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by Elza Syarief

Submission date: 10-Mar-2023 10:29PM (UTC+0700)

Submission ID: 2033941998

File name: Final--Elza_Syarif_IJCC.pdf (440.11K)

Word count: 7692

Character count: 46157



Copyright © 2022 International Journal of Cyber Criminology – ISSN: 0974–2891
July – December 2022. Vol. 16(2): 32–46. DOI: 10.5281/zenodo.4766565
Publisher & Editor-in-Chief – K. Jaishankar / Open Access (Authors / Readers No Pay Journal).

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Security Concerns in Digital Transformation of Electronic Land Registration: Legal Protection in Cybersecurity Laws in Indonesia

Elza Syarief¹

Universitas Internasional Batam, Indonesia

Abstract

Several cybercriminals and hackers are currently attempting to obtain an immovable property using fraudulent land papers in the digital realm. However, electronic land certificates are now required to maintain land records as legitimate and compelling evidence of ownership. In addition, the security concerns associated with electronic land certificates due to cyber attacks have opened the way for legislative and regulations that protect landowners from such risks. Consequently, this article aims to provide a comprehensive overview of the history and significance of electronic land certificates, data encryption, the growth of land laws, their availability, and the significance of cybersecurity to electronic land certificates in Indonesia. To fulfill the study's goal, a qualitative research design aided by a documentation technique for data collecting from diverse resources, such as case studies, legal archives, library facilities, and informal interviews with land officials from numerous locations in Indonesia, was employed. Despite several laws and regulations about the protection of land rights and electronic land certificates in Indonesia, several restrictions exist regarding the availability of regulations against false documentation and several escape routes for hackers and cybercriminals. In addition to the laws and regulations in Indonesia, their execution must be expedited, and the judicial system must be strengthened to maximize the benefits of such laws and regulations.

Keywords: Electronic Land Certificates; Cybersecurity Laws; Data Encryption; Digitalization; Developing Nation.

A. Introduction

By digitizing everything to use the long-term benefits of technology, the universe has entered a technological period in the modern world (Pan et al., 2021). The methods and procedures of the private and governmental sectors have entered a new technical realm (Akrim & Dalle, 2021; Rana et al., 2022). Globally, digital technologies

¹ Master Program of Law, Universitas Internasional Batam, Indonesia.

Email: esyarief.uib@gmail.com

are used for many purposes due to their reliability and accessibility (Ippolito et al., 2021; Mansoor, 2021). Global justice and the legislative system have been digitalized to reap the benefits of digital technology by preserving all records on multiple digital platforms for the public's benefit (Kondori, Narges, & Rouhani, 2021). Moreover, saving time is one of the most significant benefits of this digital revolution. In addition, it is highly conceivable for courts to prioritize evaluating digital land data in electronic land certificates (Hasan & Rupa, 2021).

In the past, land certificates based on handwritten documents were issued by the relevant authorities, who had limited record-keeping capabilities. Notably, the validity of land certificates is tied to the values granted by legal organizations depending on their acceptability on various legal platforms (Gao, Shi, & Fang, 2021). The study identifies several record-keeping problems associated with manual land certificates regarding authenticity and dependability (Mintah et al., 2021). Thus, digital land certificates eased the dealers' examination of various properties and resolution of land-related problems (Njeri, Maku, & Muriira, 2022). Furthermore, in this digital age, most developed nations have mandated using digital or computerized land certificates to settle numerous land disputes (Noor, 2021).

In addition, electronic land certificates are novel land-related papers that benefit landowners and expedite the sale and acquisition of land. They are issued by land records administration agencies (Ramadhani, 2021). Nevertheless, despite substantial advantages, many nations have yet to ultimately adopt digital technologies, notably digital record-keeping (Wajdi & Ramadhani, 2022). Providing cybersecurity for digital land certificates is of particular concern in most developing nations because, despite the numerous advantages of electronic land certificates, cybercrime is a global problem (Suhendi & Asmadi, 2022). Cybercriminals employed malicious programs to steal digital certificates linked to several industries. The same holds for electronic land certificates, as pinched digital land certificates enable cybercriminals to create hacking tools and viruses that appear authentic and possess all the necessary qualities. Consequently, combating cybercriminals is one of the most significant challenges of the modern digitalized world.

Prior research revealed electronic land certificates' significance in accessibility, dependability, and legal standing. Concurrently, other academics have described the rules and regulations associated with digital land certificates. However, cyber security concerns, electronic land certificates, and forgery issues are given little consideration. In addition, experts recommend analyzing the significance of data encryption to lessen the fear of cybercrimes associated with electronic land certificates and adding cybersecurity protections against such crimes. This paper tries to fill this gap in the literature by discussing the value of electronic land certificates, the likely cybersecurity threats to these certificates, and data encryption as a safeguard. Concurrently, the rules and regulations available to combat such dangers have been analyzed in depth in the context of a developing country, namely Indonesia.

Indonesia is one of the largest Asian nations with rapid digital penetration in nearly all spheres of life, including education, business, religious matters, the health sector, government matters reliant on e-governance, and the digitalization of manual documents about real estate, among others (Frinaldi, 2021; Hartanto et al., 2021;

Yusni & Sigalingging, 2022). In addition, computerized land certificates based on dependability and modernism are gaining favor in Indonesian law (Yusni & Sigalingging, 2022). Due to the potential contribution of agriculture and land industries to Indonesia's economic development, it wasn't easy to preserve property documents before introducing digital technologies (Kusmiarto et al., 2021). Thus, computerized land certificates are widely recognized as current legal requirements at the highest levels (Noor, 2021). On the other hand, about half of Indonesians are involved in the agricultural land sector; as a result, the Indonesian court system faces various possible obstacles in resolving large-scale land property disputes (Gábriš & Hamulák, 2021; Mahardika, Suwitra, & Dharsana, 2022).

The most significant of these concerns relates to the online storage of systems and the threats posed by cybercriminals to traditional and national land registration centers (Rifai, 2021; Suhendi & Asmadi, 2022). The gaps in the Land Management system provide cybercriminals an advantage, trapping unsuspecting landowners (Ben Naseir et al., 2019). Consequently, there is an urgent need to adopt laws and regulations to safeguard these landowners (Noor, 2021; Suhendi & Asmadi, 2022; Yusni & Sigalingging, 2022). Encryption is a potential countermeasure against cyber dangers that can prevent viruses from collecting digital land records (Widyastuti, 2021). Additionally, it protects landowners against internet phishing and hacking (Peci & Gashi, 2021; Suhartono, 2022; Syarief, 2021). However, relatively limited research has highlighted its significance in Indonesia, presenting the existing rules and regulations about electronic land certification and the provision of cybersecurity to landowners. Consequently, the current study has multiple objectives.

- To present a consolidated background and significance of electronic land certificates
- To present an overview of data encryption, types, and working
- To elaborate on the land laws evolution in Indonesia
- To demonstrate the availability and significance of cybersecurity laws to protect electronic land certificates in Indonesia

B. Research Methods

The current study employed a qualitative research approach aided by a documentation technique to collect data from various sources, including case studies, legal archives, library facilities, and informal interviews with land officials in diverse regions of Indonesia. Library research with a descriptive-analytical approach is deemed suitable for various types of investigations, particularly in law, because it affords sufficient opportunities for incorporating historical and descriptive elements (Bilal, 2021). In addition, library research and descriptive methodology adhere to a sequential and methodical procedure that facilitates the acquisition of both primary and secondary data (Ginting, 2020).

In light of this methodology, the data collection procedure for the current study has been divided into two sections. In the first step, all relevant information was gathered and organized to build the supporting topics by defining the scope of the research. To extract the land registration laws and services following the digitalization of the land registration process, existing research papers, regulations, and legislation were collected and evaluated following the development of the study's background and the presentation of the study's key concepts.

The legislative protections against cyber criminals and data encryption have also been extracted in detail, as has the cyber security accessible to electronic land certificates in Indonesia. In addition to these records, the researchers conducted in-depth interviews with government officials, aggregation oxfords, and attorneys to comprehensively understand the matter. After reviewing all the retrieved data, limitations and future recommendations for strengthening and enhancing the existing laws, rules, and cyber security system for electronic land certificates in Indonesia are offered as the topic's definitive conclusion.

C. Results and Discussion

1. Electronic Land Certificate

Due to digitization, the communication dynamics of society are evolving, focusing on guiding society on the proper path with legal and communal advantages and establishing economic stability (Caruso, 2018). Due to the frequent presentation of immoral and fraudulent land certificates in court, the conventional non-electronic land system had several problems with the legality of all manual certificates (Gao et al., 2021). Consequently, most land disputes were delayed, and court procedures were postponed due to the unsuitability and unreliability of such certifications (Mahardika et al., 2022). Comparatively, the technological revolution has altered the universe's dynamics by transposing old land records management systems into electronic land certificates to aid landowners, involved parties, and the legal system (Syarief, 2021). In light of the digitization of all land records, academics underlined the importance of the electronic land system to the courts (Noor, 2021; Syarief, 2021; Widyastuti, 2021).

On the other hand, developed nations are reaping the benefits of electronic land certificate insurers and using them in legal and judicial proceedings to settle land disputes (Home, 2021). However, due to the restrictions of laws and regulations associated with digital land property certificates, developing nations are experimenting with and using them extensively today (Deng & Tsao, 2022). Concurrently, the electronic land certificates system is being established in Indonesia to promote community welfare and boost economic growth. The Indonesian legal system makes it abundantly apparent that the Land Management system is designed to maintain land records and processes and to provide the courts with unified, correct information in electronic format (Silviana et al., 2021). Due to this digital change and the adoption of electronic land, many nations have gained a substantial edge regarding social and legal issues associated with land ownership transfer (Byamugisha, 2021). Moreover, administrators are responsible for handling all land-related legal actions efficiently and effectively using a digital land management system that provides electronic certificates to the public (Thamrin et al., 2021).

Despite the significance of this computerized land management system in most parts of the world for maintaining property records and facilitating land transfers, several questions regarding the integrity of electronic land certification systems arose, reflecting the unwillingness of the people to digitalize their status in the form of electronic land certificates (Ramadhani, 2021). This reluctance may be due to a lack of confidence in implementing legislation to protect landowners (Wajdi & Ramadhani, 2022). In addition, researchers underlined the necessity to assess the extent to which an electronic land system serves a common person with an



agricultural property that presents several challenges (Ramadhani, 2021; Widyastuti, 2021). Moreover, there is an urgent need for policies to enforce the current rules and regulations to protect landowners' properties (Yusni & Sigalingging, 2022).

2. Data Encryption, Types, and Working

Data encryption is a commonly employed security market for protecting messages, files, documents, and other digital network connections (Yazdeen et al., 2021). It transforms the data into random data that can only be accessed using cryptographic keys, rendering it unreadable to unauthorized parties (Saračević et al., 2020). Those in possession of the key can retrieve or decrypt the original data. In addition, encryption is described as the transformation of data from a typical readable format to an encoded form that can only be processed or read after decipherment (Mohd Satar et al., 2021). It also represents the usage of secret codes during the encryption of data, which cannot be utilized for meaningful communication by unauthorized parties in the absence of an encryption key (Diffie & Hellman, 2022). During the Second World War, US intelligence organizations used encryption to decipher the German military code, which was later improved by Internet users worldwide (Uniyal, Dobhal, & Semwal, 2020). Internet use has revealed various new encryption dimensions to combat identity theft, reduce Internet fraud, and combat cybercriminal activities. Most businesses have begun implementing encryption strategies to safeguard their documents and trade secrets. Simultaneously, financial institutions utilize data encryption to protect their customers' information by rendering their files incomprehensible to hackers (Wang et al., 2020).

This encryption is similar to digital signatures because software turns readable information into mathematical algorithms encrypted using private and public keys. However, data encryption provides higher protection and privacy since it prevents hackers from translating the encrypted material (Belej, 2019). Digital signatures, on the other hand, are solely used to verify the validity and identity of the user. Data encryption and digital signatures have different applications. Nonetheless, both services are available in person. However, two keys are required for users of digital signatures and data encryption. For example, they need a private key to transmit a message and a public key to validate a signature (Saadatmandan & Rahimi, 2021). It also indicates that a private key with a secret code is necessary to describe a message, document, or piece of information that cybercriminals are attempting to acquire to gain access to private information. In addition to a high level of protection, encrypted data is readily accessed whenever the authorized user requests (El Hanouti & El Fadili, 2021).

Symmetric and asymmetric data encryption exist (Abroshan, 2021). For the first metric encryption, data owners need only one key to encode or decode information. Simultaneously, two replaceable keys are required for asymmetric data encryption (Abroshan, 2021). Cybercriminals or hackers can only extract the data by utilizing specific keys or attempting to guess the encryption algorithms. This security mechanism makes it impossible or time-consuming for those with outstanding computer skills and resources to decrypt or hack the encoded data, making it one of the most secure methods for protecting electronic data. The current work hypothesizes this encryption method's significance in safeguarding the electronic land certificate against con artists and cyber criminals.

3. Evolution of the land laws in Indonesia

In Indonesia, "Basic Agrarian Law No. 5 of 1960" regulates land usage, declaring that "land is a gift from God to the Indonesian people, and the state is the custodian of this property, responsible for regulating its use in the public good" (Suhendi & Asmadi, 2022). In addition, the Basic Agrarian Law established a freehold title known as Hak Milik to circumvent the need for each landowner. Additionally, customary land claims control land concerns. The Basic Agrarian Law granted complete authority to acquire land based on need and desire. For such acquisitions, governmental resources are utilized in collaboration with customary land claims at the local level. However, "the Basic Agrarian Law" did not safeguard the landowners' property rights. Therefore, President Suharto issued Presidential Decree 55 of 1993, outlining the rules and processes for determining property ownership that applies to private and public land owners (Roesli et al., 2021).

Nonetheless, this presidential decree proved insufficient in preserving landowners' legal rights and providing them with legal recourse in case of forgery or fraud involving their papers (Suhendi & Asmadi, 2022). This was due to improper upkeep and incomplete title records, which made it impossible to prove proof of legal ownership. As a result, landowners relied on government compensations for public usage or earmarking their properties. This disappointed the landowners, who could not defend their rights (Roesli et al., 2021).

After 1998, this decentralization with specific safeguards for landowners against this land governance system came into existence (Yubaidi, 2020). "Law No. 2 of 2012 on Land Acquisition in the Public Interest" was the first statutory modification of the land acquisition law since the Basic Agrarian Law of 1960," which replaced the decrees and land rules in effect at the time. In addition to removing various barriers to acquiring land in the national development and trust, it also introduces several protective measures for land owners against land mafia protecting public rights. It also provided the foundation for resolving several disputes relating to states' rights to acquire land in the public interest (Noor, 2021). In addition, the National Land Agency (Badan Nasional, or BPN) was granted increased authority to record, digitize, and update land titles efficiently and effectively. In addition, technical specifications needed to be obtained from the agency to maintain ownership standards (Thamrin et al., 2021).

4. Cybersecurity laws in Indonesia

Following "the Regulation of the National Land Agency (BPN) No. 1 of 2021," the Indonesian Ministry of Agrarian Affairs and Spatial Planning (ATR) simplified and expanded access to land certificate encryption. This rule restricted the use of physical or paper documents as land certificates and converted them, via the digitization process, into electronic land certificates (Thamrin et al., 2021). This enhanced the transparency and automation of land data administration as an effective strategy to safeguard landowners' rights. During the land registration process, the digitization procedure involves maintenance, transformation, and map and survey update processes (Bennett et al., 2021). It further streamlines bureaucratic procedures, enhances the infrastructure data storage for land services, and enhances the ATR/reputation. BPN's



Additionally, this digitalization protects landowners from multiple certificate issuances, reducing the risks of duplicate and fraudulent documents. It also reduces maintenance and storage costs and improves document security, facilitating easy access and requiring no insurance (Syarief, 2021). The digitalization of land in Indonesia was subsequently incorporated into "the Government Regulation No. 24 of 1997 on land registration, and a key implementation of the recently created Digital Governance Assessment Framework (DGRA)" This rule is also tied to preventing breaches of unencrypted and sensitive information, duplication of data protection, and protecting the cybersecurity of landowners. The primary objective of digitizing the land registration process was to efficiently utilize information and communication technology to facilitate access to land identifications and streamline land certification issuance procedures (Bennett et al., 2021). In addition, "the Indonesian Ministry of Agrarian Affairs and Spatial Planning (ATR), following the Regulation of the National Land Agency (BPN) No. 1 of 2021," made land certification encryption simpler.

In addition, there are two active agencies, "The Ministry of Electronic Information Law (MEIL) and the Ministry of Communication and Informatics (MOCI)," that monitor data protection and cybersecurity about electronic land certificates in Indonesia. "The MEIL Regulation, 82 about the Implementation of Electronic Systems and Transactions, Regulation, 20 on the Protection of Personal Data in Electronic Systems (together referred to as the PDP Regulations)" establishes specific data protection and privacy criteria. On the other hand, the PDP regulations impose specific criminal Penalties on cybercrime accusations. These constants include:

- i. 4-8 years imprisonment with IDR600-IDR800 million fines for hacking or making fake ids for unlawful data access.
- ii. 6-10 years imprisonment with IDR800 million-IDR1 billion fines for transmitting, intercepting, or wiretapping electronic land records.
- iii. 8-10 years imprisonment with fines of IDR2-IDR5 billion for hiding/moving, deletion, tampering, transmission, addition, and alteration in electronic records/information.
- iv. 10-12 years imprisonment with IDR10-IDR12 billion fine for intentionally creating false documents by damaging/destroying, altering, and manipulating electronic information

In addition, according to PDP legislation, the government is responsible for evaluating, advocating, supervising, and enforcing the regulations associated with personal data protection. It also contains measures that strengthen the government's obligation to defend the public interest against cybercrimes in electronic communications and documentation, assuring the implementation of cybersecurity information and initiatives (Ben Naseir et al., 2019). The cybercrime branch of the Indonesian police has worked intensively in recent years to combat cybercrimes involving defamation of character and hoaxes, as well as negative statements impacting national interests (Kaburuan & Damayanti, 2022). In addition, the "Electronic Information Law," "Government Regulation 82 Regarding the Implementation of Electronic Systems and Transactions," and "Ministry of

Communication and Informatics (MOCI) Regulation 20 Regarding the Protection of Personal Data in Electronic Systems (PDP Regulations)" are actively working to facilitate the protection of landowners' valuables.

In addition, under Indonesian criminal law, regulators must provide at least two pieces of proof to preserve data privacy and protection in electronic form related to any field (Putra, 2022). The PDP regulations are of the utmost importance in fighting cybercrimes in Indonesia. This has prompted the Indonesian police force to establish a cyber crime team to investigate cybercriminals, including those who falsify and gain unauthorized access to land certificates. By securing landowners, this project is a milestone in managing cybercriminal activities associated with electronic land certifications.

D. Limitations in Existing System and Recommendations

Despite several laws and rules about protecting land rights and electronic land certificates in Indonesia, restrictions against fake paperwork are limited. In addition to laws and regulations, their enforcement is of the utmost importance. To reap the benefits of such rules and regulations, it must be hastened in Indonesia and accompanied by an upgraded judicial system. Although the Laws against false documentation under "Articles 263, 264, and 266 of the Criminal Code (Book of Criminal Law)" provide administrative sanctions such as temporary exclusion from the list of land registration or dismissal of services, written warnings, etc., it does not eliminate criminal or civil liability (Ramadhani, 2021). This further restricts the applicability of these laws to enforce specific penalties and imprisonment following proof of theft or falsified papers.

Simultaneously, "Article 263 part (1)" exclusively addresses the prohibitions against utilizing or compelling another person to use a fake document. While "Article 263 section (2)" addresses the purposeful use of fraudulent documentation, the damages are created by such use. In addition, "Article 264 part (1)" includes false documentation regardless of the purpose of utilizing it. However, "Article 264 part (2)" covers cases involving actual losses caused by fraudulent documents. Similarly, "Article 266 sections 1 and 2" regulates providing incorrect information on an official legal document. In addition, as an improvement to the current litigation process, "PDP Regulation 20 (joint statement of MEIL and MOCI Regulations)" provides certain illustrative sanctions by making public the identities of the agencies and individuals of the MOIC's websites that comply with the cybersecurity regulations. Simultaneously, the cybercriminal unit of the Indonesian Police Department was another beneficial component of PDP's rules, as it aggressively initiated several measures against cybercriminals committing the falsification and fishing of land papers, malicious mail hacking, and so on.

In contrast, even though the cybercriminal unit of the Indonesian Police Department is actively combating cyber security violations, there are no direct provisions in the ADP regulations regarding land acquisition via false impersonation using IDs, hacking of land registration option websites, or data theft. In addition, the Information and Electronic Transactions Act of 2008 regulates cyberspace in Indonesia with provisions for the legitimacy of electronic signatures and documents and the maintenance of the electronic system. Additionally, the law safeguards the right to privacy, intellectual property, electronic transactions, domain names, and electronic certification.



However, this rule was initially under-recognized, causing disputes over its ability to combat cybercriminals and preserve digital data, such as digital signatures, passwords, and identification cards (Siregar & Lubis, 2021). Due to the absence of any direct laws for the prevention of cyberbullying, these issues have arisen. This resulted in multiple cybercrime offenses committed by law enforcement and land registration officers. These limits necessitate strengthening cybercrime laws and regulations, with requirements for protecting digital data and maintaining digital security systems.

To this end, governments might devise and regulate new laws for the judicial system that recognize electronic land certificates as the sole legal documents. According to the research, countries that recognize electronic land certificates as legal papers for managing lands and dealing with court procedures are in better positions regarding land property rights law and order (Noor, 2021). Consequently, there is an urgent need for further rules to make them consistent with contemporary land-related concerns and to resolve them in the best interest of society, demonstrating the government's effective judicial system. Simultaneously, the electronic land system must be maintained following the norms of industrialized nations to assist the community and improve the people's well-being by providing adequate security for the land they own as a source of income. This approval of electronic land certification would also give landowners peace of mind and demonstrate the success of the Indonesian legal system.

It is also the government's responsibility to raise knowledge about electronic land certification to efficiently and effectively manage the land record system by engaging the most significant number of landowners with this modern technology. In addition, it was discovered that most Indonesian citizens are ignorant of land-related regulations, which makes them dissatisfied with the Land Management System and inhibits them from accepting electronic land certifications and utilizing them in court proceedings. This can only be minimized with the support of national and local government awareness campaigns on various platforms to reap the benefits of this digital system. García-Morán et al. (2021) found that in several developed nations, such as Canada, the government's public awareness efforts involving land certification led to the efficient and effective deployment of the computerized Land Management System. These experiences should be utilized by Indonesian legislative and administrative organizations for the nation's economic growth.

Additionally, the government is responsible for controlling the court system. The judiciary should be required to accept digitally transmitted legal documents from landowners in court proceedings. The Indonesian judicial system is reluctant to accept electronic land certificates as accompanying documents to a greater level due to traditional prohibitions and legislation that must be addressed appropriately to reap the benefits of digital technologies. Therefore, it is essential for the courts to use new technology regarding land-related issues and to accelerate their judgments about numerous conflicts. In addition, the researchers highlighted the significance of electronic land certification in the legal system transformation and the urgency of resolving land-related difficulties (Widyastuti, 2021).

In addition, the Indonesian court system must build a road map for success to adapt to the operational activities of developed nations employing digital land documents throughout legal proceedings. This would also increase the people's confidence in converting their conventional land documents to digital ones, making them easily

accessible to government records and free of disputes. Lastly, along with the government, all stakeholders, including departments of electronic land certificates and administrative organizations, should enable the landowners' access to legitimate documentation systems containing accurate data. Therefore, the management of land record systems should be effective and precise to provide all services to Indonesian citizens and progress the Indonesian legal system as an exemplar. Decentralizing electronic land certification facilities at the regional level can also help citizens reap the benefits of this efficient system. It would also assist in achieving sustainability in record management to aid the people in land dispute legal proceedings.

E. Implications

This study has multiple ramifications since it fills a vacuum in the literature regarding the availability of rules and regulations and the cybersecurity of electronic land certifications in Indonesian courts. In addition to discussing the history of electronic land certification and the encryption of vital documents, the current study has also established the legal status of such certifications in Indonesia. In addition, the present study identifies the limits of the existing regulatory structure in Indonesia regarding land certificates. It offers suggestions for the improvement and content of electronic land certificates as legal evidence. Additionally, the study highlights the importance of electronic land certificates in boosting society's economic prosperity and well-being while resolving various land disputes. Therefore, the Indonesian judicial system should be bolstered to accept electronic land advocates. The populace should be aware of the benefits of using this modern technology to certify their land and reduce the incidence of forged documents. Additionally, data encryption software should be utilized to safeguard the electronic information held on various platforms to protect persons' property rights against cyber criminals.

In addition, the importance of expanding land registration awareness and the availability of laws and regulations to protect landowners' rights is a significant addition to the current body of literature. The interviews with ordinary people and local management authorities revealed that most people are unaware of their property rights and the many sections of Indonesian law that safeguard their personal property. For the Indonesian populace to foresee their well-being based on the conservation of their land, which is their source of sustenance, it would be advantageous for the awareness initiatives to break down this barrier. The current study adds value to the functional significance of communication after the masses by underlining the importance of good communication between the court systems and the government to make electronic land certificates essential paperwork for legal processes. In conclusion, the current study would be an invaluable tool for enhancing the legitimacy and efficacy of electronic land certificates in Indonesia to maximize digital technology's benefits for the Indonesian people.

F. Conclusion and Future Directions

In light of the security concerns associated with electronic land certificates due to cyber threats, the purpose of this paper is to provide an overview of electronic land certificates, the types and functionality of data encryption, the evolution of land laws, their availability, and the significance of cybersecurity to electronic land certificates



in Indonesia. A qualitative study methodology aided by a documentation technique was utilized to collect data from various sources, including case studies, legal archives, library facilities, and informal interviews with land officials in diverse regions of Indonesia. Several legal processes exist, as evidenced by "Articles 263, 264, and 266 of the Criminal Code (Book of Criminal Law) and the PDP Regulations," according to the findings. However, it must be acknowledged that these are extremely limited. Nevertheless, there are several restrictions on the availability of legislation against fake paperwork. These legal tools also contain several flaws and loopholes, allowing fraudsters to escape after committing fraudulent acts. In addition, Indonesia must speed up the implementation of current rules and regulations and enhance its judicial system to reap the benefits of such laws and regulations. Therefore, it is suggested that future researches concentrate on the role of government authorities and prosecutors in mandating electronic land certificates as legally enforceable documents and educating the public about the existing legislation. In addition, there is a need to decentralize the land registration system and provide the necessary resources to local governments to assist the general public and reap the benefits of digital technology linked to property laws.

References

- Abroshan, H. (2021). A hybrid encryption solution to improve cloud computing security using symmetric and asymmetric cryptography algorithms. *International Journal of Advanced Computer Science and Applications*, 12(6), 31-37. <http://dx.doi.org/10.14569/IJACSA.2021.0120604>
- Akrim, A., & Dalle, J. (2021). Mobile Phone and Family Happiness, Mediating Role of Marital Communication: An Attachment Theory Perspective. *International Journal of Interactive Mobile Technologies (ijim)*, 15(21), 107-118. <https://doi.org/10.3991/ijim.v15i21.17811>
- Belej, O. (2019). The cryptography of elliptical curves application for formation of the electronic digital signature. In *International Conference on Computer Science, Engineering and Education Applications* (pp. 43-57). Springer. https://doi.org/10.1007/978-3-030-16621-2_5
- Ben Naseir, M. A., Dogan, H., Apeh, E., Richardson, C., & Ali, R. (2019). Contextualising the National Cyber Security Capacity in an Unstable Environment: A Spring Land Case Study. In *World Conference on Information Systems and Technologies* (pp. 373-382). Springer. https://doi.org/10.1007/978-3-030-16181-1_35
- Bennett, R. M., Unger, E.-M., Lemmen, C., & Dijkstra, P. (2021). Land administration maintenance: A review of the persistent problem and emerging fit-for-purpose solutions. *Land*, 10(5), 509. <https://doi.org/10.3390/land10050509>
- Bilal, D. M. (2021). International students' acquisition of library research skills: relationship with their English language proficiency. In *Integrating library use skills into the general education curriculum* (pp. 129-145). Routledge. https://doi.org/10.1300/J120v10n24_11
- Byamugisha, F. F. (2021). Experiences and development impacts of securing land rights at scale in developing countries: Case studies of China and Vietnam. *Land*, 10(2), 176. <https://doi.org/10.3390/land10020176>
- Caruso, L. (2018). Digital innovation and the fourth industrial revolution: epochal social changes? *Ai & Society*, 33(3), 379-392. <https://doi.org/10.1007/s00146-017-0736-1>

- Deng, X., & Tsao, H.-t. (2022). Truncated Property Rights, Land Finance, and Grassroots Governments: A Case Study of Minor Property Rights Housing in Transitional China. *Journal of Urban Planning and Development*, 148(3), 05022027. [https://doi.org/10.1061/\(ASCE\)UP.1943-5444.0000856](https://doi.org/10.1061/(ASCE)UP.1943-5444.0000856)
- Diffie, W., & Hellman, M. E. (2022). Exhaustive cryptanalysis of the NBS data encryption standard. In *Democratizing Cryptography: The Work of Whitfield Diffie and Martin Hellman* (pp. 391-414). ACM Digital Library. <https://doi.org/10.1145/3549993.3550008>
- El Hanouti, I., & El Fadili, H. (2021). Security analysis of an audio data encryption scheme based on key chaining and DNA encoding. *Multimedia Tools and Applications*, 80(8), 12077-12099. <https://doi.org/10.1007/s11042-020-10153-8>
- Frinaldi, A. (2021). Work Culture, Digital Governance and Employees Happiness in Pariaman City. In *Proceedings of the 1st Tidar International Conference on Advancing Local Wisdom Towards Global Megatrends, TIC 2020, 21-22 October 2020, Magelang, Jawa Tengah, Indonesia*. EAI. <http://dx.doi.org/10.4108/eai.21-10-2020.2311469>
- Gábriš, T., & Hamulák, O. (2021). Pandemics in Cyberspace – Empire in Search of a Sovereign? *Baltic Journal of Law & Politics*, 14(1), 103-123. <https://doi.org/10.2478/bjlp-2021-0005>
- Gao, X., Shi, X., & Fang, S. (2021). Property rights and misallocation: Evidence from land certification in China. *World Development*, 147, 105632. <https://doi.org/10.1016/j.worlddev.2021.105632>
- García-Morán, A., Ulvund, S., Unger, E.-M., & Bennett, R. M. (2021). Exploring PPPs in Support of Fit-for-Purpose Land Administration: A Case Study from Côte d'Ivoire. *Land*, 10(9), 892. <https://doi.org/10.3390/land10090892>
- Ginting, D. (2020). Policies on prevention and eradication of land mafia: Agrarian reform in Indonesia. *Utopía y praxis latinoamericana: revista internacional de filosofía iberoamericana y teoría social*, 25(2), 255-263. <http://doi.org/10.5281/zenodo.3809387>
- Hartanto, D., Dalle, J., Akrim, A., & Anisah, H. U. (2021). Perceived effectiveness of e-governance as an underlying mechanism between good governance and public trust: a case of Indonesia. *Digital Policy, Regulation And Governance*, 23(6), 598-616. <https://doi.org/10.1108/DPRG-03-2021-0046>
- Hasan, M. I., & Rupa, F. J. (2021). Digitalization of Bangladesh Judiciary and Access to Justice. *Asian Journal of Social Sciences and Legal Studies*, 3(3), 49-58. <https://doi.org/10.34104/ajssls.021.049058>
- Home, R. (2021). History and prospects for African land governance: institutions, technology and 'land rights for all'. *Land*, 10(3), 292. <https://doi.org/10.3390/land10030292>
- Ippolito, T. A., Herrick, J. E., Dossa, E. L., Garba, M., Ouattara, M., Singh, U., Stewart, Z. P., Prasad, P., Oumarou, I. A., & Neff, J. C. (2021). A comparison of approaches to regional land-use capability analysis for agricultural land-planning. *Land*, 10(5), 458. <https://doi.org/10.3390/land10050458>
- Kaburuan, E. D., & Damayanti, A. (2022). The Effectiveness of Indonesian National Police Strategy in Cybercrime Eradication through ASEAN Ministerial Meeting on Transnational Crime (AMMTC). *International Journal of Social Science And Human Research*, 5(8), 3649-3661. <https://www.ijsshr.in/v5i8/Doc/42.pdf>



- Kondori, F., Narges, & Rouhani, S. (2021). Presenting a conceptual framework for digital judicial transformation for digital governance. *Journal of Public Administration*, 13(3), 593-620. <https://www.sid.ir/FileServer/JF/45213990407.pdf>
- Kusmiarto, K., Aditya, T., Djurdjani, D., & Subaryono, S. (2021). Digital transformation of land services in Indonesia: A Readiness Assessment. *Land*, 10(2), 120. <https://doi.org/10.3390/land10020120>
- Mahardika, I. N. R., Suwitra, I. M., & Dharsana, I. M. P. (2022). Accountability of the national land agency for the issuance of an overlapping certificate of land rights. *International Journal of Research in Business and Social Science (2147-4478)*, 11(3), 248-256. <https://doi.org/10.20525/ijrbs.v11i3.1703>
- Mansoor, M. (2021). Citizens' trust in government as a function of good governance and government agency's provision of quality information on social media during COVID-19. *Government Information Quarterly*, 38(4), 101597. <https://doi.org/10.1016/j.giq.2021.101597>
- Mintah, K., Boateng, F. G., Baako, K. T., Gaisie, E., & Otchere, G. K. (2021). Blockchain on stool land acquisition: Lessons from Ghana for strengthening land tenure security other than titling. *Land Use Policy*, 109, 105635. <https://doi.org/10.1016/j.landusepol.2021.105635>
- Mohd Satar, S. D., Hussin, M., Hanapi, Z. M., & Mohamed, M. A. (2021). Towards Virtuous Cloud Data Storage Using Access Policy Hiding in Ciphertext Policy Attribute-Based Encryption. *Future Internet*, 13(11), 279. <https://doi.org/10.3390/fi13110279>
- Njeri, M. R., Maku, G. P., & Muriira, L. (2022). Record Management Technology and Information Service Delivery at the Land Registry in Nyandarua County, Kenya. *Journal of Information and Technology*, 2(2), 1-17. <https://edinburgjournals.org/journals/index.php/journal-of-information-technolog/article/view/105>
- Noor, A. (2021). Legal Status of Electronic Land Certificates in the Land Case Proof System in Indonesia. *International Journal of Cyber Criminology*, 15(1), 172-187. <https://www.cybercrimejournal.com/pdf/Final--Article-2-IJCC-Aslannoor-2.pdf>
- Pan, H., Qi, L., Zhang, Z., & Yan, J. (2021). Kinetic energy harvesting technologies for applications in land transportation: A comprehensive review. *Applied Energy*, 286, 116518. <https://doi.org/10.1016/j.apenergy.2021.116518>
- Peci, B., & Gashi, F. (2021). Examining Legal and Financial Aspects of Consumer Credit in Selected Countries of Western Balkans and Kosovo. *Croatian International Relations Review*, 27(88), 53-73. <http://www.cirri.org/index.php/cirri/article/view/458>
- Putra, B. A. (2022). Cyber Cooperation between Indonesia and the United States in Addressing the Threat of Cyberterrorism in Indonesia. *International Journal of Multicultural and Multireligious Understanding*, 9(10), 22-33. <http://dx.doi.org/10.18415/ijmmu.v9i10.4058>
- Ramadhani, R. (2021). Legal Protection For Land Rights Holders Who Are Victims Of The Land Mafia. *International Journal Reglement & Society (IJRS)*, 2(2), 87-95. <https://doi.org/10.55357/ijrs.v2i2.114>
- Rana, T., Steccolini, I., Bracci, E., & Mihret, D. G. (2022). Performance auditing in the public sector: A systematic literature review and future research avenues. *Financial Accountability & Management*, 38(3), 337-359. <https://doi.org/10.1111/faam.12312>
- Rifai, E. (2021). Law Enforcement and Justice Issues in Gratification Criminal Cases. *International Journal of Criminal Justice Sciences*, 16(2), 191-201. <https://ijcjs.com/menu-script/index.php/ijcjs/article/view/60>

- Roesli, M., Warka, M., Setyadji, S., & Prasetyawati, E. (2021). Land Procurement Rights for Development for Public Interest. *Technium Social Sciences Journal*, 20, 329-333. <https://techniumscience.com/index.php/socialsciences/article/view/3502>
- Saadatmandan, J., & Rahimi, A. (2021). Digital Certificate of Public Key for User Authentication and Session Key Establishment for Secure Network Communications. *International Journal of Network Security*, 23(3), 480-489. [https://doi.org/10.6633/IJNS.202105_23\(3\).13](https://doi.org/10.6633/IJNS.202105_23(3).13)
- Saračević, M. H., Adamović, S. Z., Mišković, V. A., Elhoseny, M., Maček, N. D., Selim, M. M., & Shankar, K. (2020). Data encryption for Internet of Things applications based on catalan objects and two combinatorial structures. *IEEE Transactions on Reliability*, 70(2), 819-830. <https://doi.org/10.1109/TR.2020.3010973>
- Silviana, A., Utama, Y. J., Ismail, N., & Ardani, M. N. (2021). Land management policy in the coastal area based on the local wisdom. *Aquaculture, Aquarium, Conservation & Legislation*, 14(6), 3403-3415. <https://www.proquest.com/openview/ba4ade662684b0aa4c2a291af06e1694>
- Siregar, G., & Lubis, M. R. (2021). Juridical Analysis of Religious Blasphemy Crimes Through Smartphone Application Based On The Information and Electronic Transaction. *Journal of Contemporary Issues in Business and Government*, 27(2), 1006-1012. <https://doi.org/10.47750/cibg.2021.27.02.120>
- Suhartono, S. (2022). Cyber Violence with Biosocial Perspective and The Role of Preventive Legislative Mechanism. *International Journal of Cyber Criminology*, 15(2), 92-101. <https://cybercrimejournal.com/menuscript/index.php/cybercrimejournal/article/view/13>
- Suhendi, D., & Asmadi, E. (2022). Cyber laws Related to Prevention of Theft of Information Related to Acquisition of Land and Infrastructure Resources in Indonesia. *International Journal of Cyber Criminology*, 15(2), 135-143. <https://cybercrimejournal.com/menuscript/index.php/cybercrimejournal/article/view/35>
- Syarief, E. (2021). Electronic Land Certificates: Its Goals and Challenges. *Research Horizon*, 1(4), 120-125. <https://doi.org/10.54518/rh.1.4.2021.120-125>
- Thamrin, R. M., Harahap, E. P., Khoirunisa, A., Faturahman, A., & Zelina, K. (2021). Blockchain-based land certificate management in indonesia. *ADI Journal on Recent Innovation*, 2(2), 232-252. <https://doi.org/10.34306/ajri.v2i2.339>
- Uniyal, N., Dobhal, G., & Semwal, P. (2020). Enhanced security of encrypted text by KDMT: Key-domain maximization technique. *International Journal of Recent Technology and Engineering (IJRTE)*, 8(5), 1385-1388. <https://doi.org/10.35940/ijrte.E6326.018520>
- Wajdi, F., & Ramadhani, R. (2022). Legal Problems of Land Services Online. *International Journal Reglement & Society (IJRS)*, 3(1), 19-29. <https://doi.org/10.55357/ijrs.v3i1.201>
- Wang, H., Ma, S., Dai, H.-N., Imran, M., & Wang, T. (2020). Blockchain-based data privacy management with nudge theory in open banking. *Future Generation Computer Systems*, 110, 812-823. <https://doi.org/10.1016/j.future.2019.09.010>
- Widyastuti, R. (2021). Community Legal Protection and the Legal Position of Electronic Land Certificate in Land Registration Based on Notarial Assets. *International Journal of Multicultural and Multireligious Understanding*, 8(5), 207-211. <http://dx.doi.org/10.18415/ijmmu.v8i5.2642>



- Yazdeen, A. A., Zeebaree, S. R., Sadeeq, M. M., Kak, S. F., Ahmed, O. M., & Zebari, R. R. (2021). FPGA implementations for data encryption and decryption via concurrent and parallel computation: A review. *Qubahan Academic Journal*, 1(2), 8-16. <https://doi.org/10.48161/qaj.v1n2a38>
- Yubaidi, R. S. (2020). The Future of Land Ownership Regulation in Indonesia. *International Journal of Multicultural and Multireligious Understanding*, 6(6), 712-720. <http://dx.doi.org/10.18415/ijmmu.v6i6.1236>
- Yusni, M., & Sigalingging, B. (2022). Encryption as The Legal Protection Against Cybercrimes Associated with Digital Land Certificates in Indonesia. *International Journal of Cyber Criminology*, 15(2), 124-134. <https://cybercrimejournal.com/menuscript/index.php/cybercrimejournal/article/view/34>

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