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Legal Certainty of Electronic Certificates In National Land Law Reform in The Digital Transformation Era

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Abstract: This article explores the legal legitimacy and challenges in the implementation of electronic land certificates (e-certificates) within Indonesia's national land administration system, while examining the concept of immutability the inability to alter data in the context of land law. It discusses the legal foundations, implementation processes, evidentiary strength, as well as technical and regulatory challenges, highlighting the potential of e-certificates as instruments that enhance legal certainty and security in the digital era of land administration. The digital transformation of Indonesia's national land system introduces a significant innovation in the form of electronic land ownership certificates (e-certificates), aimed at improving efficiency, accountability, and legal certainty in land administration. This article critically examines the legal legitimacy, normative basis, and practical implications of implementing e-certificates within the framework of national land law, with a primary focus on the application of the principle of immutability, whereby data cannot be changed or manipulated without a legitimate audit trail. Using a normative juridical approach and empirical analysis based on primary data, this article identifies several implementation challenges including vulnerabilities in information systems, infrastructure gaps, suboptimal legal evidentiary mechanisms in court, and social resistance to the digitization of land ownership documents. The success of e-certificate implementation is highly dependent on data interoperability, resilient system design, and regulatory clarity regarding digital legal evidence. Digital transformation has become a national strategic agenda for bureaucratic modernization and improving public service quality, as outlined in Peraturan Presiden Nomor 95 Tahun 2018 on the Electronic-Based Government System (SPBE). One of the sectors undergoing accelerated digitalization is land administration, through the implementation of electronic certificates by the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN), Peraturan Menteri ATR/BPN Nomor 3 Tahun 2023 concerning Electronic Documents. This initiative aims to create efficient, transparent, and integrated land registration services. However, the use of e-certificates as legal evidence of land rights presents both normative and practical challenges within the national legal system particularly regarding evidentiary strength, document legality, and data integrity and authentication safeguards. The effectiveness of e-certificate implementation depends on a legal system that is adaptive to technology, supported by a digital architecture that incorporates the principle of immutability through cryptographic technology, audit trails, and potential blockchain utilization. Thus, the

certificate becomes not only an administrative tool but also a new foundation for the protection of agrarian rights in the digital era. These findings are relevant for policymakers, academics, and land practitioners in designing a modern, inclusive, and legally protective national land system.

Keyword: Electronic Certificate; E-Certificate; Land Law; Immutability; Land Digitalization.

INTRODUCTION

The digitization of land administration in Indonesia has now entered a new phase, namely the transition from analog land certificates to electronic certificates (e-certificates). This change is not only aimed at improving bureaucratic efficiency, but also at strengthening data integrity and preventing manipulation, which has long been a challenge in the national land system. The modernization of Indonesia's land administration has taken a significant leap forward through the digitization of land documents, including the replacement of analog land certificates with electronic ones. This effort is aimed at increasing efficiency, reducing manipulation, and strengthening legal certainty of land ownership. However, this transition also raises profound normative questions, particularly regarding the concept of immutability to what extent electronic certificates are truly “unchangeable” and how this is viewed within the national land law framework.

The implementation of electronic certificates, although intended to speed up services and improve efficiency, still faces a number of legal problems. Among them are the lack of an optimal legal framework governing the integration of electronic data in the land registration system, as well as potential risks to cyber security, digital document forgery, and potential disputes due to data inconsistencies between institutions. In addition, there are no explicit provisions in the UUPA or its derivative regulations that comprehensively regulate the legal force of electronic certificates as evidence in court. This creates a legal vacuum that can hamper the effective implementation of digital transformation in the land sector.

In the context of economic development and investment, the presence of a modern and reliable land legal system is an important pillar in creating ease of doing business (EODB) and strengthening national competitiveness. Legal certainty regarding land ownership is not only needed by individuals, but also by business actors, investors, and financing institutions that depend on the validity of land rights as legal collateral in various transactions. Without guarantees of legal security for land assets, there will be high investment risks and weakened confidence in the national legal system.

In updating the national land system, a legal theory is needed that can explain the need for systematic and technology-based changes. The theory of legal reform according to Mochtar Kusumaatmadja Another purpose of law is to create justice that varies in content and scope, according to the times. To achieve order in society, there must be certainty in human interactions within society. Law must be seen as a living, evolving tool that is capable of adapting to social realities. On the other hand, digital transformation in the land system, such as the use of electronic certificates, must remain subject to the principle of legal certainty, which includes guarantees of data authenticity, integrity of rights, and protection from misuse or manipulation of digital data. The concept of immutability in technology is important to bridge the need for legal reform while maintaining the stability of the law itself. According to Dr. Eddy Army in “electronic evidence in judicial practice” that the role of law in development is to ensure that change occurs in an orderly manner. Legal changes are directed in accordance with the concept of Development in Indonesia. The role of law in this development is explained by Mochtar Kusumaatmadja. that all societies undergoing development are characterized by change, however we define development and whatever measures we use for societies in

development. The role of law in development is to ensure that change occurs in an orderly manner.

Legal reform in the implementation of electronic certificates is an urgent need that must be responded to in a systemic and integrative manner. This reform not only concerns regulatory revisions, but also institutional strengthening, digital system standardization, and harmonization between conventional and digital land legal systems. This study aims to examine and offer a design for legal reform that is adaptive to technological developments, while remaining based on the basic principles of national agrarian law. Thus, the digital land registration system through electronic certificates can provide certainty, protection, and legal justice for all levels of society in the era of digital transformation. The digitization of land services is an integral part of the national digital transformation agenda, which is driven by the need to create an efficient, transparent, and responsive bureaucracy that can keep pace with socio-economic dynamics.

The Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) has initiated a transition from a conventional system to an electronic system, including in the issuance of land certificates. The implementation of electronic certificates, as stipulated in ATR/BPN Ministerial Regulation No. 3 of 2023, is an important milestone in the modernization of land administration, which aims to accelerate services, minimize maladministration, and increase legal certainty of land rights. However, the implementation of this policy still faces a number of complex empirical challenges. Digitalization has recorded a number of advances, such as accelerated service processes and reduced transaction costs. However, on the other hand, there are serious obstacles related to limited coverage, the availability of digital infrastructure (uptime and accessibility systems that are not yet stable), and the quality and accuracy of data that is not yet fully reliable, especially in the process of converting from analog to digital data. Often, this actually gives rise to new potential disputes, whether due to overlapping data, delays in updating information, or inconsistencies in electronically registered land rights information.

The above conditions emphasize the importance of legal reforms that are not only normative but also functional and contextual, so that the electronic certificate system can truly function as a valid and strong evidence in guaranteeing land rights in the national land law system in this digital era. This study aims to examine the existing legal framework, identify normative and implementative gaps, and offer a model for legal reform that can address empirical challenges and strengthen the legal legitimacy of electronic certificates in the Indonesian land system. Other challenges include the synchronization of data across agencies (ATR/BPN, Dukcapil, Ministry of Finance, etc.); security and authentication risks in electronic systems (cybersecurity, potential for digital forgery); gaps in human resource capacity and public access to digital services; suboptimal dispute resolution mechanisms in electronic systems; and aspects of legitimacy and legal proof of electronic certificates in court.

Advances in information and communication technology have encouraged various countries, including Indonesia, to undertake digital transformation in their public administration systems. One sector that has undergone fundamental changes is land administration. The Indonesian government, through the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN), has officially launched an electronic certificate program as part of its agenda for bureaucratic reform and modernization of the national land system. The issuance of electronic certificates, which is regulated through ATR/BPN Ministerial Regulation Number 3 of 2023 concerning Electronic Documents, is intended to replace physical (analog) certificates with digital documents that have equivalent legal force. The main objectives of this initiative are to improve service efficiency, accelerate the land registration process, reduce the risk of document loss or falsification, and increase legal certainty and protection of land rights.

This transformation is not merely an administrative or technological change, but also raises various juridical, normative, and practical issues that require in-depth study. One of the main issues of concern is the application of the concept of immutability a principle stating that valid digital data cannot be changed, deleted, or manipulated without leaving a verifiable authentic trace. In the context of land, this principle is crucial because it concerns legal trust and the validity of ownership.

Historically, Indonesian national land law has been based on the principle of formal legal certainty through the proof of rights contained in physical documents issued by the government (land title certificates). With the shift to digital documents, the principles of proof, protection of rights, and state authority over land data must also be transformed. This raises the fundamental question of whether electronic certificates truly guarantee immutability as intended in modern legal principles and digital technology, and how these principles can be applied in the context of Indonesia's national land law, which is still rooted in a conventional administrative system and colonial inheritance law.

The implementation of electronic certificates in Indonesia faces various challenges, but on the other hand, digitization opens up great opportunities for land data integration, increased accountability, and a reduction in land mafia practices. Concerns about cybersecurity, data vulnerability, the potential for abuse of digital authority, and the unpreparedness of legal and technical infrastructure, especially in areas with limited access to technology, are challenges in the implementation of electronic certificates. The concept of immutability, although technologically achievable through cryptography, digital signatures, and blockchain technology, has not been fully internalized in Indonesia's positive legal framework. Regulations related to electronic documents, as stipulated in the Electronic Information and Transaction Law (ITE Law), still do not explicitly regulate aspects of evidence in the context of agrarian law and land rights.

In addition, the absence of a uniform evidence system to address digital data-based land disputes poses a particular challenge. In a global context, several countries, such as Estonia, Georgia, and Singapore, have already implemented electronic-based land systems with immutability mechanisms that are well-established and recognized by their national legal systems.

A comparative study of these models is relevant to identify best practices that can be adopted or adapted to the Indonesian legal context. With a juridical-normative approach combined with empirical and comparative studies, this article is expected to provide academic and practical contributions to the development of national land law that is adaptive to the digital era, without sacrificing the fundamental principles of legal certainty and justice.

METHOD

The research method in this article uses a normative approach, which is normative legal research, as stated by Prof. Dr. Irwansyah, S.H., M.H, which states that normative legal research is research conducted by examining written legal materials, including legislation, court decisions, doctrines, and other legal literature. This research aims to identify, examine, and analyze applicable legal norms, particularly those related to the digitization of land certificates and the principle of immutability in national land law. Normative legal analysis essentially emphasizes the deductive method as the main approach, while the inductive method is used as a supplement. According to Prof. Dr. H. Moh. Askin, SH, Normative Legal Research, analysis of the judge's decision the analysis was conducted qualitatively, comprehensively, and thoroughly. This was done to describe the data in a high-quality manner in the form of sentences that were organized, coherent, logical, not overlapping, and effective, thereby facilitating data interpretation and understanding of the analysis results. Several approaches were used in this study, namely:

Statute Approach, this approach is used to examine various positive legal provisions governing land and electronic systems, including Law No. 5 of 1960 concerning Basic Agrarian Principles (UUPA), other regulations, both Government Regulations and ATR/BPN Ministerial Regulations that are relevant and related to this study, especially concerning Electronic Certificates, Electronic Documents, and Evidence. This approach is used to examine the legal concepts that form the basis of the discussion, such as the principle of immutability, the principle of legal certainty, and the principle of protection of land rights within the national legal framework. This approach aims to understand how legal theory and doctrine can be used to strengthen the analysis of existing norms. This approach was carried out by analyzing several court decisions related to land rights disputes and the use of electronic systems in land administration, in order to determine how legal norms are applied in judicial practice and to assess the effectiveness of legal protection in the context of land digitization.

The data used in this article's research is secondary data, in accordance with the category of legal materials, namely primary legal materials in the form of legislation, court decisions, legal literature in the form of books, journals, research results, legal expert opinions, legal dictionaries, legal encyclopedias, and bibliographies. The data was obtained through library research, namely by collecting, reviewing, and recording legal information from various relevant sources.

The data was analyzed using descriptive qualitative methods, namely by classifying legal materials, interpreting the content of legal norms, and compiling logical, systematic, and critical legal arguments. The interpretation techniques used included grammatical interpretation (based on the language of the norms), systematic interpretation (based on the applicable legal structure), and teleological interpretation (based on the purpose of the legal norms). It is hoped that through these techniques, the results of the analysis will provide a comprehensive understanding of the dynamics of electronic land law and its contribution to legal certainty in the digital age.

RESULTS AND DISCUSSION

Development of Land Registration and Issuance of Land Title Certificates in

Land registration in Indonesia is inseparable from the long history and development of Indonesia's national government and political systems. Registration is an integral part of the national agrarian legal system, whose main purpose is to provide legal certainty and protection of land rights. The development of legal and regulatory reforms in the field of land registration shows the transformation of Indonesia's land policy, which continues to adapt to the needs of the times, from a manual or analog administrative approach to the current era of digital transformation.

Law No. 5 of 1960 concerning Basic Agrarian Principles (UUPA) is the main foundation of the national land law system. Article 19 paragraph (1) of the UUPA states that: "To ensure legal certainty, the Government shall conduct land registration throughout the territory of the Republic of Indonesia in accordance with the provisions stipulated by Government Regulation." This provision marks a paradigm shift from colonial law to the national legal system, in which the regulation of land rights is no longer merely administrative in nature, but is also based on social principles and justice. Land registration within the framework of the UUPA aims to: Provide legal certainty and protection of land rights, Prevent agrarian disputes, Provide reliable juridical and physical data on land. Boedi Harsono As stated in Article 19 of the UUPA relating to land registration, paragraph (1) "to ensure legal certainty, the government shall conduct land registration throughout the territory of the Republic of Indonesia in accordance with the provisions stipulated by Government Regulations," paragraph (2) "The registration referred to in paragraph (1) shall include: a). land measurement, mapping, and recording; b). registration of land rights and transfer of such rights; c). issuance of title

deeds, which serve as strong evidence. Based on the UUPA, land registration is not merely a technical procedure, but a manifestation of citizens' constitutional rights to land. Land registration in Indonesia is a fundamental aspect of the national land law system. Since the enactment of the Basic Agrarian Law (UUPA) in 1960, the Indonesian government has been committed to developing a land system that can guarantee legal certainty, justice, and legal protection of land rights.

Land rights certificates are issued by the government through surveying, mapping, and recording of rights, with the issuance of certificates as strong evidence of rights. Dr. H. Eddy Army, SH. MH states, From the perspective of the theory of evidence as regulated in civil law, namely in the Civil Code (KUP Perdata) stated in Article 1865, it is stated that "every person who claims to have a certain right, or points to a certain event to confirm that right or to refute the rights of others, is obliged to prove the existence of that right or the event that he/she has presented. This construction means that anyone who claims to have a certain right must be able to prove it. These two theories show that land title certificates have a high position in the system of evidence, both in public and private relations regarding the land rights of individuals or legal entities in the national land law system.

There are two types of land registration systems, according to Prof. Boedi Hasono There are two types of land registration, namely deed registration and title registration (title in the sense of rights). The land registration system addresses the following issues: what is registered, the form of storage and presentation of legal data, and the form of proof of rights.

Government Regulation No. 10 of 1961 concerning Land Registration was the initial implementation of the 1960 Basic Agrarian Law. This regulation became the foundation for the land administration system in Indonesia. This Government Regulation stipulates that every land right must be registered in order to provide legal certainty for the right holder. Land rights certificates are issued as strong written evidence, and it is stipulated that the registration process is carried out administratively by the Land Office. The implementation of Government Regulation No. 10 of 1961 is still limited and manual in nature and sporadic, meaning that registration is only carried out if there is a request from the land owner, and is not yet comprehensive nationwide. The term "certificate" first appeared as mentioned in PP 10 of 1961, Article 13, 1) For each right recorded in accordance with Article 12, a copy of the relevant land register shall be made, 2) To describe the land referred to in the copy of the land register, a survey letter shall be made, 3) The copy of the land register and the survey letter, after being bound together with a cover whose form is determined by the Minister of Agrarian Affairs, shall be called a certificate and given to the rightful owner, 4) The certificate in paragraph (3) of this article is a document proving the rights referred to in Article 19 of the Basic Agrarian Law.

After almost 36 (thirty-six) years of PP 10 of 1961 being in effect, a regulation was issued governing land registration by implementing various simplifications, marked by the enactment of Government Regulation No. 24 of 1997 concerning Land Registration (PP 24 of 1997), which was marked by the modernization of the Land Registration System in Indonesia, both in terms of the system and the management of land registration in a systematic manner. As an improvement on the previous PP, PP No. 24 of 1997 concerning Land Registration significantly updated the national land registration system. In this regulation, land registration is divided into two approaches, namely: Systematic land registration: carried out on the initiative of the government in a comprehensive and structured manner. Sporadic land registration: carried out at the request of individuals or community groups.

This PP promotes the principles of legal certainty, ease of access, and protection of rights, and recognizes certificates as valid evidence of land ownership issued by the state. In addition, the principles of transparency and public service have been incorporated into the land system. Article 2 of Government Regulation No. 24 of 1997 states that "land registration shall

be carried out based on the principles of simplicity, security, affordability, timeliness, and openness.” Then in Article 3 (three) it is stated that land registration aims to: a. provide legal certainty and protection to holders of rights to a plot of land, apartment unit, and other registered rights so that they can easily prove themselves as the holders of the rights concerned; b. to provide information to interested parties, including the Government, so that they can easily obtain the data needed to carry out legal actions regarding registered land parcels and apartment units; c. to ensure the orderly administration of land affairs. According to Prof. Boedi Hasono that land registration is the responsibility of the Government, which is carried out in order to ensure legal certainty in the field of land (a “rechtscadaster” or “legal cadaster”).

The implementation of PP 24 of 1997 is regulated in the Technical Regulations on Land Registration, marked by the enactment of Regulation of the Minister of Agrarian Affairs/Head of the National Land Agency (Permen ATR/BPN) Number 3 of 1997 concerning the implementation of PP 24 of 1997 concerning Land Registration. This regulation details the procedures for land registration, from the submission of applications, measurement, creation of land maps, examination of legal data, to the issuance of certificates. This regulation also regulates the format and form of land certificates as well as the authority of land officials in the registration process. Although the system is now more structured, the entire process is still carried out conventionally and is based on physical documents.

Amidst the rapid development of information technology and digital transformation in both science and public services, regulations and rules in the land sector have also been adjusted, marked by the issuance of several regulations that are in line with digital transformation and developments in science and technology, namely Permen ATR/BPN No. 1 of 2021 concerning Electronic Certificates, which initiated the digitization of land certificates. In response to technological developments and the need for efficient public services, the Ministry of ATR/BPN issued Permen ATR/BPN No. 1 of 2021 concerning Electronic Certificates. This regulation marks the beginning of the digitization of Indonesia's land system. This regulation stipulates that land documents, including land title certificates, can be issued in electronic form and have the same legal force as physical documents. Electronic certificates contain digital data, electronic signatures, and QR codes that are integrated with the national land database system.

The strengthening of electronic certificates is increasingly becoming a necessity for current and future land services and management. The refinement of Permen ATR/BPN No. 1 of 2021 continues with the enactment of Permen ATR/BPN No. 3 of 2023 concerning the Issuance of Electronic Documents. This regulation expands the scope of land document digitization beyond land title certificates to include: electronic measurement letters, electronic land books, situation maps, and other supporting documents. This regulation affirms that all land documents issued electronically have the same legal force as physical documents and can be used as valid evidence in legal proceedings. This regulation is also a concrete form of transformational and information technology-based national land law reform, in line with the national development direction towards digital governance.

The Indonesian land registration system has undergone a significant regulatory evolution, from a manual system to a digital system. This legal reform is not only a response to the need for efficiency and security, but also a manifestation of progressive legal theory and legal reform theory. Law can and should be used as a means of social renewal. The digitization of land certificates is a concrete manifestation of the use of law as a tool of social engineering. The regulatory journey of land registration reflects the implementation of the theory of legal reform as proposed by Mochtar Kusumaatmadja, which states that law can function as a means of social renewal (law as a tool of social engineering). Land digitization not only addresses administrative efficiency needs, but is also part of a legal strategy to address the challenges of globalization and the industrial revolution 4.0.

Legal Analysis Of Electronic Certificates In The National Land Law System In The Digital Transformation Era

The implementation of electronic certificates with the concept of immutability provides an important foundation for the integrity of the electronic certificate system. In land law, this principle supports the main objective of land registration as mandated by the Basic Agrarian Law and its derivative regulations. However, its implementation must be complemented by a strong digital legal framework, accountable technology governance, and public participation in system oversight. This is because in a legal society, validity is not based solely on technology, but also on the legitimacy of norms and transparency of processes. According to Josua Sitompul, Law is also a reflection of modernity. The development of law is greatly influenced by technological developments. Law also develops based on concepts that are borrowed, adopted, or integrated from other branches of science, such as philosophy, language, biology, economics, and computer science. The development of a country's law is also influenced by the doctrines of other countries. Therefore, law can be seen as bricolage, a mixture of various elements originating from various branches of science in the form of art. However, regardless of these developments and influences, the backbone of law is the same, namely, enforceable rules established by authorities, with sanctions imposed on violators.

According to Prof. Dr. MCL, MPA, "Responsible legal development requires an objective perspective to avoid excessive suspicion of new developments or an overly accepting attitude toward new things without careful consideration of the underlying concepts. Whatever method of legal discovery is chosen, it must be based on a logical, consistent, and critical approach to the operationalization of applicable legal principles. Building law is not a simple matter, because a good law must fulfill the requirements of justice, legal certainty, and benefit in a balanced manner."

The theory of electronic and digital evidence is inseparable from the term information technology, which is currently developing. Dr. Danrivanto Budihijanto, SH, LLM, in his book *Teori Hukum Digital (Theory of Digital Law)*, Information and Communication Technology (ICT) is also understood as technology that is capable of storing, transmitting and/or processing information and communication. According to him, *lex information* has a set of specific characteristics that can flexibly advance the objectives of information management policies. The formulation of *lex information* as a regulation has avoided many difficulties with the significance of conflict and uncertainty inherent in legal settlements.

Immutability in the digital context refers to the impossibility of making changes without leaving a trace, whether through encryption, blockchain, or digital audit systems. In land law, immutable data is important to ensure the integrity of land ownership records from manipulation, falsification, and disputes. This article begins with the theory of national land law sourced from the 1960 Basic Agrarian Law, namely Law Number 5 of 1996, and digital law theory to bridge how the concept of electronic certificates and the concept of immutability in national land law in the current era of digital transformation.

According to Prof. Boedi Harsono "Judging from its objectives, the Dutch East Indies Administrative Land Law cannot be maintained and must be replaced with the National Administrative Land Law, which provides legal support to the National Government in implementing the National Land Policy outlined in the 1945 Constitution." The Basic Agrarian Law is a milestone in the history of national land law because it marked a renewal of national land law with the enactment of the UUPA, namely Law Number 5 of 1960 concerning Basic Agrarian Principles. This change was fundamental in nature, as it concerned the structure of the legal apparatus, the underlying concept, and the content, which is stated in the "opinion" section of the UUPA, which must be in accordance with the interests of the Indonesian people and also meet the needs of the times.

Various agrarian legal instruments prior to the enactment of the UUPA were based on customary law, which had a communalistic regius concept, and Western civil law, which had an individualistic liberal concept. There were also instruments originating from various autonomous governments, which generally had a feudal concept, while the Dutch government implemented its agrarian policy as stipulated in the Agraïsche Wet 1870. The development of National Land Law from the above periods has been very dynamic, beginning from the pre-independence era, which was characterized by the concepts of Customary Land Law and Western Law, especially Dutch law, as the ruling power and colonizing nation at that time, to the present day, where the development of Digital Technology in the Era of the Industrial Revolution 4.0 is marked by the use of digital technology, which is believed to be able to improve the quality of life of the community in this era of rapidly advancing Information Technology. The digital transformation that we cannot avoid today has brought about major changes, including in the field of land and spatial planning in Indonesia, both in terms of land services and the National Land Law system. The rapid development of information technology has brought about major changes in the development of National Land Law, including the Land Registration system in Indonesia.

Suyus Windayana explains that the current national land registration status of the total land area throughout Indonesia is 126 million plots. The national land registration achievement as of November 28, 2024, is a total of 120.4 million registered plots (95.59), with a total of 94.9 million plots (75.39) certified. The management and administration of such a large number of land registrations needs to be anticipated, especially the management of certified land, which is proof of ownership and control, one of which is by modernizing electronic services and issuing electronic certificates as proof of land ownership rights in Indonesia. Secretary General (Sekjen) of the Ministry of ATR/BPN, Suyus Windayana When serving as the keynote speaker at the National Seminar organized by the Indonesian Cadastral Survey Experts Association (MASKI) at the Horison Hotel in Bandung on Saturday (September 14, 2024), he stated that the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (BPN) reported on the progress of implementing electronic certificate services. To date, 891,939 electronic certificates have been issued. "Currently, 455 Land Offices are operating electronic land services. We have issued 891,939 electronic certificates to date. E-Certificates are certificates issued through an electronic system whose physical and legal data are stored in the Electronic Land Registry or BT-El. In this case, the public also receives electronic land certificates in physical form, namely 1 sheet of paper with special specifications in the form of security paper and a certified electronic signature.

Raden Ayu Rani Mutiara Dewi, In his writing on the Use of Electronic Certificates, he stated that in order to improve the efficiency of land registration in an effort to prevent land mafia, digitization in land ownership services using this technology minimizes human error, such as disputes or the existence of duplicate or overlapping data. In this digital transformation, the ministry has implemented improvements in digital services and shifted data input from manual to digital, thereby reducing the occurrence of land disputes. He concluded that paper land certificates carry many risks, such as forgery by land mafia, theft, damage to documents caused by natural disasters or fires, or other things that cause losses. These conditions have prompted the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) to digitize and streamline files, giving rise to the idea of issuing electronic land certificates.

The current development of the national legal system shows adaptive efforts towards digitization, including in terms of the recognition of electronic documents, electronic signatures (TTE), and personal data protection (PDP) as part of legal reform in the era of digital transformation. Various regulations, such as Law Number 11 of 2008 concerning Electronic Information and Transactions (ITE Law) and its amendments, Law Number 27 of 2022

concerning Personal Data Protection, and a number of technical regulations concerning TTE and electronic systems, have become the initial basis for the recognition of digital-based evidence. However, when these norms are applied in the context of land, particularly electronic certificates as evidence of land rights, various normative and implementational issues arise. One of the main challenges is the potential disharmony between general norms regarding electronic documents and the need for specific norms in land law, which do not explicitly regulate the characteristics, form, or legal proof of electronic certificates. The absence of specific and sectoral norms has led to uncertainty regarding the probative value, validity of authentication, and digital originality of electronic land certificates, especially when compared to physical certificates, which have been considered authentic evidence under civil evidence law. In practice, this raises concerns about the applicability and acceptance of electronic certificates as primary evidence in legal proceedings, both in the administrative and judicial spheres. Therefore, comprehensive and harmonious legal reforms are needed, which not only guarantee legal certainty but also ensure that norms regarding electronic documents and digital evidence can function effectively in a national land law system based on digital transformation.

Digital transformation is an inevitable global phenomenon, including in governance and public services. The Indonesian government has encouraged the acceleration of digitization through the Electronic-Based Government System (SPBE) policy as stipulated in Presidential Regulation No. 95 of 2018, with the aim of creating a more efficient, transparent, and accountable bureaucracy. However, the transition from a conventional system to an electronic system presents real challenges in practice. On the one hand, digitization has produced a number of achievements, such as efficiency in service time and the potential for improving the quality of land data. However, empirically, the implementation of electronic certificates still faces serious problems, including limited coverage of implementation, unstable electronic system infrastructure (uptime), and inaccuracy or inconsistency of data converted from analog to digital documents. This poses the risk of new disputes arising, whether in terms of ownership, overlapping rights, or legal claims based on electronically verified data that is weak. This problem becomes even more complex when the national land law system does not yet fully provide adequate normative instruments to guarantee the legal force and validity of electronic certificates as evidence of land rights.

Definition and Contextualization of Immutability In the realm of information technology, immutability means the impossibility of data being altered or deleted without a trace. This is an important element in cryptography, digital signatures, and distributed ledger technology (such as blockchain) to ensure data integrity, non-repudiation, and reliability. **Ledger and Blockchain.** According to Ledger Academy, Immutability in the context of blockchain means that recorded data or transactions become permanent and tamper-proof so that the record history cannot be modified after it is created. This is achieved through a cryptographic hashing mechanism that binds each block to the previous block. The term “immutable” in the context of blockchain implies that the data or ledger is permanent and tamper-proof, and its history cannot be modified or changed after its creation. Immutability is one of the core, defining characteristics of blockchain. It is the property whereby something, once created, cannot be changed. Immutable transactions are an important aspect of blockchain.

Immutable transactions mean that transactions or data stored on the blockchain cannot be manipulated, modified, or falsified by anyone (government, organization, or individual). Immutability, as one of the key features of blockchain technology, is achieved through a method called cryptographic hashing, which converts plain text of any size into a unique text string of fixed length. The main benefits of immutability in blockchain technology relate to data integrity, security, fraud detection and prevention, and auditing. Immutability makes the auditing process easier and more cost-effective, as auditors can rely on the authenticity and legitimacy of the data source (blockchain). This is coupled with the indelible, permanent, and

indisputable nature of blockchain transaction history, facilitating a verifiable and shareable source of truth, minimizing the risk of any data modification, as it would require all nodes participating in the network to verify and accept the change, protecting data integrity by preventing invalid transactions. Although immutability is one of the core benefits of blockchain, it does not make blockchain immune to vulnerabilities such as double spending or 51% attacks. Although the chances are low, malicious actors could gain control over the majority of the network's hash rate to alter data or transactions.

Oliver Bennett in his article on www.blockchainsecuretech.com "Understanding Blockchain's Immutable Ledger: Implications for Business" Security and trust are among the most significant implications of blockchain technology for businesses. By utilizing cryptographic techniques and distributed consensus mechanisms, blockchain creates a tamper-proof and transparent system. The decentralized nature of blockchain makes it extremely difficult for malicious actors to manipulate or alter the data stored on the blockchain. This increase in security and transparency can help businesses build trust among stakeholders, such as customers, partners, and regulators.

Law Number 11 of 2008 concerning Electronic Information and Transactions (ITE Law) provides a legal basis for the recognition of electronic documents as valid evidence if they can be verified and protected from unauthorized changes. Immutability is a technical prerequisite to ensure that electronic documents are reliable as evidence; every change must be recorded and traceable. The Constitution and the Basic Law on Land Administration (UUPA) place the state as the institution in charge of managing land rights (Article 33 of the 1945 Constitution and the 1960 UUPA). The state is responsible for protecting land data from manipulation, in line with the principle of public trust. If a digital system does not implement immutability, its legitimacy and public trust will be compromised. Immutability and Blockchain are known for their ability to create unalterable and transparent records. In a digital land administration system, blockchain enables secure public verification and auditing of land data.

In line with the principle and concept of the impossibility of data being altered or deleted without a trace, the ITE Law also guarantees that the authority over electronic evidence in the ITE Law is stated in Article 32 paragraph (1), which explains that altering, adding, reducing, transmitting, damaging, removing, moving, or hiding any electronic information and/or electronic documents belonging to another person or the public is punishable by imprisonment for a maximum of 8 (eight) years and/or a fine of up to 2,000,000,000 (two billion rupiah). Then, in the provisions of Article 233 of the Criminal Code, it is explained that intentionally destroying, damaging, rendering unusable, or removing items used to convince or prove something before the competent authorities, deeds, letters, or lists that, by order of the public authorities, continuously or temporarily stored, or submitted to an official, or to another person for the public interest, shall be punished with a maximum imprisonment of four years.

Electronic certificates are an extension of legal evidence as also mentioned in Article 5 of the Information and Electronic Transactions Law Number 11 of 2008 as amended by Law Number 19 of 2016, which states that electronic information and/or electronic documents can be valid evidence, provided that they can be accessed, displayed, guaranteed to be complete, and accounted for so as to explain a situation. Regulatory implementation in the national context through Permen ATR/BPN No. 3 of 2023 requires that electronic certificates must have electronic signatures, but does not explicitly require immutability systems.

Legal studies state that this system strengthens digital legal certainty compared to analog certificates, but the urgency of data protection and digital auditing still needs to be strengthened. In addition, the concept of responsive law emphasizes that regulations must be adaptive to technological dynamics and community needs. Public responsibility and conditions, as well as social challenges, reveal public concerns about the security of digital

documents. Although digital systems offer convenience, the risk of data leaks or technical manipulation is a major concern. This confirms that immutability is not only a matter of technology, but also a matter of public trust in the system.

CONCLUSION

The transformation of Indonesia's land administration system into the digital era through the implementation of electronic certificates marks a major leap in efficiency, accountability, and modernization of public services. However, this transition is not only a technical issue, but also concerns fundamental legal principles, one of which is the concept of immutability, which is the guarantee that digital data cannot be changed without a trace and accountability mechanism. In the context of national land law, immutability has a central position as a prerequisite for maintaining legal certainty, data integrity of ownership, and protection of the rights of legal subjects. The application of this principle requires comprehensive support, both from a juridical aspect through the strengthening of regulations such as the explicit principles of auditability and transparency in Permen ATR/BPN No. 3 of 2023 and from a technical aspect, through the use of digital signature mechanisms and, in the long term, the application of distributed ledger technology (DLT) such as blockchain.

From a legal theory perspective, immutability brings together the classical agrarian approach, which emphasizes certainty of rights, with the digital legal paradigm, which emphasizes digital systems as a legal foundation and distributed trust. This convergence requires a national land legal framework that is adaptive, responsive, and anticipatory to technological dynamics. Indonesia, as a country with high complexity in land issues, cannot rely solely on technical excellence. Immutability must be embedded in formal legal structures and institutional practices, with an emphasis on the principles of trust, transparency, and traceability. Without this, electronic certificates will be vulnerable to becoming administrative instruments that lose their legal value. Trust means confidence, transparency means openness that is clearly visible, and traceability is the ability of a legal or administrative system to record, track, and verify every activity or transaction that occurs.

Thus, this is where legal reform in electronic certificates in the national land law system is marked by the strengthening of the principle of immutability, not merely as a technological choice, but as a national legal agenda to ensure justice, prevent disputes, and build a land ecosystem that is resistant to digital manipulation and corruption. Immutability is an important normative and technological bridge for the birth of a digital land law system (Digital Land Law). Reform is not only about revising regulations, but also strengthening institutions in the land sector, standardizing digital electronic certificate systems and land registration systems, and harmonizing conventional and digital land law systems (land law and digital law). It is important to design legal reforms that are adaptive to technological developments, while remaining based on the basic principles of national agrarian law as sourced from the Basic Agrarian Law (UUPA). Thus, the digital land registration system through electronic certificates can provide certainty, protection, and legal justice for all levels of society in the era of digital transformation. The digitization of land services is an integral part of the national digital transformation agenda, which is driven by the need to create an efficient, transparent, and responsive bureaucracy that is responsive to socio-economic dynamics.

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