



Cyber PPAT and Legal Certainty in Indonesia's Electronic Land Certification System

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ARTICLE INFO

Article history

Received: 28 January 2025

Revised: 24 March 2025

Accepted: 29 March 2025

Keywords

Electronic Land Certificate;

Cyber PPAT;

Legal Certainty;

Land Registration;

Digital Legal Transformation

ABSTRACT

The digitalization of land registration in Indonesia, particularly through electronic land certificates, reflects a major reform in legal and administrative governance. This study examines the evolving role of the Land Deed Official (PPAT) in ensuring legal certainty amid the transition from conventional to electronic land certification. Employing a normative-empirical legal approach and case study in Bekasi Regency, the research explores how PPAT adapts to digital platforms while maintaining legal compliance. Findings reveal that electronic certification enhances efficiency, transparency, and security. However, its implementation faces significant challenges, including fragmented data systems, inadequate infrastructure, limited digital literacy, and the absence of specific legal norms regulating PPAT's digital responsibilities. To address this gap, the study introduces the concept of "Cyber PPAT"—a redefined legal actor equipped with both legal and digital competencies. This study contributes to the discourse on land administration reform by underscoring the need for harmonized regulations, improved infrastructure, and institutional readiness. It emphasizes that legal certainty in digital land governance depends not only on technology but on the strength of the legal framework and institutional trust supporting it.

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1. Introduction

The advancement of information technology has driven a fundamental transformation across various sectors, including in the governance of public administration.¹ Digital innovation accelerates the flow of information, simplifies service procedures, and enhances bureaucratic efficiency.² In this context, digitalization has become one of the main pillars of national development, aiming to establish an adaptive, transparent, and accountable government system in the era of globalization.³

One of the strategic sectors undergoing digital transformation in Indonesia is land affairs. Since 2013, the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (Ministry of ATR/BPN) has implemented bureaucratic reforms focusing on improving the quality of public services.⁴ A tangible manifestation of this reform is issuing electronic land certificates, as regulated under the Ministerial Regulation of ATR/Head of BPN No. 1 of 2021.⁵ This policy aims to streamline the land registration process, improve the ease of doing business, and accelerate land administration through the utilization of technology.

The transition from physical land certificates to electronic certificates presents opportunities and challenges. On the one hand, electronic documents can minimize the risk of forgery, expedite the issuance process, and facilitate legal transactions involving land. On the other hand, significant challenges remain, including the digital divide within society, limited infrastructure, and concerns over electronic data security.⁶ These structural barriers continue to hinder the comprehensive implementation of a fully digital land administration system.

The implementation of electronic land certificates also necessitates a redefinition of the role of the Land Deed Official (PPAT), who is responsible for ensuring the validity and completeness of electronic documents.⁷ PPATs are no longer limited to performing

¹ Mustafa et al., *Kampus Merdeka, CV Bintang Semesta Media* (Yogyakarta: Bintang Semesta Media, 2023).

² Asni Zubair et al., "Response of islamic religious college to independent campus policy," *Journal of Law and Sustainable Development* 11, no. 6 (2023): 1–20, <https://doi.org/10.55908/sdgs.v11i6.1203>.

³ Khoirul Aswar et al., "An investigation of the factors affecting citizens' adoption of e-government in Indonesia," *Problems and Perspectives in Management* 21, no. 2 (2023): 187–97, [https://doi.org/10.21511/ppm.21\(2\).2023.21](https://doi.org/10.21511/ppm.21(2).2023.21).

⁴ Kurnia Rheza Randy Adinegoro, "Analisis Transformasi Digital Layanan Publik Pertanahan : Hak Tanggungan Elektronik pada Kementerian Agraria dan Tata Ruang," *Jurnal Administrasi Publik* 19, no. 1 (2023): 26–49, <https://doi.org/10.52316/jap.v19i1.135>.

⁵ Kusmiarto Kusmiarto et al., "Digital transformation of land services in indonesia: A readiness assessment," *Land* 10, no. 2 (2021): 1–16, <https://doi.org/10.3390/land10020120>.

⁶ Trias Aditya et al., "Participatory land administration in Indonesia: Quality and usability assessment," *Land* 9, no. 3 (2020): 1–27, <https://doi.org/10.3390/land9030079>.

⁷ Darwin Ginting, "Legal status of land deed officers in land registration for preventing land disputes in Indonesia," *Journal of Legal, Ethical and Regulatory Issues* 24, no. 1 (2021): 1–9.

administrative functions; they are now required to actively engage in the digital-based system at every stage of the legal land affairs process.⁸ This transformation gives rise to the concept of the “Cyber PPAT,” namely a PPAT equipped with technological competence and the ability to integrate land legal services through digital means, in order to ensure both efficiency and legal certainty.⁹

Digitalizing land affairs through electronic certificates must remain grounded in the fundamental principles of national land law, particularly as stipulated in Law No. 5 of 1960 concerning the Basic Agrarian Law (UUPA). The principles of legal certainty and legal protection must consistently be upheld in every policy reform, including within the digital context. As legal proof of land ownership, electronic certificates must fulfil the formal legality standards regulated under Article 1866 of the Indonesian Civil Code, and as further expanded in the meaning of Article 5 paragraph (1) of Law No. 11 of 2008 on Electronic Information and Transactions.

Previous studies have examined the issue of land certificate digitalization from legal and administrative perspectives. However, in general, these studies remain limited to regulatory and institutional aspects and have yet to specifically highlight the role of the Land Deed Official (PPAT) as a key actor in this digital transformation process.

A study conducted by Prasetya (2023),¹⁰ for instance, examined the stages and challenges in the implementation of initial land registration through electronic means within the national land law system. The findings revealed that the modernization of land services has been carried out through two main schemes: issuing electronic certificates for previously unregistered land and converting physical certificates into digital format. One of the key challenges identified was public resistance to electronic registration.¹¹ However, this study did not explore in depth the involvement of legal actors such as the Land Deed Official (PPAT) in ensuring the legal validity of electronic certificates.

A study by Ali et al. (2024), titled *"The Vulnerabilities of Electronic Land Certificates and Legal Adaptation in Indonesia's Land Registration System,"* highlights the importance of legal system adaptation to information technology developments to ensure legal certainty over land ownership. The study emphasizes the Ministry of ATR/BPN's central role and the need for robust regulations, data security protection, and enhanced

⁸ Ulfa Roffilah Meiyona dan Ali Ismail Shaleh, “PERTANGGUNGJAWABAN PPAT TERHADAP PEMBUATAN SURAT PERNYATAAN KEABSAHAN DAN KEBENARAN DOKUMEN ELEKTRONIK,” *Jurnal Hukum Bisnis Bonum Commune* 5, no. 1 (23 Februari 2022): 98–108, <https://doi.org/10.30996/jhbbc.v5i1.5739>.

⁹ Naurah Humam Alkatiri, Mohamad Fajri Mekka Putra, dan Kyle Ongko, “A Legal Perspective: Implementing an Electronic Notarization System in Indonesia in the Post-Pandemic Era,” *Jambura Law Review* 5, no. 2 (2023): 332–55, <https://doi.org/10.33756/jlr.v5i2.19221>.

¹⁰ Fikahati Prasetya dan Muh Afif Mahfud, “Pendaftaran Tanah Untuk Pertama Kali Secara Elektronik Dalam Hukum Pertanahan Nasional,” *Jurnal Hukum Unissula* 39, no. 1 (2023): 78–89, <https://doi.org/10.26532/jh.v39i1.30581>.

¹¹ Prasetya dan Afif Mahfud.

stakeholder capacity.¹² Although it provides a comprehensive overview of the legal and institutional framework, the study does not specifically address the role of the Land Deed Official (PPAT) as a technical implementer within the digital land administration system.

Furthermore, a study by Permadi et al. (2024) raises the issue of regulatory synchronization and harmonization in implementing electronic land certificates, particularly in the context of the Job Creation Law.¹³ The study underscores the need for alignment among various legal instruments, including the Electronic Information and Transactions Law (ITE Law) and land-related regulations, as well as the importance of inter-agency coordination between the Ministry of ATR/BPN and other relevant institutions. Although it includes a comparative analysis with Rwanda's *e-title* system as a best practice,¹⁴ the study does not examine the direct contribution of the Land Deed Official (PPAT) within the digitalization framework, thus leaving room for further inquiry into the role of PPAT in ensuring the legality of electronic land transactions.

Although various studies have addressed the issue of land digitalization from legal, institutional, and technological perspectives, most have not explicitly examined the strategic role of the Land Deed Official (PPAT) as a key actor in ensuring legal certainty through electronic systems. This study seeks to fill that gap by focusing on optimizing the role of PPAT in the digital land administration system through the Cyber PPAT approach. This approach explores the integration between information technology and land legal services performed by PPATs to guarantee justice and legal certainty.

This research is significant because it offers a new perspective on the active involvement of the Land Deed Official (PPAT) in the digital land administration system. This area has not been extensively explored in legal literature. Through the Cyber PPAT approach, this study contributes to developing digital land law theory and provides practical recommendations for strengthening regulations, enhancing human resource capacity, and reforming technology-based public service governance. As such, the findings of this research are expected to offer strategic contributions to policymakers, legal practitioners, and the development of a modern, equitable, and sustainable national land administration system.

¹² Mahrus Ali, Rendi Susiswo Ismail, dan Winahyu Erwiningsih, "The Vulnerabilities of Electronic Land Certificates and Legal Adaptation in Indonesia's Land Registration System," *Pakistan Journal of Criminology* 16, no. 2 (8 April 2024): 1095–1106, <https://doi.org/10.62271/pjc.16.2.1095.1106>.

¹³ Iwan Permadi, Diah Pawestri Maharani, dan Md Yazid Ahmad, "LEGAL PERSPECTIVES ON DIGITALISING LAND CERTIFICATES: Analyzing Synchronization and Harmonization in Indonesia's Job Creation Law," *Jurisdictie: Jurnal Hukum dan Syariah* 15, no. 2 (3 Januari 2025): 337–79, <https://doi.org/10.18860/j.v15i2.28859>.

¹⁴ Permadi, Maharani, dan Ahmad.

2. Legal Material and Methods

This study is a descriptive research employing a normative-empirical legal approach. Its primary aim is to describe and analyze the implementation of the electronic land certificate policy as legal evidence of land ownership in Bekasi Regency, with a specific focus on the role of the Land Deed Official (PPAT) within the digital land administration ecosystem. As part of an applied legal research framework, this study is not intended to test hypotheses, but rather to understand the interaction between positive legal norms and their practical implementation within a technology-based land administration system.

This study employs both statutory and conceptual approaches. The statutory approach is used to examine relevant legal provisions,¹⁵ including Law No. 5 of 1960 on the Basic Agrarian Law (UUPA), the Indonesian Civil Code (KUHPer), the Electronic Information and Transactions Law (ITE Law), as well as implementing regulations related to land digitalization. Meanwhile, the conceptual approach is utilized to construct an argumentative framework based on the views of legal scholars, particularly in addressing issues that are not yet explicitly regulated under positive legal norms¹⁶.

The data in this study consists of primary and secondary data. Primary data were obtained through interviews with key informants, namely officials from the Bekasi Regency Land Office and several Land Deed Officials (PPATs) actively involved in the electronic registration process. Secondary data were collected through a literature review of scholarly works, statutory regulations, jurisprudence, and other relevant official documents. The types of legal materials analyzed include primary legal materials (statutes, jurisprudence, treaties), secondary legal materials (books, journal articles, research reports), and tertiary legal materials (legal dictionaries and encyclopedias).

All data were analyzed qualitatively using a descriptive-analytical approach by interpreting and contextualizing legal norms about practical realities in the field. This analysis was carried out integratively, referring to the alignment between written legal rules, legal doctrines, and the living social norms within society. Through this approach, the study is expected to comprehensively understand the dynamics of the PPAT's role in the digital land administration system and offer a conceptual model grounded in the principles of justice and legal certainty.

3. Results and Discussion

3.1. Strategic Role of PPAT in the Implementation of Electronic Land Certificates

Digital transformation in land administration is part of a national policy aimed at developing a public service system that is efficient, transparent, and based on information

¹⁵ Kornelius Benuf dan Muhamad Azhar, "Metodologi Penelitian Hukum sebagai Instrumen Mengurai Permasalahan Hukum Kontemporer," *Gema Keadilan* 7, no. 1 (2020): 20–33, <https://doi.org/10.24246/jrh.2019.v3.i2.p145-160>.

¹⁶ Benuf dan Azhar.

technology.¹⁷ This policy has been reinforced through the issuance of Minister of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) Regulation No. 1 of 2021,¹⁸ and later updated by ATR/BPN Regulation No. 3 of 2023,¹⁹ which regulates the issuance of land documents in electronic form, including land certificates. Within this framework, Land Deed Officials (PPAT) occupy a key position as legal actors responsible for authenticating deeds of transfer of land rights, while also serving as official partners of the Ministry of ATR/BPN in implementing the electronic system.²⁰

Juridically, the position of the Land Deed Official (PPAT) is regulated under Article 37 paragraph (1) of Government Regulation No. 24 of 1997 on Land Registration, which affirms the authority of PPAT to draw up authentic deeds for every transfer of land rights. In the context of digital transformation, this authority has undergone an expanded interpretation, in line with the enactment of Government Regulation No. 18 of 2021 and Ministerial Regulation of ATR/BPN No. 3 of 2023, which open the way for implementing electronic land registration. PPAT is no longer merely responsible for recording legal events but is now a bridge between formal legal norms and the electronic land information system.

Within this framework, the PPAT holds a strategic role: verifying the validity of data related to legal subjects and objects, conducting electronic certificate checks, uploading documents through official BPN applications (such as MITRA),²¹ and ensuring consistency between the deed and the digital land database. This role reinforces the legal function of the PPAT in guaranteeing the legitimacy of land rights transfer processes and accelerates the realization of the principle of legal certainty in the digital era.²²

The conversion from physical to digital documents requires PPATs to perform new functions, such as using certified electronic signatures (TTE), accessing the MITRA account within the ATR/BPN system, and validating parties' identities through KTP

¹⁷ AA Muhammad Insany Rachman dan Evi Dwi Hastri, "Analisis Kendala Implementasi Peraturan Menteri ATR / Kepala BPN Nomor 1 Tahun 2021 Tentang Sertipikat Elektronik," *Mulawarman Law Review* 6, no. 32 (2021): 91–104, <https://doi.org/10.30872/mulrev.v6i2.646>.

¹⁸ Kementerian Agraria dan Tata Ruang/Badan Pertanahan Nasional, "Peraturan Menteri Agraria Dan Tata Ruang/ Kepala Badan Pertanahan Nasional Republik Indonesia Nomor 1 Tahun 2021 Tentang Sertipikat Elektronik" (2021).

¹⁹ Kementerian Agraria dan Tata Ruang/Kepala Badan Pertanahan Nasional, "Peraturan Menteri Agraria dan Tata Ruang/Kepala Badan Pertanahan Nasional Republik Indonesia Nomor 3 Tahun 2023 tentang Penerbitan Dokumen Elektronik dalam Kegiatan Pendaftaran Tanah," Jaringan Dokumentasi dan Informasi Hukum Badan Pemeriksaan Keuangan Republik Indonesia (JDIH BPK RI) § (2023).

²⁰ Ahmad Budi Setiawan, "Studi Standardisasi Sertifikat Elektronik dan Keandalan dalam Penyelenggaraan Sistem Transaksi Elektronik," *Buletin Pos dan Telekomunikasi* 12, no. 2 (2015): 119, <https://doi.org/10.17933/bpostel.2014.120204>.

²¹ <https://mitra.atrbpn.go.id/>

²² Dewi Rasda et al., "Tanggung Jawab Pejabat Pembuat Akta Tanah (PPAT) Dalam Pendaftaran Peralihan Hak Milik Atas Tanah," *Jurnal Litigasi Amsir* 9, no. 1 (2021): 34–40, <http://journalstih.amsir.ac.id/index.php/julia/article/view/55/47>.

Readers and biometric recording features.²³ This positions the PPAT as a legal actor operating at the intersection of legal and administrative digital functions. The validation of deeds and documents conducted by the PPAT is crucial to ensuring the legal validity of land rights in the digital context.²⁴

Normatively, deeds drawn up by PPAT continue to constitute authentic deeds as defined under Article 1868 of the Indonesian Civil Code (KUH Perdata), which stipulates that an authentic deed is one made by, or in the presence of, a public official authorized to do so at the place where the deed is done.²⁵ Even in the digital context, this principle of authentication is not lost; rather, it is reinforced through electronic security systems such as hashcodes, Two-Factor Authentication (2FA), and ISO 27001:2013-based information security management systems that the Ministry of ATR/BPN has implemented.²⁶

Field findings indicate that PPATs in Bekasi Regency have been performing their functions within the electronic system by uploading digital deeds to the MITRA application, verifying the accuracy of both the legal subject and object data, and ensuring that the digital documents used genuinely reflect the will of the parties and are legally protected.²⁷ This reflects a shift in the role of PPATs from merely administrative executors to "Cyber Legal Actors" who bridge formal legal norms with information technology.

Thus, PPATs' strategic role in implementing electronic land certificates not only reflects their adaptation to technological change but also positions them as key pillars in ensuring legal certainty.²⁸ The presence of PPATs within the digital system becomes a determining factor in assessing whether the transformation of land administration through electronic means can establish formal legality and substantive protection for land rights holders.

3.2. Challenges in the Implementation of Electronic Land Certificates

Although the electronic land certificate policy represents a significant step toward modernizing Indonesia's land administration system, its implementation on the ground

²³ Intan Rifka Auliani dan Kholis Roisah, "Peranan Pejabat Pembuat Akta Tanah dalam Pelaksanaan Transformasi Digital Layanan Pertanahan melalui Sertipikat Tanah Elektronik," *Legal Standing : Jurnal Ilmu Hukum* 9, no. 2 (2025): 394, <https://doi.org/https://doi.org/10.24269/ls.v9i2.11571>.

²⁴ Rasda et al., "Tanggung Jawab Pejabat Pembuat Akta Tanah (PPAT) Dalam Pendaftaran Peralihan Hak Milik Atas Tanah."

²⁵ Irma Devita Purnamasari, "Akta Notaris Sebagai Akta Otentik," *Hukum Online*, 2015, <https://www.hukumonline.com/klinik/detail/ulasan/lt550c0a7450a04/akta-notaris-sebagai-akta-otentik>.

²⁶ Suhaiela Bahfein dan Hilda B Alexander, "Sertifikat Tanah Elektronik Akan Dimulai di Jakarta dan Surabaya," *Kompas.com*, 2021.

²⁷ Pradita Kurniawan Syah, "Kantor Pertanahan Bekasi jadi pelopor layanan peralihan hak elektronik □," <https://megapolitan.antaranews.com/>, 2024.

²⁸ Novia Heriani Fitri, "Melihat Peran Notaris dan PPAT dalam Transformasi Digital," *Hukumonline.Com*, 2024.

faces many complex challenges.²⁹ The transition from a manual to a digital system involves not only administrative changes but also encompasses infrastructure readiness, regulatory alignment, the capacity of implementing actors, and the social response from the community.³⁰

At the technical level, uneven information technology infrastructure remains one of the most critical structural barriers to implementing Indonesia's digital land administration system.³¹ Disparities in internet access—particularly in non-urban areas—have led to operational limitations for key stakeholders, including Land Deed Officials (PPAT).³² Field findings in Bekasi Regency indicate that several PPATs have reported recurring system disruptions and difficulties in accessing official applications of the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN), such as MITRA and HT-el.³³

The system's instability directly affects data validation, uploading electronic documents, and completing online forms—all essential prerequisites for electronic land registration. Reliance on a system that is not yet fully stable creates significant administrative risks, such as service delays, data entry errors, and the potential duplication of legal documents. Furthermore, these technical issues can potentially undermine the principle of legal certainty, a fundamental tenet of national land law. When the digital system cannot be accessed optimally, the function of authentic deeds is compromised, weakening their effectiveness in ensuring the validity of legal acts.

Thus, the success of digital transformation in land services is not only supported by normative policies but also requires a widespread, reliable, and adaptive digital infrastructure to the dynamics on the ground.³⁴ In this context, the role of PPAT as Cyber Legal Actors becomes even more crucial, as they not only perform authentication functions

²⁹ Fatemeh Jahani Chehrehbargh et al., "Current challenges and strategic directions for land administration system modernisation in Indonesia," *Journal of Spatial Science* 69, no. 4 (2024): 1097–1130, <https://doi.org/10.1080/14498596.2024.2360531>.

³⁰ Jahani Chehrehbargh et al.; Kusmiarto et al., "Digital transformation of land services in indonesia: A readiness assessment."

³¹ Jahani Chehrehbargh et al., "Current challenges and strategic directions for land administration system modernisation in Indonesia."

³² Hasil wawancara Dedy Fu'ad, PPAT wilayah Kerja di Kabupaten Bekasi, pada Tanggal Tanggal 18 Oktober 2024, Pukul 15. 12 Wib.

³³ The MITRA application (Manajemen Informasi Kemitraan PPAT / PPAT Partnership Information Management) is a digital platform used for PPAT account authentication, uploading electronic deeds, and accessing other electronic land services, as regulated in Ministerial Regulation of ATR/BPN No. 3 of 2023 on the Issuance of Electronic Documents. Meanwhile, HT-el (Electronic Mortgage Rights System) is an online registration system for mortgage rights, governed by Ministerial Regulation of ATR/BPN No. 5 of 2020, which mandates that applications and issuance of deeds must be conducted electronically through the official PPAT account.

³⁴ Rohan Mark Bennett et al., "Digital Transformation in Indonesian Land Administration," in *Geospatial Science for Smart Land Management* (Boca Raton: CRC Press, 2023), 43–67, <https://doi.org/10.1201/9781003349518-7>.

but also act as a bridge between formal legal systems and the ever-evolving technological realities.

From a regulatory perspective, the lack of synchronization between old and new policies has led to ambiguity in implementation.³⁵ The Ministerial Regulation of ATR/BPN No. 3 of 2023 provides a legal basis for implementing electronic documents. However, most old regulations, such as Government Regulation No. 24 of 1997, are still oriented towards an analog system. This misalignment creates procedural uncertainty at the operational level and confuses implementing officials and the public. This disharmony can hinder the legitimacy of the new electronic-based system within the framework of the principles of legality and legal certainty.

In terms of institutional dimensions, the readiness of human resources in the land sector has not fully supported digital transformation.³⁶ An interview with Fachrully Fratama, Head of the Rights Determination Section at the Bekasi Regency Land Office, revealed that although human resources are sufficient, there is still a competency gap, particularly in mastering digital technology and internal application systems.³⁷ This disparity directly impacts the effectiveness of services and the quality of verification and data input within the electronic system.

Meanwhile, the challenges from the community's legal culture perspective cannot be overlooked. Many people, especially the older generation, still strongly depend on physical documents.³⁸ Printed land certificates are considered more tangible and convincing than digital online documents. Such rejection or resistance reflects a gap between progressive legal policies and a social reality that is not yet ready. From the perspective of the progressive legal theory developed by Satjipto Rahardjo—strengthening the concept of legal development by Muchtar Kusumaatmadja—the effectiveness of law is heavily determined by its ability to respond to existing social structures. If regulations fail to bridge legal norms with community culture, their implementation will face significant resistance.³⁹

Security issues also pose a significant challenge that requires serious attention. Although ATR/BPN has implemented ISO 27001:2013 standards, certified electronic signatures, and collaborated with the National Cyber and Encryption Agency (BSSN),

³⁵ Permadi, Maharani, dan Ahmad, "LEGAL PERSPECTIVES ON DIGITALISING LAND CERTIFICATES: Analyzing Synchronization and Harmonization in Indonesia's Job Creation Law."

³⁶ Permadi, Maharani, dan Ahmad.

³⁷ Hasil wawancara, Fachrully Fratama selaku Kepala Seksi Penetapan Hak dan Pendaftaran Kantor Pertanahan Kabupaten Bekasi, pada Tanggal 16 Oktober 2024, Pukul 09. 44 Wib.

³⁸ Hasil wawancara, Dedy Fu'ad, PPAT wilayah Kerja Kabupaten Bekasi, pada Tanggal Tanggal 18 Oktober 2024, Pukul 15. 12 Wib.

³⁹ Made Oka Cahyadi Wiguna, "Pemikiran Hukum Progresif untuk Perlindungan Hukum dan Kesejahteraan Masyarakat Hukum Adat," *Jurnal Konstitusi* 18, no. 1 (2021): 112–37, <https://doi.org/10.31078/jk1816>.

concerns about potential hacking and data breaches persist among the public.⁴⁰ Electronic certificates, as high-value legal documents, require extra protection systems, including authentication, data integrity, and non-repudiation guarantees.⁴¹ If these aspects are neglected, new forms of legal uncertainty will emerge.

In addition, data fragmentation between institutions becomes another complex challenge. Land registration depends on land data and is closely related to population data, taxation, and other information sourced from different institutions. When data is not integrated or synchronized, the validation process for rights can be hindered, leading to administrative errors that carry legal risks.

All of these challenges show that the success of the electronic certificate system depends not only on technological sophistication but is also heavily influenced by the quality of the legal structure, regulatory alignment, human resource readiness, and adequate social adaptation. Lawrence Friedman believes an effective legal system requires integration between structure, substance, and legal culture.⁴² Therefore, the digital transformation of land services must be understood as a long-term process that involves comprehensive legal reform, not just administrative innovation.

3.3. The Transformation Toward Cyber PPAT

Digital transformation in the national land system has led to changes in the legal actors' roles, particularly the Land Deed Official (PPAT). In digitalizing land registration through electronic certificates, PPAT is no longer merely responsible for creating authentic deeds of transfer of rights but is also accountable for the digital validation process, the use of official electronic systems, and ensuring the legality of electronic documents as legal evidence. This transformation leads to the emergence of the concept of Cyber PPAT, a figure of PPAT who possesses both legal and digital competencies in an integrated manner.

The legal basis for the role of PPAT still refers to Article 37, paragraph (1) of Government Regulation No. 24 of 1997, which states that the transfer of land rights must be proven with a deed made by a PPAT.⁴³ In the electronic system, the deed is still considered authentic as long as it meets the provisions of Article 1868 of the Civil Code, which states that it must be made by or in the presence of an authorized public official. However, the format and medium have now changed to digital. Therefore, it must align

⁴⁰ Putu Aryan Darma Sukerta dan Andri Sutrisno, "Personal Data Protection in ASEAN: A Critical Comparison between Indonesia's and Malaysia's Legal Frameworks," *Constitutional Law Review* 3, no. 2 (2024): 133–47.

⁴¹ Elza Syarif, "Security Concerns in Digital Transformation of Electronic Land Registration: Legal Protection in Cybersecurity Laws in Indonesia," *International Journal of Cyber Criminology*, 2022, <https://doi.org/10.5281/zenodo.4766565>.

⁴² Lawrence M. Friedman, "The Law and Society Movement," *Stanford Law Review* 38, no. 3 (1986): 763, <https://doi.org/10.2307/1228563>.

⁴³ Kadek Cahya Susila Wibawa, "Menakar Kewenangan Dan Tanggung Jawab Pejabat Pembuat Akta Tanah (Ppat) Dalam Perspektif Bestuurs Bevoegdheid," *Crepido* 1, no. 1 (2019): 40–51, <https://doi.org/10.14710/crepido.1.1.40-51>.

with Law No. 11 of 2008 on Electronic Information and Transactions (ITE), particularly Article 5, paragraph (1), which states that electronic documents have valid legal force as long as they meet the principles of integrity and can be accessed.⁴⁴

In its implementation, PPAT is active in application systems such as MITRA and HT-el, which ATR/BPN owns. They perform identity verification through KTP Reader and biometric recording, upload documents digitally, and use certified Electronic Signatures (TTE). This role aligns with the mandate of Article 6 and Article 9 of the Ministerial Regulation of ATR/BPN No. 3 of 2023, which stipulates that the preparation, signing, and submission of land documents can now be done electronically by authorized parties, including PPAT.

An interview with PPAT in Bekasi Regency revealed that the electronic system provides efficiency in services but also requires a significant improvement in technical competencies. The Ministry of ATR/BPN has responded to this by implementing the E-learning program by the Human Resource Development Center (PPSDM) and requiring every PPAT to have a verified MITRA account. This is an administrative access form and a means of strengthening supervision and digital legal legitimacy for PPAT activities.

From a legal responsibility perspective, the transformation towards Cyber PPAT does not eliminate the basic obligations of the profession. PPAT remains subject to three forms of accountability: administrative, as regulated in the professional organization's code of ethics (IPPAT)⁴⁵ and Ministerial Regulation ATR/BPN No. 2 of 2018;⁴⁶ civil, if negligent or incorrect in performing their duties (Article 1365 of the Civil Code)⁴⁷; and criminal, if involved in forgery, data misuse, or manipulation of electronic systems (Article 263 of the Penal Code and Articles 30–32 of the ITE Law). Thus, integrity and professional caution remain the primary pillars in PPAT, both in conventional and digital settings.

Furthermore, the position of Cyber PPAT needs to be supported by a more specific and progressive secondary legal foundation, considering that Ministerial Regulation ATR/BPN No. 3 of 2023 is still general and does not explicitly regulate the roles, rights, duties, and responsibilities of PPATs in the electronic system. This highlights the need to reform legal norms through a future-oriented legal thinking approach so legal policies can address technological developments without neglecting the principles of national agrarian law.

⁴⁴ Shella Aniscasary Shella dan Risti Dwi Ramasari, “Tinjauan Yuridis Kekuatan Hukum Sertifikat Tanah Elektronik Berdasarkan Peraturan Menteri Agraria Dan Tata Ruang Nomor 1 Tahun 2021,” *Jurnal Hukum dan Etika Kesehatan* 2 (2022): 1–14, <https://doi.org/10.30649/jhek.v2i1.38>.

⁴⁵ IPPAT stands for Ikatan Pejabat Pembuat Akta Tanah, the Indonesian Association of Land Deed Officials. This organization sets the code of ethics for PPATs, ensuring their professional conduct and accountability.

⁴⁶ “Peraturan Menteri dan Tata Ruang/Kepala Badan Pertanahan Nasional Nomor 2 Tahun 2018 Terhadap Pembinaan dan Pengawasan Pejabat Pembuat Akta Tanah” (2018). Lihat Pasal 13

⁴⁷ Ahmad Arizal Mukti dan Oci Senjaya, “Tanggung Jawab PPAT Secara Pribadi Terhadap Batalnya Akta Jual Beli Akibat Adanya Perbuatan Melawan Hukum,” *Jurnal Hukum POSITUM* 5, no. 2 (2020): 66–78.

In the framework of Lawrence Friedman's legal system theory, the role of PPAT as a legal structure must now adapt to the new legal substance (digital regulation) and the legal culture of society, which is not yet fully familiar with electronic documents. This means that the success of this transformation is not only determined by technical policies but also by the ability of PPAT to bridge legal norms with technology, and between the state and the public.

Cyber PPAT is a symbol of the reform of land administration law that goes beyond the digitalization of processes; it also touches the essence of law: ensuring legal certainty, strengthening legal protection, and enhancing public trust in a fair and adaptive legal system. Therefore, building the capacity of PPAT should be seen as a long-term legal investment to create a modern and inclusive digital land ecosystem.

3.4. Legal Certainty and the Promise of the Electronic Land Certificate

One of the fundamental goals of land registration is to create legal certainty regarding ownership and control over land rights.⁴⁸ In this context, the land certificate functions as a valid proof of the rights held by an individual, as regulated in Article 19, paragraph (2), letter c of the Basic Agrarian Law (UUPA). The transition of the certificate form from physical to electronic is part of the transformation of land services to improve efficiency, reduce the potential for disputes, and address the demands of legal modernization.

Legal certainty in electronic land registration is determined by the technology system used and the juridical legitimacy of the electronic document itself. According to Article 5, paragraph (1) of Law No. 11 of 2008 on Electronic Information and Transactions (ITE), electronic documents have legal force. They can be used as valid evidence as long as they are accessible, their integrity is guaranteed, and they are accountable.⁴⁹ This provision is reinforced by Ministerial Regulation ATR/BPN No. 3 of 2023, particularly in Article 4, paragraph (3), which emphasizes that electronic documents are stored in a Database and recognized in the legal system as proof of ownership.⁵⁰

In practice, electronic certificates offer various advantages in ensuring legal certainty. These include process efficiency, reduced potential forgery, and improved data accuracy through digital validation. Features such as hash codes, QR codes, and the Field Identification Number (NIB) replace the analog format previously susceptible to

⁴⁸ Dewi Arnita, Fakultas Syariah, dan Islam Iain, "Sengketa Pendaftaran Hak Milik Atas Tanah," no. 1 (n.d.).

⁴⁹ Gandi Assidiqih dan Indri Fogar Susilowati, "Tinjauan Yuridis Sertifikat Tanah Elektronik Sebagai Alat Bukti Kepemilikan Tanah Di Indonesia," *Novum: Jurnal Hukum*, no. Salam 2020 (2021): 57–72.

⁵⁰ Pratama Herry Herlambang, Yos Johan Utama, dan Aju Putrijanti, "Harmonisasi Hukum UU Peratun dan UU ITE dalam Ketentuan Alat Bukti Elektronik sebagai Alat Bukti Tambahan dalam Sistem Peradilan Tata Usaha Negara," *Jurnal Pembangunan Hukum Indonesia* 6, no. 1 (2024): 61–81.

manipulation.⁵¹ Electronic certificates also use Electronic Signatures (TTE) and encryption technology, enhancing the authenticity and security of the document. This reinforces the idea that digital instruments do not diminish legal legitimacy but strengthen it in the context of verification and transparency.

However, this system also presents challenges that could impact the guarantee of legal certainty if not addressed systematically. In field findings, several PPATs reported cases of certificates that could not be verified in the system because they did not yet have an NIB or were not yet recorded in the Electronic Database. This causes the conversion or verification process to become slow, or even rejected by the system. In this context, infrastructure limitations and the database's validity become major obstacles.

Another issue affecting legal certainty is data fragmentation between institutions, such as the lack of synchronization between ATR/BPN, Dukcapil, and tax authorities. Discrepancies in identity or rights status can hinder the registration and verification process and open the door for potential conflicts over rights that could lead to legal disputes. From the perspective of the principle of legal certainty (*rechtszekerheid*), this demands the integration of systems and comprehensive data harmonization.

From the perspective of legal protection for the public, there are still concerns about the risk of data loss due to system disruptions or cyberattacks. Although ATR/BPN has implemented a security system based on ISO 27001:2013 and partnered with BSSN for cryptographic protection, public trust in protecting their rights through the digital system still needs to be strengthened through legal socialization and the reinforcement of technical regulations.⁵² This demonstrates that legal certainty is not only shaped by the existing system but also by public trust in that system.

Considering its various advantages and challenges, electronic certificates essentially bring great hope for ensuring land ownership rights more accurately, efficiently, and securely. However, their effectiveness is highly dependent on the alignment between the technology system, the underlying regulations, and the capacity of legal implementers on the ground. Electronic certificates are not merely administrative instruments, but also binding legal products, meaning that the integrity of the process and data must be maintained as part of the state's responsibility to its citizens.

In the framework of modern administrative law, the success of implementing this system is a reflection of the state's ability to translate the principles of good governance into digital-based services. Therefore, in addition to technological updates, regulatory and institutional reforms are also needed to ensure that the legal certainty promised by electronic certificates can truly be realized in practice.

⁵¹ Tiffany J. Monalu, Tommy F. Sumakul, dan Meiske T Sondakh, "Kedudukan Yuridis Penerbitan Sertifikat Tanah ke Sistem Elektronik sebagai Jaminan Keamanan," *Lex Privatum* XI, no. 2 (2023): 1–10, <https://ejournal.unsrat.ac.id/v3/index.php/lexprivatum/article/view/46654>.

⁵² "BSSN dan Kementerian ATR / BPN Tanda Tangan Kerja Sama Pemanfaatan Sertifikat Elektronik," BSSN.go.id, 2024.

4. Conclusion

The transition to electronic land certificates in Indonesia reflects the nation's broader agenda to modernize land administration and strengthen legal certainty in the digital era. This research shows that implementing electronic certificates is not merely a procedural innovation, but a legal transformation that redefines the role of the Land Deed Official (PPAT). As a legal intermediary between the State's system and society, PPAT plays a crucial role in validating documents, submitting electronic applications, and ensuring compliance with conventional land laws and applicable digital regulations. The concept of Cyber PPAT emerging from this study illustrates the convergence of legal accountability and digital capacity in shaping Indonesia's new land governance framework.

While electronic certificates offer various advantages such as transparency, efficiency, and document security, the extent to which this instrument guarantees legal certainty depends heavily on regulatory alignment, data integration across institutions, institutional readiness, and public trust. This research identifies ongoing structural challenges, including data fragmentation between agencies, uneven digital infrastructure, and the need for clearer legal norms to support the digitalization process. Thus, the promise of legal certainty does not automatically stem from the technology itself but rather from the legal and administrative ecosystem that supports its implementation.

This study has limitations in terms of its narrow geographic scope and primary focus on the role of PPAT in a single administrative region. Future research could expand this study by conducting comparative analyses across different areas or exploring the roles of other legal actors in the land digitalization process, such as notaries or land office officials involved in the registration system. In-depth examinations of cybersecurity, electronic identity validation, and public legal awareness in the context of land registration also strengthen the academic and practical foundations of the digital land system in Indonesia and globally.

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