

Electronic Land Deed Issuance by Land Deed Officials in Indonesia: Regulation, Data Protection, and Legal Certainty

Gloria Gita Putri Ginting^{1*}, Henry Aspan², Muhammad Juang Rambe³

¹Universitas Pembangunan Panca Budi, Medan, Indonesia.

² Universitas Pembangunan Panca Budi, Medan, Indonesia.

³ Universitas Pembangunan Panca Budi, Medan, Indonesia.

e-mail: gloriagita@dosen.pancabudi.ac.id, henryaspan@yahoo.com, muhammadjuangrambe@gmail.com

*Corresponding Author: Gloria Gita Putri Ginting (gloriagita@dosen.pancabudi.ac.id)

ABSTRACT

Keywords:

*Authentic Deed,
Cyber Notary,
Jurimetrics, Legal
Certainty, Land
Registration.*

Article Info:

Received:

03/05/2025

Revised:

15/06/2025

Accepted:

18/07/2025

Published:

30/07/2025

Digital transformation in land registration in Indonesia triggers a conflict of laws regarding the electronic issuance of deeds by Land Deed Officials (Pejabat Pembuat Akta Tanah / PPAT). This study aims to analyze the disharmony between Government Regulation Number 18 of 2021 and Government Regulation Number 37 of 1998 concerning the prerequisite of physical presence, its implications for personal data protection governance, and to formulate a regulatory architecture through a comparative study. The method employed is normative legal research utilizing statutory, conceptual, and comparative approaches. This study applies a jurimetric instrument through the Legal Reliability Index (LRI) modeling to quantitatively measure the degree of evidentiary reliability of deeds. The results indicate that non-compliance with the physical presence requirement degrades the status of an authentic deed to a private deed (akta di bawah tangan) pursuant to Article 1869 of the Indonesian Civil Code. Simulation of the LRI formula demonstrates that procedural compliance regarding physical presence serves as the primary determinant maintaining the independent validity of the deed, while concurrently limiting the scope of the PPAT's liability from cyber system failure risks at the Land Office under the Personal Data Protection Law. This study recommends the adoption of a hybrid model based on a cautionary approach, drawing from practices in Germany. Physical presence remains mandatory for the substance of rights transfer to validate intent, whereas the archiving of original deeds (minuta akta) is centrally computerized. Amendments to the PPAT Position Regulations are necessary to align technological efficiency with formal civil law certainty.



This work is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International \(CC BY-SA 4.0\)](https://creativecommons.org/licenses/by-sa/4.0/)



How to cite: Gloria Gita Putri Ginting, Henry Aspan, & Muhammad Juang Rambe. (2025). Electronic Land Deed Issuance by Land Deed Officials in Indonesia: Regulation, Data Protection, and Legal Certainty. *International Journal of Educational Review, Law And Social Sciences (IJERLAS)*, 5(4), 1081–1093.

DOI: <https://doi.org/10.5281/zenodo.21718098>

Introduction

The land law system in Indonesia is grounded in Law Number 5 of 1960 on the Basic Regulations on Agrarian Principles (UUPA). The UUPA mandates the state's obligation to conduct land registration to ensure legal certainty and legal protection over the public's land rights (Sulistiyowati & Rijadi, 2024). Within the land administration system, Land Deed Officials (Pejabat Pembuat Akta Tanah / PPAT) serve an integral role as public officials authorized by the state to draw up authentic deeds concerning specific legal acts over land rights and condominium units (Auliani & Roisah, 2025). The deeds executed by PPAT serve as conclusive evidence (volledig bewijskracht) as well as the primary instrument in the process of registering the transfer of rights at the Land Office (Sulistiyowati & Rijadi, 2024). Technological advancements have driven the transition of the land administration system from manual methods toward digital systems, aligning with the global implementation of the Electronic-Based Government System (SPBE) (Abdillah et

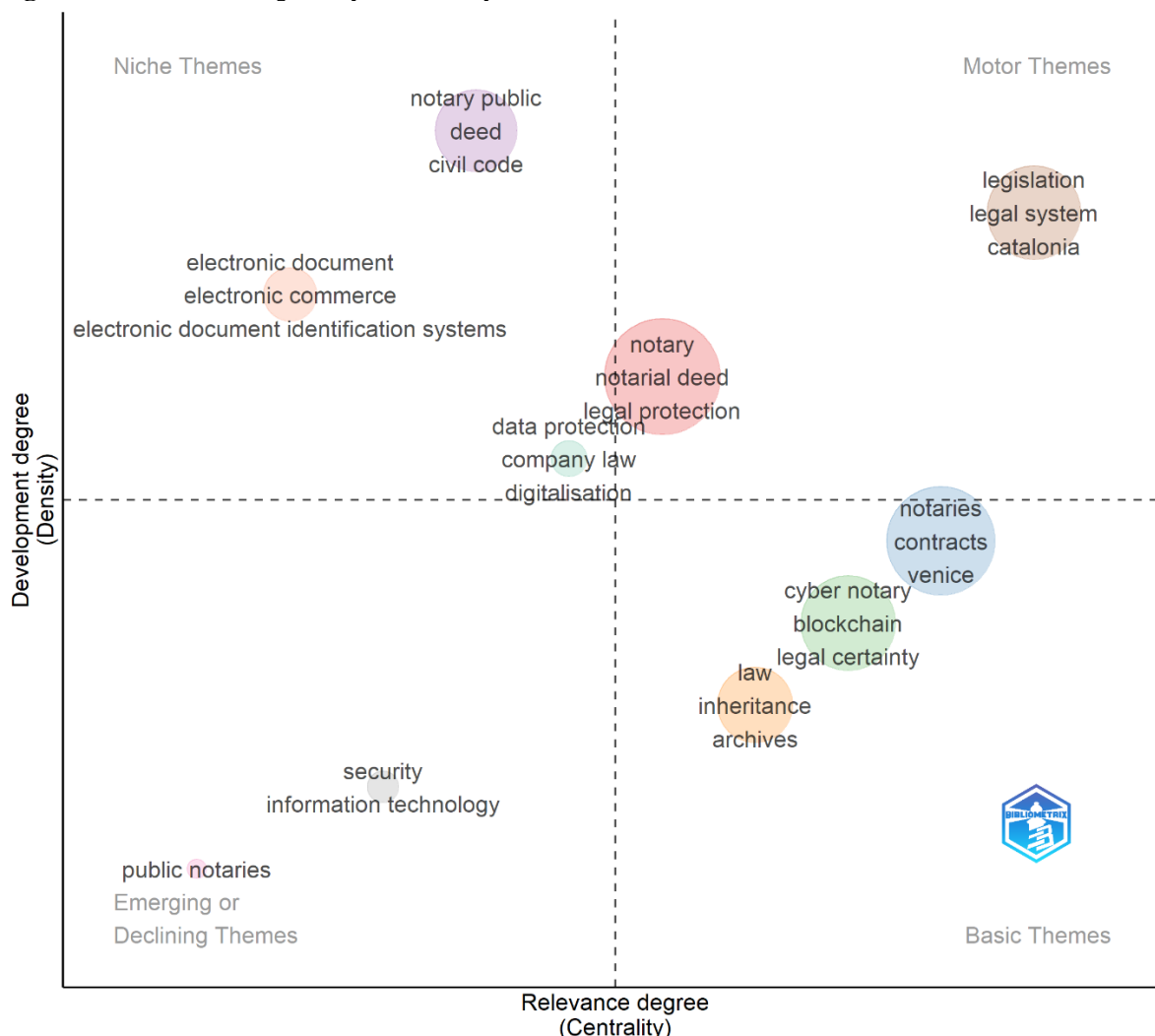
al., 2026; Auliani & Roisah, 2025). This transformation is aimed at optimizing land administration governance through procedural simplification and operational efficiency (Adelina & Sendrawan, 2025). In accordance with this policy direction, the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (*ATR/BPN*) implements the digitization of land services through the issuance of Electronic Land Certificates. This policy is based on Government Regulation Number 18 of 2021, which is currently regulated operationally under Minister of ATR/Head of BPN Regulation Number 3 of 2023 on the Issuance of Electronic Documents in Land Registration Activities, revoking the previous provisions under Minister of ATR/BPN Regulation Number 1 of 2021 (Auliani & Roisah, 2025).

The modernization of land administration triggers a conflict of laws regarding the electronic execution of deeds by Land Deed Officials (*Pejabat Pembuat Akta Tanah / PPAT*) (Lumintang & Serfiyani, 2026). In this context, a conflict of laws is understood as an inconsistency between regulations governing similar legal objects, thereby leading to uncertainty in implementation. Article 86 of Government Regulation Number 18 of 2021 provides an opportunity for the electronic execution of PPAT deeds. However, the Position Regulations of PPAT as governed under Government Regulation Number 37 of 1998, as amended by Government Regulation Number 24 of 2016, maintain mandatory requirements for physical formalities (Lumintang & Serfiyani, 2026). Such hurdles are evident in Article 22 of Government Regulation Number 37 of 1998, which mandates the reading and explanation of the deed's contents physically in the presence of at least two witnesses prior to being executed immediately, as well as Article 25, which requires the physical binding of original deeds (*minuta akta*) up to 50 deeds per month. Furthermore, the territorial restriction of PPAT jurisdiction under Article 9 of Government Regulation Number 24 of 2016 creates a conceptual inconsistency regarding the limits of physical jurisdiction when confronted with the borderless nature of the digital ecosystem.

The dynamics of cyber law regulation also affect the application of evidentiary norms for electronic land deeds. Previously, Article 5, paragraph (4), subparagraph b of Law Number 11 of 2008 on Electronic Information and Transactions expressly excluded land deeds from the category of electronic documents recognized as valid evidence (Lumintang & Serfiyani, 2026). A significant shift occurred through Law Number 1 of 2024 on the Second Amendment to the EIT Law, which removed the explicit exclusion clause (Lubis & Lubis, 2026). Nevertheless, the newly enacted provision of Article 5, paragraph (4) of Law Number 1 of 2024 now stipulates that the clause on electronic documents does not apply where otherwise provided by Law. This closing provision triggers interpretive uncertainty as to whether the absolute formalities of deed authenticity under the Civil Code (*KUHPerdata*) and the PPAT Position Regulations can be categorized as valid statutory exceptions, thereby leaving electronic PPAT deeds vulnerable to the risk of degradation in evidentiary strength to private deeds (*akta di bawah tangan*) (Lumintang & Serfiyani, 2026).

The absence of implementing regulations to synchronize virtual presence procedures, cyber document security standards, and the management of natively digital protocols causes the implementation of electronic PPAT deeds in Indonesia to lack technical and operational certainty (Fernando & Djajaputra, 2025). This condition gives rise to new governance conflicts, such as the fulfillment of the right to erasure under Law Number 27 of 2022 on Personal Data Protection (*PDP Law*), which contradicts the land registration principle of publicity that demands the permanence and authenticity of historical chain of title over land.

Figure 1. Thematic Map of Cyber Notary Research Clusters



Source: R-Studio Bibliometrix data analysis results (2026), processed from 177 filtered legal literatures.

Based on an analysis of 177 literatures, current studies remain focused on the rights protection function within classic doctrines (Riviyusnita et al., 2019) and the recognition of digital notarial instruments in general (Riviyusnita et al., 2019; Siswanto et al., 2025). Therefore, this study aims to unravel the normative conflict of laws in the electronic execution of PPAT deeds, focusing the analysis on formulating parameters for the limitation of liability of PPAT, aligning land jurisdiction work areas, and integrating professional risk management within the transition toward electronic land registration in Indonesia. An external comparative study is conducted against the deed digitization policies in Germany, the Netherlands, and Estonia to formulate adaptive regulatory architecture recommendations that guarantee legal certainty for the public's property rights (*hak kebendaan*).

Method

This study employs a normative legal research method supplemented by a jurimetric analysis using the Legal Reliability Index (LRI). The focus of the analysis is the synchronization of positive law norms, doctrines, and legal principles concerning the digitization of PPAT services and land registration administration. The research approaches utilized include the statutory approach, the conceptual approach, and the comparative law approach. Legal materials are classified into three categories. Primary legal materials comprise the Civil Code

(KUHPdata), the Basic Agrarian Law (UUPA), the EIT Law, the Law on Notary Positions (UUJN), the PDP Law, Government Regulation Number 37 of 1998, Government Regulation Number 18 of 2021, and Minister of ATR/BPN Regulation Number 3 of 2023. Secondary legal materials consist of academic literature and scientific journals regarding the validity of digital documents, the authenticity of deeds, and the organization of electronic systems. Tertiary legal materials, in the form of legal dictionaries and encyclopedias, are utilized to clarify technical terminology. Data analysis is conducted through deductive-qualitative reasoning and quantitative modeling. Qualitative reasoning utilizes the instrument of legal syllogism, placing the provisions on deed authenticity under Articles 1868 and 1869 of the Civil Code along with the PPAT Position Regulations as the major premise, and the implementation of electronic deeds in land registration as the minor premise. To measure the degree of legal certainty and the level of evidentiary vulnerability, the normative analysis is supplemented by the Legal Reliability Index (LRI) formulation. This model incorporates the variables of formal civil compliance (F), cryptographic integrity index (I_s), platform reliability (A_e), digital verification capacity (P_{dig}), and the cyber risk coefficient (R_{cyber}) with proportional weights (α dan β). Furthermore, a comparative analysis is performed against the legal instruments and electronic archiving systems in Estonia (e-Notar), Germany (Electronic Documents Archive), and the Netherlands to formulate a harmonization framework for land registration regulations in Indonesia.

Results and Discussion

Normative Conflict of Laws in the Regulation of Electronic PPAT Deed Execution

Digital transformation within land administration directly intersects with evidentiary provisions under civil law, particularly concerning the requirements for the authenticity of authentic deeds as outlined in Article 1868 of the Civil Code (KUHPdata). Pursuant to this provision, an authentic deed is a deed drawn up in the form prescribed by law by or before authorized public officials at the place where the deed is executed (Al Hadid et al., 2024). The authenticity of a deed is conditional upon the fulfillment of cumulative formal prerequisites, including the identification of legal subjects, the reading of the deed by the public official, immediate execution, and the physical presence of the parties and witnesses (Lumintang & Serfiyani, 2026). Referring to Article 1869 of the Civil Code, if these formal requirements are deviated from due to procedural defects or lack of authority of the public official, the deed loses its authenticity and undergoes a degradation into a private deed (*akta di bawah tangan*). This direct deviation weakens the legal evidentiary weight of the document from initially possessing conclusive evidence (*volledig bewijskracht*) to free evidence (*vrij bewijskracht*) when utilized as an instrument for registering the transfer of land rights at the Land Office (Lumintang & Serfiyani, 2026).

Conversely, Article 86 of Government Regulation Number 18 of 2021 provides a statutory basis for PPAT to draw up and submit deeds electronically within the framework of modernizing land registration (Adelina & Sendrawan, 2025). This policy is operationally implemented through Minister of ATR/BPN Regulation Number 3 of 2023, which regulates the examination mechanism of electronic documents under Articles 26, 27, and 28. Based on these provisions, PPAT submit deeds and required documents through the Electronic System integrated with the database of the Ministry of ATR/BPN to be examined for substantive validity by Land Office officials within a maximum period of 5 (five) working days (Yusuf et al., 2024). Should the examination period lapse without any administrative action from the officials, the submission of the deed is deemed approved by the system, and the applicant receives an electronic notification to proceed with the land registration data maintenance process (Minister of ATR/BPN Regulation Number 3 of 2023).

However, the use of the term 'may' (*dapat*) in Article 86 of Government Regulation Number 18 of 2021 creates a normative ambiguity, as this land administration regulation was not accompanied by adjustments to the formality provisions for deed execution under Government Regulation Number 37 of 1998 on the Position Regulations of PPAT (Lumintang & Serfiyani, 2026; Adelina & Sendrawan, 2025). The mandatory requirement of physical presence is explicitly governed under Article 22 of Government Regulation Number 37 of 1998, which stipulates that a PPAT deed must be read aloud or its contents explained to the parties in the presence of at least 2 (two) witnesses prior to being executed immediately by the parties, the witnesses, and the PPAT. This procedural barrier becomes even more pronounced considering that the majority of PPAT are professionals who concurrently serve as Notaries, thereby binding them absolutely to the provisions of Article 16, paragraph (1), subparagraph m of Law Number 2 of 2014 on the Amendment to Law Number 30 of 2004 on Notary Positions (UUJN). The Elucidation of Article 16, paragraph (1), subparagraph m of the UUJN strictly reinforces the doctrine that a Notary/public official must be physically present and execute the deed in the presence of the appearers (*penghadap*) and witnesses. The absence of an operational definition regarding the criteria for 'confronting each other

electronically' within land law triggers a disharmony between the convenience of cyber administration and the legality of deed execution methods by public officials (Al Hadid et al., 2024; Adelina & Sendrawan, 2025).

The dynamics of cyber law through Law Number 1 of 2024 on the Second Amendment to the EIT Law have also been insufficient to eliminate this conflict of laws. Although Law Number 1 of 2024 removed the previous provision of Article 5, paragraph (4), subparagraph b of the EIT Law—which excluded authentic deeds from the category of electronic documents (Zulfikar & Meiliawati, 2025)—and granted legality for the recognition of Certified Electronic Signatures (ITE) on land documents (Pemayun & Dewi, 2025), this cyber regulation does not automatically invalidate civil formalities. Dogmatically, the EIT Law operates as a general legal framework (*lex generalis*) for electronic transactions, whereas regulations concerning the standardization and methods of deed authenticity remain specifically tied to professional position regulations. Furthermore, Article 5, paragraph (4) of Law Number 1 of 2024 affirms that provisions on electronic information and documents do not apply where otherwise provided by Law, which means that the procedural requirements of face-to-face confrontation under formal civil law continue to demand rigid compliance (Lubis & Lubis, 2026).

Therefore, the horizontal conflict of laws occurring between Government Regulation Number 18 of 2021 concerning electronic land registration and Government Regulation Number 37 of 1998 on the Position Regulations of PPAT cannot be resolved through the principle of *lex posterior derogat legi priori*. Government Regulation Number 37 of 1998 constitutes a specific provision (*lex specialis*) regulating the profession, formal requirements, and deed validation procedures, whereas Government Regulation Number 18 of 2021 constitutes a general provision (*lex generalis*) regulating macro-level land administration. Pursuant to the legal maxim *lex posterior generalis non derogat legi priori speciali*, a subsequently enacted general law cannot override a previously enacted specific law. Consequently, Government Regulation Number 18 of 2021 lacks the legal force to override the requirements of physical presence and the reading of the deed mandated under Government Regulation Number 37 of 1998 and the UUJN. This stance underscores the actual locus of the conflict of laws, wherein administrative regulations demand land digitization, while professional position regulations continue to restrict procedural validity to conventional physical presence of the parties, thereby leaving the resulting electronic PPAT deeds vulnerable to evidentiary challenges in court (Lumintang & Serfiyani, 2026; Ramadhan, 2025; Tan et al., 2024).

Aspects of Data Protection and Legal Certainty in Electronic Land Registration

The digitization of land registration has fundamental implications for legal certainty within operational stages of land administration. Legal certainty in agrarian administration encompasses the aspect of procedural validity regarding the transfer of rights to prevent formal legal defects that could invalidate the transfer of ownership rights in the future. The primary hurdle in implementing this policy stems from the absence of technical provisions at the level of Standard Operating Procedures (SOP) governing the parameters of virtual 'face-to-face' confrontation mechanisms (Lumintang & Serfiyani, 2026). The unavailability of adequate technical standards for audio-visual transmission and cyber identity authentication to guarantee the authenticity of legal subjects creates procedural constraints for Land Deed Officials (*Pejabat Pembuat Akta Tanah* / PPAT) in executing their mandatory obligations, such as reading the deed aloud and providing legal counsel to the parties (Al Hadid et al., 2024).

Other administrative problems relate to the lack of synchronization in the governance of official protocols. Although the land registration service system has been transitioned to a digital format pursuant to Minister of ATR/Head of BPN Regulation Number 3 of 2023, PPAT remain absolutely burdened by conventional obligations to maintain and preserve original deeds (*minuta akta*) in physical form. Under the provisions of Article 25 of Government Regulation Number 37 of 1998 on the Position Regulations of PPAT, every sheet of the original preserved PPAT deed must be bound once a month into a book containing no more than 50 (fifty) deeds (Lumintang & Serfiyani, 2026). Conversely, Articles 25 and 26 of Minister of ATR/Head of BPN Regulation Number 3 of 2023 require PPAT to upload data and submit deed contents electronically to the ministry's system (Yusuf et al., 2024). This dual record-keeping obligation not only creates work redundancy but also poses a risk of information discrepancy between physical land archives and their digital copies, which directly affects the validity of evidentiary instruments in the event of a legal dispute (Lumintang & Serfiyani, 2026).

The management of reliable electronic land registration demands stable inter-institutional data integration. In practice, data maintenance frequently encounters technical and operational constraints due to a lack of periodic synchronization between the database of the Ministry of ATR/BPN, the population database (Dukcapil), Electronic Certification Providers (PSrE), and regional tax information systems for the validation of the Land and Building Title Transfer Tax (BPHTB) (Sulistiyowati & Rijadi, 2024). This interconnection disruption causes delays in issuing electronic land document registration confirmation notifications as regulated under Article 28 of Minister

of ATR/Head of BPN Regulation Number 3 of 2023, thereby hindering certainty regarding service completion timeframes for the public.

Electronic data security has become an immensely crucial aspect following the enactment of Law Number 27 of 2022 on Personal Data Protection (PDP Law). Pursuant to Article 8 and Article 43, paragraph (1) of the PDP Law, personal data subjects possess the right to terminate processing, request erasure, and/or destroy personal data concerning themselves from the data controller's system. This provision regarding the right to erasure dogmatically clashes with the land registration principle of publicity, which demands transparency and the permanence of historical records regarding the management of agrarian objects (chain of title) to guarantee *in rem* property rights (*hak kebendaan*). The cyber land transmission process, which currently lacks uniform standard operating procedures for safeguarding client data, exposes PPAT to the risk of privacy violations, data breaches, and data exploitation threats by third parties prior to the formal execution of official documents.

Another technical challenge relates to the system for correcting or rectifying electronic data. In the event of a substantive administrative error post-transmission of a document—such as a clerical error in the subject's identity or a discrepancy in the spatial plot of the land parcel map—the mechanism regulated under Article 27 of Minister of ATR/General BPN Regulation Number 3 of 2023 requires a total rejection and return of the application file. PPAT are mandated to carry out rectifications by repeating the entire administrative phase from the beginning (Berliana et al., 2024). This rigid correction system hinders the efficiency of digital land services and triggers a state of legal uncertainty during the repetition of the data rectification procedure.

The primary legal issue in the digitization of land documents stems from the fulfillment of the physical presence prerequisite as an absolute element for the authenticity of authentic deeds pursuant to Article 1868 of the Civil Code (Aksa & Ginting, 2026). The authenticity of a deed requires a public official to directly witness the mutual and free consent of the parties (*wilsovereenstemming*), validate the legal capacity to act (*rechtsbekwaamheid*), and ensure the absence of vitiating factors of consent in the form of duress (*dwang*), fraud (*bedrog*), or mistake (*dwalig*) in the transaction (Isnaini & Wanda, 2017; Kumalaratri, 2021; Alincia & Sitabuana, 2021).

This physical presence obligation is imperatively regulated under Article 22 of Government Regulation Number 37 of 1998, which affirms that a PPAT deed must be read aloud and its contents explained to the parties in the presence of at least 2 (two) witnesses prior to being executed immediately (Intansari & Ratna, 2022). This standard of formality aligns with Article 16, paragraph (1), subparagraph m of Law Number 2 of 2014 on the Amendment to Law Number 30 of 2004 on Notary Positions (UUJN) and its elucidation, which mandates public officials to be physically present at the place where the deed is drawn up (Kumalaratri, 2021). Jurisdictional barriers become increasingly complex for PPAT who concurrently hold office as Notaries, where their relative competence is strictly confined by the territorial boundaries of the physical work area of the regency/city of their domicile pursuant to Article 9 of Government Regulation Number 24 of 2016—a conventional geographic restriction that contradicts the borderless nature of cyberspace.

This dogmatic boundary regarding physical presence was reinforced by the Constitutional Court through Decision Number 34/PUU-XXII/2024. Although the court's order declared the applicant's petition inadmissible (*niet ontvankelijk verklaard*) due to a lack of legal standing (Constitutional Court of the Republic of Indonesia, 2024), the Court provided a substantial *obiter dictum*. The Court stated that audio-visual recording or the virtual reading of a deed cannot substitute the requirement of direct physical presence, because remote interaction possesses inherent limitations in verifying the psychological condition, mental health, and free will of the appearing parties (Constitutional Court Decision Number 34/PUU-XXII/2024).

The lack of physical presence in the execution of electronic deeds directly impacts the evidentiary weight of the document. Pursuant to Article 1869 of the Civil Code, procedural deviations regarding authenticity alter the status of an authentic deed into a private deed. This dynamic creates a conflict of laws between the principle of *Tabellionis Officium Fideliter Exercebo*, which demands physical presence as a condition of authenticity, and the efficiency of digital administration.

Lon L. Fuller's paradigm of fidelity to law emphasizes the alignment between regulatory frameworks and the fundamental purposes of law. On the other hand, the architecture of code (*code is law*) according to Lawrence Lessig alters the validation mechanism of the parties' free will, meaning that conventional legal instruments require adaptation to digital operational frameworks.

The gap between civil law dogmatics and cyber architecture necessitates the application of Lee Loevinger's jurimetric approach (1961). This approach converts normative uncertainty into quantitative variables. Consequently, the degree of legal certainty is no longer assessed via a static dichotomy, but through a reliability index that aligns

formal procedures with the integrity of cyber infrastructure.¹ The Legal Reliability Index (LRI) modeling is employed as an analytical tool within this approach. This model converts statutory provisions (such as the physical presence requirement) and cyber infrastructure capacity (such as the integrity of electronic signatures) into structured variables. The mathematical formulation of the LRI is established as follows:

$$LRI = \alpha \cdot F + \beta \left(\frac{I_s \cdot A_e \cdot P_{dig}}{1 + R_{Cyber}} \right)$$

The operationalization of variables within the LRI modeling instrument is classified into the following parameters:

1. Civil Law Aspects

The component $\alpha \cdot F$ serves as an absolute requirement (gatekeeper) representing compliance with civil law instruments and professional position regulations concerning the authenticity of deeds.

a. F (Formal Compliance): A binary variable measuring the fulfillment of statutory formality requirements.²

1) It is valued at 1 if the procedures of physical presence of the parties, the reading aloud of the deed, and the execution in the presence of the public official are fulfilled pursuant to the mandate of Article 16, paragraph (1), subparagraph m of the UUJN and Article 22 of Government Regulation Number 37 of 1998. Under this condition, the public official's validation function regarding the psychological state and legal capacity to act (*rechtsbekwaamheid*) of the parties is inherently included.

2) It is valued at 0 if the physical presence requirement is deviated from (substituted by purely virtual procedures lacking a sectoral *lex specialis* basis).

b. α (Normative *Weight*): A weight constant representing the determination of formal civil law.³

2. Information Technology Aspects

This technical component measures the reliability of the electronic system as an instrument for the quality and integrity of digital trail evidence.

a. I_s (Integrity of Electronic Signature): The integrity index of Certified Electronic Signatures (ITE) pursuant to the provisions of the EIT Law.⁴

b. A_e (Authority Land Platform Reliability): The reliability index of the electronic land registration platform managed by the land authority (Ministry of ATR/BPN).⁵

c. P_{dig} (Digital Validation Capacity): The effectiveness index of digital verification protocols, representing the capacity of the cyber system to prevent defects of will through integrated biometric mechanisms.⁶

d. R_{Cyber} (Cyber Risk Coefficient): The cyber vulnerability risk coefficient, encompassing potential system failures, identity fraud, and personal data protection concerns (PDP Law). The placement of this variable as a denominator ensures that any increase in operational risk will proportionally degrade system reliability.⁷

¹ Lee Loevinger, in his foundational postulate, asserted that jurimetrics is not intended to replace normative legal reasoning, but rather to apply scientific methods to legal problems. In the context of this study, the quantitative approach is used strictly as an analytical tool to map the degree of deed reliability within the land registration system.

² This variable refers to the fulfillment of the mandatory physical presence requirement as obligated under Article 16, paragraph (1), subparagraph m of Law Number 2 of 2014 on the Amendment to Law Number 30 of 2004 on Notary Positions, alongside Article 22 of Government Regulation Number 37 of 1998 on the Position Regulations of Land Deed Officials. This provision reflects the principle of *Tabellionis Officium Fideliter Exercebo*, which mandates the obligation of public officials to directly see, hear, and execute deeds in the presence of the parties.

³ The determination of weight α is based on a doctrinal analysis of procedural formalism within the Indonesian civil law system. Under this system, the formal aspects of deed execution possess a more determinant position (primary condition) regarding the validity of authentic deeds compared to mere administrative efficiency, as discussed in Kartika et al. (2024).

⁴ Referring to the validity of Certified Electronic Signatures (ITE) as regulated under Law Number 1 of 2024 on the Second Amendment to Law Number 11 of 2008 on Electronic Information and Transactions, which positions cryptographic integrity as a technical requirement for the authenticity of electronic documents.

⁵ Referring to the reliability standards of the Electronic System managed by the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency, in accordance with the operational mandate under Minister of ATR/Head of BPN Regulation Number 3 of 2023 on the Issuance of Electronic Documents in Land Registration Activities.

⁶ This variable represents the risk mitigation capacity against defects of will in virtual transactions. It refers to the modern concept of Cyber Notary, which integrates biometric verification (liveness detection) as a substitutive instrument for face-to-face psychological verification (legal screening) conducted by a Public Official.

⁷ The formulation placing the cyber risk coefficient R_{Cyber} as a denominator adopts the logic of a proportional evidentiary value degradation function. This scenario ensures that even the smallest data security vulnerability or system failure occurring on the land platform will mathematically directly lower the legal reliability index (LRI) of the deed. This variable encompasses legal risks

- e. β (Technical/Empirical Weight): A constant representing the legal recognition of cyber infrastructure reliability.⁸
3. Legal Implications and Evidentiary Status Transformation Mechanisms
The separation of formal and technical structures within this formula prevents a mathematical multiplicative fallacy and reflects civil evidentiary doctrines through two scenarios:
 - a. Procedural Compliance Condition ($F = 1$): Juridical validity is fully maintained. The LRI reaches its maximum probability by accumulating the fulfillment of legal-formal civil requirements (α) and electronic archiving support (β).
 - b. Authenticity Degradation Condition ($F = 0$): If the electronic registration deviates from the physical presence requirement, the formal civil component is eliminated ($\alpha \cdot 0 = 0$). Pursuant to the mandate of Article 1869 of the Civil Code, the deed loses its authenticity and degrades into a private deed. However, through a jurimetric approach, the probability of the degree of free evidence (*vrij bewijskracht*) can still be measured in court by relying on technological instruments (β), where judicial discretion will evaluate the integrity of the supporting electronic evidence (I_s, A_e , dan P_{dig}).
4. Constant Weighting Methodology
To ensure that the probability index remains within a measurable range, the weighting incorporates constraint parameters ($\alpha + \beta = 1$). Considering that the Indonesian civil justice system prioritizes the principle of procedural formalism (*Tabellionis Officium*), the model configuration establishes the ratio ($\alpha > \beta$) (simulation example: $\alpha = 0.7$ dan $\beta = 0.3$).⁹ This weighting asymmetry legitimizes the postulate that fulfillment of the physical presence requirement remains the primary standard for the authenticity of deeds, while cyber instruments are positioned as supporting evidence that cannot absolutely substitute authenticity requirements.

To test the consistency and operationalization of the parameters within the formulated LRI formula, a simulated application was conducted within the context of land administration in Indonesia. The application of this mathematical function to various factual scenarios is presented in detail in Table 2 below.

Table 2. Simulation of Land Operational Scenarios Based on the Legal Reliability Index (LRI)

Modeling			
Scenario	Input Variables	LRI Numerical Calculation	Juridical Analysis and Legal Implications
Scenario I	$F = 1$ $I_s = 0.9$ $A_e = 0.9$ $P_{dig} = 0.8$ $R_{cyber} = 0.1$	$LRI = (0.7 \cdot 1) + 0.3 \left(\frac{0.9 \cdot 0.9 \cdot 0.8}{1 + 0.1} \right)$ $LRI = 0.7 + 0.3 \left(\frac{0.648}{1.1} \right) = 0.876$	An LRI value of 0.876 indicates that legal reliability is at a high level. Legal certainty is achieved when formal civil legality requirements ($F = 1$) are executed, whereas the use of electronic documents serves a supporting function in land registration.
Scenario II	$F = 0$ $I_s = 0.9$ $A_e = 0.9$ $P_{dig} = 0.8$ $R_{cyber} = 0.1$	$LRI = (0.7 \cdot 0) + 0.3 \left(\frac{0.9 \cdot 0.9 \cdot 0.8}{1 + 0.1} \right)$ $LRI = 0.7 + 0.3(0.589) = 0.176$	An LRI value of 0.176 demonstrates the impact of a vertical conflict of laws. Non-compliance with the physical presence requirement invalidates the normative weight of civil law (α). Pursuant to Article 1869 of the Civil Code <i>juncto</i> Article 5, paragraph (4) of the EIT Law, the deed degrades into a private deed

arising from cyber vulnerabilities and personal data protection obligations, which doctrinally clash with the land registration principle of publicity. References point to the obligations of data controllers under Law Number 27 of 2022 on Personal Data Protection (PDP Law).

⁸ The constant β represents the legal recognition of *lex informatica* as outlined in Lawrence Lessig, *Code and Other Laws of Cyberspace* (New York: Basic Books, 1999). Technological architecture is recognized as a regulatory instrument possessing the authority to support legal certainty in electronic transactions, though its position remains complementary to civil law formalism.

⁹ The determination of the simulated constant values is based on the weight of precedence within Indonesian civil litigation, which positions procedural formalism as the highest formal truth (*kebenaran formil tertinggi*). This figure serves as a normative simulation model and can be readjusted (calibrated) through further empirical research utilizing multi-subject decision-making methods such as the Analytic Hierarchy Process (AHP).

			(akta di bawah tangan), whose evidentiary weight becomes free evidence (<i>vrij bewijskracht</i>) and relies on the judicial discretion of the judge during trial.
Scenario III	$F = 1$ $I_s = 0.9$ $A_e = 0.4$ $P_{dig} = 0.3$ $R_{cyber} = 0.9$	$LRI = (0.7 \cdot 0) + 0.3 \left(\frac{0.9 \cdot 0.4 \cdot 0.3}{1 + 0.9} \right)$ $LRI = 0.7 + 0.3 \left(\frac{0.108}{1.9} \right) = 0.716$	In the event of an electronic system failure in land registration, the LRI value remains at 0.716 because the variable $F = 1$ serves as the primary determinant of validity. The civil validity of the PPAT deed stands independently from any land registration system failures. Liability for cyber system vulnerabilities rests upon the Land Office as the Data Controller under Article 46 of the PDP Law, thereby separating the scope of the PPAT's liability from system errors.

Simulations of operational scenarios through the Legal Reliability Index (LRI) model indicate that compliance with formal civil law requirements, particularly the physical presence of the parties, is the determining factor in maintaining the legal reliability value of Land Deed Officials' (PPAT) deeds. Non-compliance with the physical presence requirement results in the elimination of the deed's authenticity, thereby degrading its legal status to a private deed (*akta di bawah tangan*) pursuant to the provisions of Article 1869 of the Civil Code *juncto* Article 5, paragraph (4) of the Electronic Information and Transactions Law (EIT Law). Conversely, formal procedural compliance by the PPAT serves to limit the scope of personal data liability independently, thereby isolating the liability for cyber system failures or data breaches to the Land Office as the Data Controller pursuant to Article 46 of the Personal Data Protection Law (PDP Law).

Doctrinally under the law of evidence, electronic PPAT deeds that do not fulfill the physical presence requirement lose their authentic characteristics and are qualified as private deeds (Priscilla et al., 2024). This shift in legal status results in the loss of the external, formal, and substantive evidentiary force inherent in authentic deeds, thereby reducing their evidentiary weight to free evidence (*vrij bewijskracht*) (Hasmi, 2022). The legal implication of this condition dictates that if a party denies the validity of the instrument, the burden of proof to establish substantive truth (*kebenaran materiil*) at trial shifts entirely to the party seeking to enforce the deed (Priscilla et al., 2024).

The conflict of laws regarding the fulfillment of the physical presence requirement directly impacts banking sector operations, given that financial institutions mandate the validity of transfer deeds and Deeds of Grant of Mortgage Rights (APHT) as the primary basis for credit disbursement (Mujiburohman, 2024). The reduction of the deed's evidentiary weight to a private deed poses a risk of court-ordered revocation of mortgage collateral, which subsequently prompts banks to adjust their risk profiles or review the acceptance of electronic certificates as collateral (Mujiburohman, 2024). In its development, this juridical hurdle within the cyber ecosystem has the potential to affect property financing liquidity as well as economic growth in the real sector (Faku & Amadi-Echendu, 2026).

A Comparison of Electronic Deed Digitization Policies

A comparative law analysis of countries adhering to the civil law tradition is required to examine the conflict of laws in electronic deed regulations. The civil law system mandates the involvement of an independent public official (a Notary or PPAT) in contract drafting and the registration of *in rem* property rights to fulfill formality requirements and ensure the substantive truth of the deed (Koos, 2023). This study compares the policies in Estonia, Germany, and the Netherlands, which exhibit diverse regulatory characteristics regarding electronic evidence (Hafidzan et al., 2026).

Table 3. Comparison of Cyber Notary Approaches across Civil Law Jurisdictions

Jurisdiction	Digitization Approach	Presence Regulation	Archiving
Estonia	Integration of a national electronic identity (e-ID) system.	Physical presence can be substituted via remote verification.	<i>e-Notar</i> platform; centralized, encrypted, and supports cross-border transactions.
Germany	Prioritizes a cautionary approach.	Restricted to corporate law; prohibited for land title transfer transactions.	Electronic Documents Archive (EDA) with a long-term retention system.
Netherlands	Pragmatic policy approach.	Recognition of remote notarization through temporary regulations.	Synchronized with European Union electronic security standards (eIDAS).

Source: processed from Gracale & Putra (2022); Koos (2023); Hafidzan et al. (2026); Humaira & Latumeten (2022).

1. Cyber Notary in Estonia

Estonia has adopted the *e-Notar* platform to administer digital notarial services. This system allows physical presence to be substituted via remote verification, which encompasses the use of encrypted video communication, biometric-based electronic identification (e-ID), and electronic signatures holding evidentiary weight equivalent to wet-ink signatures (Gracale & Putra, 2022). The utilization of this platform is aimed at maximizing time and service cost efficiency (Fernando & Djajaputra, 2025).

The application of this model in Indonesia requires profound consideration. Disparities in internet infrastructure, digital literacy rates, and geographical challenges constitute factors that affect service accessibility if full digitization were to be implemented (Fernando & Djajaputra, 2025).

2. Selective Approach and the Cautionary Principle in Germany

Germany implements a selective digitization approach by prioritizing a cautionary approach. Within corporate law, deed execution procedures may be conducted virtually. However, for land title transfers and real estate registrations, German law mandates the physical presence of the parties (Koos, 2023). This provision preserves the warning function (*Warnfunktion*) to prevent hasty decision-making, while ensuring that the notary can perform the advisory function (*Belehrungsfunktion*) to maintain balanced bargaining positions among the parties (Koos, 2023).

In addition to procedural aspects, Germany possesses a protocol management system through the Electronic Documents Archive (EDA), which is administered by an independent authority. This system preserves electronic documents using asymmetric encryption under long-term retention and security standards (Hafidzan et al., 2026). This centralized digital archive infrastructure may be considered as a reference to resolve the dual constraints of physical and digital record-keeping faced by PPAT in Indonesia.

3. The Pragmatic Approach of the Netherlands

The Netherlands implements regulatory flexibility during transitional phases. To address physical interaction restrictions during the pandemic, the Dutch government enacted the *Dutch Covid-19 Temporary Act*. This regulation recognized audio-visual transmission as fulfillment of the physical presence obligation, provided that it complies with the European Union cyber security standards (eIDAS) (Humaira & Latumeten, 2022).

The practice in the Netherlands serves as a reference for Indonesia in drafting transitional regulations. Although the 2024 EIT Law has recognized the validity of electronic documents, follow-up actions in the form of systematic legislative reform remain required (Hafidzan et al., 2026). Without harmonization between the UUJN and sectoral PPAT regulations, operational hurdles in virtual deed execution will likely persist.

This comparative law analysis indicates that the regulatory architecture in Indonesia can be developed through a hybrid model. The archiving system for PPAT deed protocols could adopt a centralization mechanism, drawing from the Electronic Documents Archive (EDA) framework in Germany (Hafidzan et al., 2026), integrated with identity validation systems from national Electronic Certification Providers (PSrE).

Regarding the substance of legal acts transferring land rights (such as sales or grants), the physical presence principle remains necessary to safeguard the warning and advisory functions for the parties (Koos, 2023). If remote interaction is to be applied, such mechanisms require a certified teleconferencing infrastructure equipped with biometric verification, which must be formally governed under amendments to the PPAT Position Regulations (Fernando & Djajaputra, 2025; Al Hadid et al., 2024).

Conclusion

The electronic land registration policy under Government Regulation Number 18 of 2021 exhibits a disharmony with the formal provisions within Government Regulation Number 37 of 1998 on the Position Regulations of PPAT. Although Law Number 1 of 2024 recognizes the validity of electronic documents, operational inconsistencies with the PPAT Position Regulations as the *lex specialis* create technical uncertainty. The absence of regulatory standards for virtual presence, alongside the obligation for duplicate physical and digital record-keeping, affects the evidentiary weight of electronic PPAT deeds and leaves them vulnerable to court-ordered disputes.

Efforts to adjust land technology infrastructure must be balanced with sectoral regulatory reform. Considering the disparities in digital literacy, geographical conditions, and cyber security risks, the adoption of a hybrid model based on a cautionary approach—as implemented in Germany—could serve as a policy reference. This transformation is oriented toward the centralization of electronic archives utilizing digital storage systems and encryption to enhance PPAT administrative efficiency.

The Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) needs to harmonize regulations, particularly through amendments to Government Regulation Number 37 of 1998 on the Position Regulations of PPAT. Such regulatory revisions should incorporate definitions regarding the operational boundaries of audio-visual communication instruments, data processing standardization pursuant to the Personal Data Protection Law (PDP Law), and data interoperability between regional tax systems and the land database. This synchronization is required to align digital land service efficiency with legal certainty and the protection of land rights.

AI Usage Statement

The author declares that during the preparation of this manuscript, AI-assisted technologies were utilized strictly as limited instruments for analytical, computational, and linguistic support. Specifically, R-Studio (Bibliometrix) was employed for data analysis and visualization to construct the thematic map presented in Figure 1, and generative AI models were used to optimize legal-linguistic transitions during the translation of specific normative-legal passages from Indonesian into legal English.

Conflict of Interest

The author declares that there are no financial, personal, professional, or institutional conflicts of interest that could inappropriately influence, bias, or affect the objectivity of the research, analysis, and conclusions presented in this manuscript.

References

- Abdillah, S., N. Ghapa, and M. Makhtar. "Cyber Notary: Adaptation to Changes in Notary Practices in Indonesia." *Jambura Law Review* 1, no. 1 (2026): 45–58.
- Adelina, A. A., and T. Sendrawan. "Analisis Yuridis Pembuatan Akta Elektronik oleh PPAT dalam Perspektif PP 18/2021: Peluang, Tantangan, dan Implikasi terhadap Kepastian Hukum." *Jurnal Ilmiah Advokasi* 13, no. 3 (2025): 904–916.
- Aksa, F. S., and L. Ginting. "Analysis of the Validity of Cyber Notary-Based Notary Deeds in the Perspective of Civil Law." *International Journal of Cultural and Social Science (IJCSS)* 7, no. 1 (2026): 92–98.
- Al Hadid, A. P., T. Nur'aini, F. Christy, and Tjempaka. "Analysis of the Strength of a Deed Made by a Notary Against the Concept of Cyber Notary." *Sultan Agung Notary Law Review (SANLaR)* 6, no. 3 (2024): 122–143.
- Alincia, D., and T. H. Sitabuana. "Urgency of Law Amendment as Foundation of the Implementation of Cyber Notary." *LAW REFORM* 17, no. 2 (2021): 214–231.
- Auliani, I. R., and K. 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): 394–407.
- Berliana, N. S. G., S. Z. N. Rahma, A. Salsabila, and U. Basoeky. "Remodeling Cyber Notary Concept in Making Notarial Deeds Electronically." *Sultan Agung Notary Law Review (SANLaR)* 6, no. 4 (2024): 310–325.

- Bondarieva, M. "The Role of the Notary in the Efficient Protection of Property Rights." *Access to Justice in Eastern Europe* 2, no. 4 (2019): 68–84. <https://doi.org/10.33327/AJEE-18-2.4-a000023>.
- Faku, N., and A. Amadi-Echendu. "The Economic Benefit of Blockchain-Based Land Registry for South Africa: A Systematic Literature Review." *South African Journal of Information Management* 28, no. 1 (2026): art. 2002.
- Fendri, A., and Y. A. Mannas. "Electronic Notary Deed: A Legal Certainty Study Based on the Law of Notarial, the Law of the Limited Liability Company and the Law of Electronic Transaction and Information." *International Journal of Innovation, Creativity and Change* 10, no. 5 (2019): 109–119.
- Fernando, G., and G. Djajaputra. "Cyber Notary in the Indonesian Legal System: Its Urgency and Implementation." *Journal of Social Research* 4, no. 6 (2025): 1032–1040.
- Fuller, L. L. "Positivism and Fidelity to Law: A Reply to Professor Hart." *Harvard Law Review* 71, no. 4 (1958): 630–672. <https://doi.org/10.2307/1338226>.
- Gracale, S., and M. F. M. Putra. "The Urgency of Electronic Notarization in Indonesia by Seeing the Implementation in Estonia During the COVID-19 Pandemic." *American Journal of Humanities and Social Sciences Research* 6, no. 9 (2022): 135–138.
- Hafidzan, D. A., I. Ikhwanasyah, and N. A. Lubis. "Digitizing Notarial Protocols: A Comparative Study of Indonesia, Netherlands, and Germany." *Awang Long Law Review* 8, no. 3 (2026): 868–878.
- Hasmi, R. "Pemenuhan Syarat Formil dan Kekuatan Pembuktian Akta Pejabat Pembuat Akta Tanah Elektronik." *Banua Law Review* 4, no. 1 (2022): 85–97.
- Humaira, M., and P. E. Latumeten. "Comparison of Notary Deed in Indonesia, Netherlands, and Belgium During the COVID-19 Pandemic." *Linguistics and Culture Review* 6, no. 1 (2022): 233–243.
- Intansari, O., and E. Ratna. "Keotentikan Akta Pejabat Pembuat Akta Tanah Elektronik." *Notarius* 16, no. 2 (2022): 916–922.
- Isnaini, H., and W. Utomo. "The Existence of the Notary and notarial deeds within private procedural law in the industrial revolution era 4.0." *International Journal of Innovation, Creativity and Change* 10, no. 3 (2019): 128–139.
- Kartika, R. S., L. S. Salsabella, and A. R. Kusumadewi. "Penerapan Asas Tabellionis Officium Fideliter Exercebo dalam Penandatanganan Akta Notaris Secara Digital." *Perspektif* 29, no. 2 (2024): 100–109.
- Koos, S. "The Digitization of Notarial Tasks - A Comparative Overview and Outlook of 'CyberNotary' in Indonesia and Germany." *The Indonesian Journal of Socio-Legal Studies* 2, no. 2 (2023): art. 1.
- Kumalaratri, G. "Urgency of the Personal Data Protection Bill on Privacy Rights in Indonesia." *Jurnal Hukum Unissula* 37, no. 1 (2021): 1–13.
- Lessig, L. "The Law of the Horse: What Cyberlaw Might Teach." *Harvard Law Review* 113, no. 2 (1999): 501–549. <https://doi.org/10.2307/1342331>.
- Loevinger, L. "Jurimetrics: Science and Prediction in the Field of Law." *Minnesota Law Review* 46 (1961): 255–275. <https://doi.org/10.24926/265535.2699>.
- Lubis, I., and A. H. Lubis. "Labirin Regulasi Notaris: Menakar Kepastian Hukum di Era KUHP dan KUHAP (2)." *Indonesiana*, 16 Mei 2026.
- Lumintang, A. Y., and C. Y. Serfiyani. "Notary's Responsibility for the Validity of Deeds in the Implementation of Cyber Notary in Indonesia." *Jurnal Poros Hukum Padjadjaran* 7, no. 2 (2026): 180–195.
- Mahkamah Konstitusi RI. *Putusan Mahkamah Konstitusi Nomor 34/PUU-XXII/2024*. Jakarta: Mahkamah Konstitusi Republik Indonesia, 2024.
- Mujiburohman, D. A. "Kebijakan Pendaftaran Elektronik: Perspektif Regulasi, Teknologi, dan Aksesibilitas." *Jurnal Ilmu Pemerintahan* 8, no. 2 (2024): 159–174.
- Pemayun, C. T. D., and P. E. T. Dewi. "Keabsahan Tanda Tangan Digital dalam Transaksi Bisnis." *Jurnal Ilmiah Hukum dan Hak Asasi Manusia* 4, no. 2 (2025): 91–101.
- Priscilla, M., D. L. Nova, and S. N. Fajriah. "Keabsahan Hukum Penerbitan Sertipikat Tanah Elektronik Sebagai Alat Bukti Kepemilikan Hak Atan Tanah di Persidangan." *UIR Law Review* 8, no. 2 (2024): 68–84.
- Ramadhan, A. M. "Transformasi Digital dalam Pelayanan Notaris: Analisis Hukum Terhadap Keabsahan Akta yang Dibuat Secara Elektronik." *Journal of Accounting Law Communication and Technology* 2, no. 2 (2025): 922–932.

- Riviyusnita, R., Jauhariah, and F. F. Busroh. "Notary and the Implementation of Integrated Electronics Business Licensing Services." *Journal of Advanced Research in Law and Economics* 10, no. 3 (2019): 886–889. [https://doi.org/10.14505//jarle.v10.3\(41\).25](https://doi.org/10.14505//jarle.v10.3(41).25).
- Siswanto, C. A., S. E. Adiyatma, U. Nnawulezi, and J. Kabano. "Legal Recognition of Electronic Notarial Acts: A Comparative Study of Indonesia and Rwanda." *Indonesia Private Law Review* 6, no. 2 (2025): 112–126.
- Sulistiowati, I., and P. Rijadi. "Problems of Authority of Land Deed Making Officials in the Transfer of Rights in Surabaya." *DE RECHT (Journal of Police and Law Enforcement)* 5, no. 1 (2024): 40–52.
- Tan, W., S. Agustini, and A. Situmeang. "The Urgency of Implementing a Cyber Notary in Indonesia: A Comparative Study with the United States." *Sasi* 30, no. 3 (2024): 274–286.
- Yusuf, A. M. R., N. Kurniati, and Y. Y. Rukmana. "Pelaksanaan Pendaftaran Tanah Secara Elektronik pada Badan Pertanahan Nasional dan Pejabat Pembuat Akta Tanah." *ACTA DIURNAL Jurnal Ilmu Hukum Kenotariatan* 7, no. 2 (2024): 271–289.
- Zulfikar, Z., and I. Meiliawati. "Tantangan Yuridis dan Harmonisasi Regulasi Kedudukan Akta Notaris dalam Pembuktian Perjanjian Elektronik di Era Digital Indonesia." *Lex Lectio Law Journal* 4, no. 1 (2025): 1–13.