Education and Social Sciences (IJHESS)* 2, no. 3 (December 3, 2022), <https://doi.org/10.55227/ijhess.v2i3.296>.

¹⁵ Muhammad Ali et al., "The Ideal Construction of Legal Ownership of Land Rights in the Administrative System of the National Land Agency," *International Journal of Science and Society* 4, no. 4 (November 21, 2022): 375–87, <https://doi.org/10.54783/ijssoc.v4i4.583>.

¹⁶ Gunarto Gunarto et al., "Ideal Regulation of Land Registration Using Land Certificate as Evidence Based on Legal Certainty," *Saudi Journal of Humanities and Social Sciences* 8, no. 03 (March 27, 2023): 67–71, <https://doi.org/10.36348/sjhss.2023.v08i03.006>.

¹⁷ João Luiz Martinechen Beghetto and Celio Roberto Correa, "O Positivismo Jurídico de Hans Kelsen," *Ciências Sociais Aplicadas Em Revista* 21, no. 41 (August 19, 2022): 104–21, <https://doi.org/10.48075/csar.v2i1.24701>.

Dworkin, in his interpretative view of law, emphasizes that law is not merely a set of rigid rules but also the result of principles of justice and procedural fairness.¹⁸ In this context, legal protection for electronic land certificates requires a broader interpretation than mere formal recognition. A mechanism is necessary to safeguard the rights of electronic certificate holders during disputes or potential manipulation of digital data. One of the emerging concerns is the risk of cybercrime or hacking, which could damage data or lead to the forgery of electronic land certificates. Although conventional certificates also carry the risk of forgery, their physical nature makes their handling simpler and allows for direct verification by competent authorities. On the other hand, because electronic certificates rely heavily on information technology, the risk of disrupting the integrity of digital data can occur more broadly and systematically.¹⁹

Furthermore, the comparison of legal protection between these two types of certificates must also consider accessibility and ease of execution. In banking credit procedures, the execution of collateral rights assumes significance if the debtor fails to fulfill their obligations. Conventional certificates have a clear execution pathway through a long-established judicial and administrative system. However, electronic land certificates introduce a new dimension that requires harmonization with existing legal procedures, especially in terms of tracking property rights and executing collateral. According to Lon Fuller, beneficial law must adhere to the principles of clarity, consistency, and procedural fairness.²⁰ The main challenge in the context of electronic certificates is ensuring the execution of security rights with the same level of certainty as with conventional certificates. Technical constraints or a lack of trust in digital systems could still affect the execution procedures, potentially compromising the legal protection of creditors and their rights.

However, the implementation of electronic land certificates also presents a number of significant potentials that can enhance both legal protection and the efficiency of land administration. For instance, the blockchain system strengthens data security and transparency by providing a decentralized mechanism for tracking and recording land transactions. Tapscott stated that blockchain technology can create a more secure system because every data change is recorded in an immutable ledger, which is crucial for ensuring the validity of electronic land certificates.²¹ If applied correctly, this technology can address concerns about data forgery and enhance public and banking sector trust in the validity of electronic certificates.

In addition, the use of electronic land certificates can also facilitate cross-agency integration, which ultimately speeds up the verification process and legal transactions. Bentham emphasized the importance of efficiency in law; good law should be able to reduce costs and expedite the resolution of legal issues.²² Electronic certificates can reduce administrative burdens by eliminating the need for physical filing, speeding up the land ownership transfer process, and enabling a more integrated system between government agencies, notaries, and banks. If the legal framework and supporting technology are reliable and secure, this potential can enhance legal certainty.

The comparison between conventional land certificates and electronic certificates shows significant challenges and opportunities in terms of legal protection. Electronic land certificates have the potential to enhance the efficiency and security of land administration, but their successful implementation heavily depends on adequate technological infrastructure, strong regulations, and

¹⁸ Samra Ibric, "Ronald Dworkin: Seeking Truth and Justice through Responsibility," *Laws* 12, no. 3 (April 28, 2023): 41, <https://doi.org/10.3390/laws12030041>.

¹⁹ Arko Djajadi et al., "Blockchain-Based E-Certificate Verification and Validation Automation Architecture to Avoid Counterfeiting of Digital Assets in Order to Accelerate Digital Transformation," *CCIT Journal* 16, no. 1 (January 11, 2023): 68–85, <https://doi.org/10.33050/ccit.v16i1.2367>.

²⁰ Nadia Elizabeth Nedzel, "Fuller, Dworkin, Scientism, and Liberty: The Dichotomy between Continental and Common Law Traditions and Their Consequences," *Laws* 12, no. 3 (April 28, 2023): 37, <https://doi.org/10.3390/laws12030037>.

²¹ Mohammed Shuaib, Shadab Alam, and Salwani Mohd Daud, "Improving the Authenticity of Real Estate Land Transaction Data Using Blockchain-Based Security Scheme," in *Advances in Cyber Security*, ed. Mohammed Anbar, Nibras Abdullah, and Selvakumar Manickam, vol. 1347, Communications in Computer and Information Science (Singapore: Springer Singapore, 2021), 3–10, https://doi.org/10.1007/978-981-33-6835-4_1.

²² Dan Priel, "Bentham's Public Utilitarianism and Its Jurisprudential Significance," *Ratio Juris* 34, no. 4 (December 2021): 415–37, <https://doi.org/10.1111/raju.12334>.

the readiness of banking institutions and legal entities to accept and adopt these changes. The harmonization between positive law and technological innovation is key to creating a more modern and reliable land administration system in the future.

CONCLUSION

The implementation of electronic land certificates in Indonesia offers enormous potential in enhancing the efficiency and security of land administration, particularly in the context of providing bank credit. Despite the legal recognition of electronic certificates, we still face significant challenges such as legal validity concerns, data security risks, and the readiness of infrastructure and institutions to adopt this technology. This study emphasizes that the success of implementing electronic land certificates does not only depend on existing regulations but also on the technology's ability to provide protection comparable to conventional certificates. To achieve an optimal level of legal certainty, comprehensive efforts are required from the government, the banking sector, and legal institutions in building a system that is safe, transparent, and trustworthy for all stakeholders.

Indonesia must take several strategic steps to ensure the successful implementation of electronic land certificates. First, there is a need for more comprehensive regulatory harmonization that integrates this electronic system with existing legal procedures, especially related to the execution of collateral rights in the banking sector. Secondly, the improvement of digital infrastructure and cybersecurity must be a priority to reduce the risk of data manipulation and security breaches. The government must also guarantee the effective implementation of technology, like blockchain, to bolster transparency and accountability. Third, training and socialization for the banking sector and the public are essential to build trust and facilitate the comprehensive adoption of electronic certificates. With these measures, electronic land certificates can function as effective and reliable legal instruments in supporting the banking credit system in the digital era.

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