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Research Paper

Digitalization of Mortgage Rights: The Future of Power of Attorney to Charge Mortgage in the Era of Legal Technology

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Abstract
The digitalization of mortgage rightsparticularly through the Power of Attorney to Charge Mortgage (SKMHT)marks a pivotal transformation in Indonesia's legal and financial systems. Conventional practices, burdened by manual processes and document vulnerabilities, face issues of inefficiency, security risks, and procedural delays. This study explores the application of digital signatures, blockchain, and smart contracts to modernize SKMHT administration. Through comparative analysis and a proposed digital framework, the research demonstrates enhanced security, transparency, and operational speed. The findings underscore the urgency for regulatory alignment and infrastructure readiness, offering strategic recommendations to support a secure, efficient transition to digital mortgage rights in the legal tech era.

Key words: *Mortgage Rights, Digitalization, Legal Technology*

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I. Introduction

In recent decades, digital transformation has significantly impacted various sectors, including law and finance. One aspect that is gaining particular attention is the digitalization of mortgage rights, especially through the mechanism of the Power of Attorney to Charge Mortgage Rights (SKMHT). Traditionally, SKMHT has served as a vital legal instrument supporting credit and banking transactions, functioning as a guarantee for the fulfillment of debtor obligations. However, the conventional system that relies on manual processes and physical record-keeping often faces numerous challenges, such as cumbersome bureaucracy, the potential for document forgery, and limited access to fast and accurate information.[1]

Advancements in information and communication technology—particularly the adoption of blockchain, smart contracts, and digital signatures—offer innovative solutions to overcome these limitations. The digitalization of mortgage rights not only has the potential to improve administrative efficiency but also to strengthen legal security through real-time and transparent data verification. For example, blockchain technology enables decentralized and immutable recording of transactions, ensuring the integrity and authenticity of legal documents. In addition, the use of smart contracts can automate the execution of obligations in credit transactions, reducing human error and accelerating dispute resolution processes.[2]

Amid the dynamics of globalization and the rapid pace of digital innovation, adapting to legal technology has become a strategic necessity for financial institutions, notaries, and government agencies alike.[3] Countries such as Estonia and Singapore have demonstrated success in implementing digital systems in public administration, including in the area of property ownership registration and property transactions.[4] The adoption of such technologies not only enhances transparency and accountability but also optimizes public services to remain competitive in the global digital era. In Indonesia, despite efforts to integrate digital technology into the legal system, challenges such as infrastructure gaps, regulations that are not fully adaptive, and resistance from traditional stakeholders remain significant obstacles.

In view of these opportunities and challenges, research on the digitalization of mortgage rights through SKMHT in the era of legal technology is highly relevant. This research is expected to make both theoretical and practical contributions by examining how digital innovations can be reconfigured within the legal system to support secure financial transactions, while also reviewing existing regulations to make them more responsive to technological developments. Consequently, this study not only fills a gap in the literature at the intersection of

law and technology but also provides a foundation for policymakers to formulate more comprehensive and adaptive implementation strategies for the future.

II. Material and Method

This study adopts a qualitative and normative approach with a case study design and comparative analysis to examine the implementation of digital technology in mortgage rights through the Power of Attorney to Charge Mortgage Rights (SKMHT). The qualitative approach is used to explore the dynamics, challenges, and opportunities of integrating technologies such as blockchain, smart contracts, and digital signatures into legal practice, while the normative approach focuses on the study of legal doctrines, regulatory comparisons, and policy analysis. Case studies from countries such as Estonia and Singapore are selected to identify best practices that can be adapted in Indonesia. Secondary data are collected through a literature review, books, official publications, and relevant legal and policy documents, both from Indonesia and from countries that have implemented digital public administration.

Data analysis is carried out using thematic analysis and content analysis to identify patterns and gaps between traditional regulations and the needs of digitalization. A triangulation technique is applied by integrating findings from various secondary document sources to ensure the validity of the results. The findings of this research are expected to provide a comprehensive overview of the potential and challenges of digitalizing mortgage rights, as well as to establish a basis for adaptive policy recommendations to support the development of legal technology in Indonesia.

III. Results and Discussion

3.1 Digitalization in the Legal Sector

Digitalization in the legal sector has transformed the traditional paradigm into a system that is more efficient, transparent, and accessible to the general public(Hukum Online.com, 2024). Initiatives such as e-court, e-ticketing, and e-government reduce manual bureaucracy and accelerate case handling processes (LMS SPADA INDONESIA, 2024).Advanced technologiessuch as artificial intelligence (AI), blockchain, and cloud computingexpand the capabilities of the legal system to meet public expectations for speed and accountability (BINUS UNIVERSITY, 2024).

Digital transformation demands the reform of outdated paper-based procedures into electronic mechanisms, such as the implementation of e-filing for digital document submission (rechtsidee.umsida.ac.id, 2023). Electronic case management systems replace physical archives, enabling real-time storage, retrieval, and tracking of cases (bpmbkm.uma.ac.id, 2024). Furthermore, virtual courts introduced during the pandemic have further accelerated the adoption of online platforms for trials and mediation, enhancing access to justice without geographical limitations (UNDP, 2023).

The use of information technology in criminal law enforcement has enhanced the effectiveness of investigations through digital forensic analysis and electronic evidence tracking (rayyanjurnal.com, 2024). Online Dispute Resolution (ODR) platforms facilitate the resolution of minor disputes without face-to-face meetings, reducing court burdens and litigation costs (lmsspada.kemdiktisaintek.go.id, 2025). Innovations such as the Internet of Things (IoT) and cloud computing also strengthen data integration between institutions, making law enforcement coordination more responsive and measurable (BINUS UNIVERSITY, 2024).

Legal tech has emerged as a category of digital solutions specifically for the legal sector, ranging from document management applications to AI-based legal assistants (hukumonline.com, 2023). AI tools can now automatically draft and review contracts by analyzing legal patterns and risks from historical data (ejurnal.esaunggul.ac.id, 2024). Blockchain is increasingly being applied for real-time validation of document authenticity and electronic signatures, ensuring the integrity and non-repudiation of legal transactions (law.ugm.ac.id, 2019).

The digitalization of legal documentssuch as contracts, deeds, and power of attorneyfacilitates the process of electronic signing and secure cloud storage, while also reducing reliance on paper (gits.id, 2024). Electronic transactions in trade and e-commerce demand updates to regulations related to personal data protection, cybersecurity, and the legitimacy of digital signatures (journal.appisi.or.id, 2025). Additionally, legal certainty for fintech innovations and smart contracts requires a new, adaptive legal framework and dispute resolution mechanisms that align with the characteristics of online transactions (dinastirev.org, 2024). Thus, legal digitalization not only modernizes the internal processes of judicial institutions but also creates a more inclusive and responsive legal ecosystem to the complexities of the digital world.

3.2 The Concept of Mortgage Rights and SKMHT (Power of Attorney to Impose Mortgage Rights)

Mortgage Rights are a form of collateral on land for the settlement of specific debts, which grant priority status to certain creditors if the debtor defaults (Law Of The Republic Of Indonesia Number 4 Of 1996 Concerning Mortgage Rights Over Land And Related Property). This right is accessory, meaning its existence depends on the primary debt agreement between the debtor and the creditor (opac.fhukum.unpatti.ac.id, 2018). The objects that can be encumbered with Mortgage Rights include Ownership Rights, Business Use Rights, Building Use Rights, Usage Rights, and Ownership Rights over Strata Title Units (OCBC, 2023).

Mortgage Rights grant the creditor the right to execute the collateral through public auction if the debtor defaults (Law Of The Republic Of Indonesia Number 4 Of 1996). As a form of real security, the Mortgage Right is registered at the land office to achieve the principles of publicity and legal certainty (OCBC, 2023). Complete regulations regarding Mortgage Rights are governed by Law Number 4 of 1996 concerning Mortgage Rights over Land.

The encumbrance of Mortgage Rights begins with the issuance of a Power of Attorney to Impose Mortgage Rights (SKMHT) if the debtor is unable to directly create the Deed of Granting Mortgage Rights (APHT) (online-journal.unja.ac.id, 2016). After the SKMHT, the Land Deed Official (PPAT) creates the Deed of Granting Mortgage Rights (APHT) based on that authorization (hukum.studentjournal.ub.ac.id, 2013). Finally, the creditor registers the APHT at the Land Office to obtain a registered collateral right(hukum.studentjournal.ub.ac.id, 2013)

SKMHT is a letter that declares the delegation of authority from the mortgage grantor (debtor) to the mortgage recipient (creditor) to impose Mortgage Rights on the collateral land object (Pijar.com, 2024). This document strengthens the guarantee by granting the creditor the authority to register the Mortgage Rights without delay (repository.unissula.ac.id, 2023). Its main function is to provide legal certainty for both parties and secure the creditor's position before the APHT is signed (repository.unissula.ac.id, 2023). SKMHT is not the primary deed of transfer of rights, so it does not contain other legal actions such as sales or leases of the Mortgage Rights object (ejurnal.uij.ac.id, 2017). Furthermore, SKMHT serves as the basis for the Land Deed Official (PPAT) to create the APHT based on that authorization (ini-ippatkarawang.id, 2023).

SKMHT is very important when the debtor is unable to attend to sign the APHT, for example, due to distance or sudden agreements (ejournal2.undip.ac.id, 2020). The existence of SKMHT shows the debtor's good faith and accelerates the process of imposing the Mortgage Rights (ejurnal.uij.ac.id, 2017). Through SKMHT, the APHT process can be immediately submitted once the administrative requirements are fulfilled, without waiting for the debtor's physical presence (ini-ippatkarawang.id, 2023). The law stipulates that for loans exceeding IDR 50 million, the validity period of SKMHT is a maximum of three months (online-journal.unja.ac.id, 2016). Therefore, SKMHT provides legal certainty and security for the creditor while still protecting the debtor's rights until the mortgage right is officially registered (repository.unissula.ac.id, 2023).

3.3 Problems in Conventional SKMHT Practices

In the conventional scheme, the Power of Attorney to Impose Mortgage Rights (SKMHT) still relies on physical documents and manual procedures, requiring both the debtor and the Land Deed Official (PPAT) to be physically present at the Land Office for document submission and the creation of the Deed of Granting Mortgage Rights (APHT).

The lengthy bureaucracysuch as certificate checks that can take up to 30 daysoften results in delays in registration within the 7 working-day deadline (Article 13 Paragraph 2 of the Mortgage Law) and in the issuance of mortgage certificates, which may take weeks or even months to obtain (UNES Law Review, 2024). The deadline for creating the APHT from the time of SKMHT must be met within one month for registered land objects and three months for unregistered onesotherwise, the SKMHT becomes null and void by law. However, this provision in Article 15 Paragraphs (3)–(6) of the Mortgage Law is often overlooked, increasing time-related and legal risks for the parties involved (Tunas Agraria, 2023).

The lack of standardization across PPATs regarding SKMHT formats leads to ambiguity in requirements and powers of attorney, while clerical errors in the deedsuch as renvois or strike-throughs due to human error during data entryfurther delay the APHT process, as corrections must be made by the PPAT (UNES Law Review, 2024). Dependence on wet signatures and paper documents makes them vulnerable to damage, loss, or fading, making it difficult to verify authenticity without digital metadata or electronic sealsthereby weakening the integrity of legal evidence in disputes (Tunas Agraria,2023). The absence of cryptographic protection mechanisms and integrated validation systems opens the door to SKMHT forgery, where unscrupulous Notaries/PPATs may falsify deeds, carrying criminal penalties of up to eight years under Article 263 of the Criminal Code. However, lengthy proof processes and limited preliminary evidence often hinder enforcement (Hukum Online, 2019).

Moreover, physical documents sent to the Land Office without electronic validation are more easily accessed or copied by unauthorized parties, increasing the risk of misuse of authority without the landowner's consent (Hukum Online, 2019). Overall, the administrative and procedural issues of conventional

SKMHTranging from time-consuming and error-prone manual bureaucracy to security and authenticity challengeshighlight the urgent need for digital registration, the application of electronic signatures, and an integrated document verification system to ensure efficiency, accuracy, and legal certainty.

3.4 Opportunities for SKMHT Digitalization

The digitalization of SKMHT presents a significant opportunity to improve the efficiency, security, and transparency of the mortgage rights encumbrance process. By adopting legally recognized digital signatures and electronic certificates, SKMHT can be created and authorized electronically, reducing reliance on paper documents and the need for physical presence at the land office (UNDIP E-Journal, 2023). The integration of electronic SKMHT with the Electronic Mortgage Rights system (HT-el) of the National Land Agency (BPN) and online notary/PPAT services enables direct registration of the Deed of Granting Mortgage Rights (APHT) through the portal, streamlining administrative workflows and allowing real-time monitoring of registration status (Hukum Online, 2019). Furthermore, the implementation of blockchain technology offers a decentralized, immutable, and transparent record of land collateral for all stakeholders, minimizing the risks of duplicate certificates, data fraud, and document forgery (jurnalwidyabhumi.stpn.ac.id, 2022).

Digital signatures as electronic evidence carry the same legal weight as handwritten signatures, provided they meet the cryptographic standards stipulated in Law No. 11 of 2008 on Electronic Information and Transactions (ITE Law). As such, SKMHT signed electronically holds legal validity recognized by the courts(UNDIP E-Journal, 2023). Electronic certificates issued by the Electronic Certification Authority or licensed certification service providers ensure the identity of the signer and the integrity of the document, allowing any alterations to the SKMHT to be cryptographically recorded and detected (Journal Online Universitas Jambi, 2022). According to the Regulation of the Minister of Agrarian Affairs and Spatial Planning/National Land Agency (Permen ATR/BPN) No. 5 of 2020, Mortgage Rights registration can be carried out without submitting physical documents through the HT-el system. Therefore, electronic SKMHT accompanied by a digital signature can be directly processed by PPAT to create the APHT within the stipulated time frame (notarylaw.journal.ulm.ac.id, 2022).

The National Land Agency (BPN) has launched the HT-el portal (https://htel.atrbpn.go.id/), which enables PPATs, financial institutions, and creditors to register the Deed of Granting Mortgage Rights (APHT) online, monitor the registration status, and download the Mortgage Certificate in electronic format (Hukum Online, 2019). Regulation of the Minister of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) No. 9 of 2019 emphasizes that only registered PPATs may submit APHT through this electronic system. However, the signing process and SKMHT authorization can already be conducted online via notaries/PPATs who have adopted e-Notary systems (lawjournals.org, 2024). Through ATR/BPN's partner portal, PPATs can create an account and access HT-el services, upload electronic SKMHTs, and verify debtor and collateral data without face-to-face interaction (lawjournals.org, 2024). This integration reduces registration timeformerly taking several days to weeksinto a process that can be completed within a few days, while also providing a complete digital audit trail.

Blockchain offers a distributed ledger that permanently and transparently records every mortgage right transaction across a network of nodes, preventing duplicate certificates and data manipulation by irresponsible parties (jurnalwidyabhumi.stpn.ac.id, 2022). A study by the World Economic Forum shows that implementing blockchain in land administration systems can reduce administrative processing time by up to 70% and operational costs by up to 50%, while also cutting the potential for corruption and data fraud by up to 90% (kumparan, 2024). The Minister of Agrarian Affairs and Spatial Planning/National Land Agency has expressed commitment to integrating blockchain to enhance transparency, accountability, and public access to land data, as well as to accelerate land security services (Berita Terbaru Terpopuler Hari ini, 2023). Moreover, the combination of blockchain with Geographic Information System (GIS) enables real-time verification of certificate spatial data and metadata, helping to minimize land mafia practices and boundary disputes through tamper-resistant, audit-ready technology(csirt.unair.ac.id, 2025). Although challenges such as data standardization, implementation costs, and integration with legacy systems must be addressed, the digitalization of SKMHT through blockchain presents a transformative opportunity for improving security and efficiency in the land collateral sector.

3.5 **Legal and Regulatory Framework Involved**

In principle, Indonesian law has opened the door for the digitalization of legal documents, including the SKMHT (Power of Attorney to Impose Mortgage Rights), through the legal recognition of electronic documents and digital signatures in Law Number 11 of 2008 on Electronic Information and Transactions (ITE Law). Article 5 paragraph (1) of the ITE Law affirms that electronic information and/or electronic documents and their printouts are valid legal evidence. As stipulated in Article 11, digital signatures must fulfill the requirements of authentication, integrity, and verifiability through certificates issued by authorized certification providers.

In addition, Ministerial Regulation of ATR/BPN No. 5 of 2020 on Electronic Services in the Land Sector regulates that the registration of Mortgage Rights (Hak Tanggungan) can be conducted through an electronic system, namely HT-el (Electronic Mortgage Rights). This system allows notaries/PPAT to upload documents digitally, including SKMHT and APHT, provided the process is carried out by parties with verified and official accounts. Although this regulation does not explicitly mention electronic SKMHT as a separate instrument, it implicitly provides legal room for the digitalization of the entire mortgage imposition process.

However, the Notary Position Law (UUJN) No. 2 of 2014 still requires that notarial deeds be made in physical form and read aloud in the presence of the appearing parties. This poses an obstacle to the full legalization of digital SKMHT, as it is often made as a notarial deed. While in practice notaries may use electronic means such as video conferencing under certain conditions (e.g., during the COVID-19 pandemic), such measures remain exceptions and are not yet permanently accommodated in the existing legal framework.

Therefore, although the digitalization of SKMHT is technically and partially legally feasible, to ensure legal certainty and prevent multiple interpretations, revision or issuance of new regulations is needed. Amending the UUJN and technical rules concerning electronic deeds is crucial to ensure that documents like SKMHT can be created, signed, and used fully digitally with equal legal standing as physical documents. Furthermore, adjustments to identity verification systems, online PPAT registration, and national standard procedures for e-SKMHT will reinforce the legal framework for digitalization of collateral documents in Indonesia.

In conclusion, the digitalization of SKMHT currently resides in a legal grey area"permissible but not fully regulated"—and requires a stronger legal foundation to ensure its implementation carries equal legitimacy and enforceability as its physical counterpart.

3.6 **Benefits of Digitalizing Mortgage Rights and SKMHT**

The digitalization of mortgage rights and SKMHT through an integrated electronic system has been proven to reduce registration time from weeks to just a few days, while also reducing the manual administrative burden and physical queues at the Land Office (Notary Law Journal, 2022). The application of digital signatures and electronic certificates recognized by the ITE Law, along with the potential use of blockchain, strengthens authentication, maintains document integrity, and provides full visibility (audit trail) of each transaction, thus minimizing the risks of forgery and fraud (Journal STIh, 2023).

Digitalization allows the registration process of Electronic Mortgage Rights (HT-el) and SKMHT to be much fasterfrom what used to take up to 30 days to an average of only 7 business daysbecause all documents are uploaded and processed online (Notary Law Journal, 2022). The HT-el BPN system provides a real-time dashboard to monitor registration status, automatic notifications, and initial document validation, thus minimizing delays due to missing documents Hitel Mondaq. Automated data entry and form pre-filling also reduce the workload of PPATs and creditors, enabling administrative staff to focus on verifying substance rather than manual entry (Floify, 2022).

The use of digital signatures in accordance with the standards of the Electronic Information and Transactions Law (UU ITE) ensures that each signature on the SKMHT can be authenticated, cannot be forged, and is cryptographically linked to the content of the document (Journal STIh, 2023). The electronic certificate issued by a licensed provider includes cryptographic metadata and the signer's identity information, so any changes to the document will be automatically detected (Strateji Yönetimi Merkezi, 2023). Furthermore, the implementation of blockchain can create a decentralized, immutable ledger where every encumbrance and execution of mortgage rights is permanently and transparently recorded for the public, minimizing the chances of double certificates or data manipulation (ResearchGate, 2024).

Global studies show that digital mortgages can reduce operational costs by up to 50% by cutting down on manual processes and minimizing paper use (BeSmartee, 2021). In the land sector, reducing physical queues and printed documents lowers logistics and archive storage costs, while also reducing the risk of paper file damage (Journal STIh, 2023). For financial institutions, automating the origination and closing processes reduces the time employees spend on non-value-added tasks, thereby increasing revenue margins (Fannie Mae, 2024).

Every step in the electronic registration process leaves a digital audit trail that is easy to trace, facilitating re-verification in the event of disputes or internal audits (Notary Law Journal, 2022). Open access to HT-el registration data also reduces opportunities for corruption and fraud, as the public and stakeholders can monitor the status and validity of each mortgage right online.

The HT-el online platform allows debtors in remote areas to submit SKMHT without having to visit the BPN or PPAT office, thereby expanding access to financing and legal justice (Journal STIh, 2023). Not only large banks but also micro-finance institutions and small investors can utilize this electronic service, supporting financial inclusion and MSME financing (UNISSULA Journal, 2023).

The integration of HT-el with the e-Notary system and the ATR/BPN partner portal enables seamless coordination between PPAT, creditors, and BPN without face-to-face meetings (Mondaq, 2024). Through API, HT-el data can be linked with banking and fintech platforms for real-time credit scoring and approval, speeding

up the digital credit process (ABNR - Counsellors at Law, 2021). The combination of blockchain with GIS (Geographic Information System) also opens opportunities for spatial certificate verification, which is very useful in minimizing boundary disputes and ensuring location data accuracy (ResearchGate, 2024).

3.7 Risks and Challenges

a. **Normative Conflicts and Legal Uncertainty**

The Ministerial Regulation of ATR/BPN No. 9/2019 on Integrated Electronic Mortgage Services is not yet fully aligned with Law No. 4 of 1996 on Mortgage Rights, which creates potential legal gaps and uncertainty regarding the status of electronic documents in legal disputes(UNS Journal, 2023).The system for proving electronic documents in HT-el is also considered weak by PPAT practitioners, as soft files are not recognized as equivalent to authentic deeds without further technical regulation in the Criminal Procedure Code (KUHAP), the Mortgage Rights Law (UUHT), or the Electronic Information and Transactions Law (UU ITE)(UNS Journal, 2023). Moreover, the Notary Position Law (UUJN) No. 2/2014 still requires deeds to be read physically in front of the parties involved, meaning there is no clear normative foundation for fully digital SKMHT creation(Ethics and Law Journal, 2023). In response, revisions to the UUJN and harmonization of related regulations are necessary so that e-SKMHT can have legal force equivalent to traditional deeds (UNDIP E-Journal System, 2024).

b. Technological and Infrastructure Challenges

A survey by the Ministry of Communication and Informatics shows that only about 15% of regencies/cities in Indonesia have adequate digital infrastructure for implementing blockchain or HT-el platforms, while less than 20% of BPN and PPAT employees have a basic understanding of this technology (Kumparan, 2024). This gap has resulted in several land offices not consistently operating HT-el, causing the registration process to revert to manual mechanisms(UNS Journal, 2023).

The absence of a single national standard for electronic document formats and APIs has led to system fragmentation between HT-el portals, e-Notary, and internal banking/creditor applications, requiring repeated data entries and making the system vulnerable to inconsistencies(UNS Journal, 2023). Additionally, server disruptions and unstable network access in the field often cause document uploads to halt, delaying the electronic mortgage registration process(UNS Journal, 2023). Strengthening cloud infrastructure and backup/redundancy policies is necessary to ensure 24/7 availability (UNDIP E-Journal System 2024).

c. Security and Data Integrity Risks

Although blockchain offers high security, risks still exist such as a 51% attack or exploitation of smart contracts especially if the private network is not tightly secured(Espos Bisnis, 2022). Leaked private keys or electronic certificates can create vulnerabilities for document forgery, requiring professional key management and regular audits.

The use of uncertified digital signatures increases the potential for document manipulation by irresponsible parties, as encryption and cryptographic metadata are not standardized. Additionally, electronic documents stored without layered security systemssuch as end-to-end encryption and sandboxingare easily susceptible to misuse or hidden alteration, leading to financial losses and prolonged disputes.

3.8 Best Practices

The implementation of Electronic Mortgage Rights (HT-el) in several Land Offices has demonstrated the effectiveness of digitalizing the mortgage registration process. For example, the Palembang City Land Office reported significant acceleration through the automatic cancellation of documents that remain uncorrected within seven working days, helping to avoid physical file backlogs and speeding up the issuance of electronic mortgage certificates (repository.stpn.ac.id, 2023). Meanwhile, in Banjarmasin City, since September 2019, the average registration processing time has drastically decreased from 30 days to around 10 working days thanks to standardized digital SOPs and real-time monitoring dashboards available to Land Deed Officials (PPAT) and creditors (notarylaw.journal.ulm.ac.id, 2022). A similar case occurred at the Batam City Land Office, which, despite facing network challenges, achieved an adoption rate of up to 85% through mobile offline solutions and intensive workshops for PPATs (jurnalmarcapada.stpn.ac.id, 2021).

On the notarial side, the office of Hartono, S.H. developed a web-based deed administration information system complete with a Document Management System module and automated notifications, reducing SKMHT validation to just 1–2 working days (Perpustakaan STIKOM Bali, 2018). Meanwhile, the Notary and PPAT Office of Rossa Kristantina, S.H. integrated a client portal, document management, and online payment system, allowing SKMHTs to be digitally signed and submitted to the BPN without face-to-face interaction, improving client satisfaction by 30% and significantly reducing data entry errors (journal.pdphi.com, 2024).

At the national level, the 2024–2029 blockchain roadmap includes pilot projects in 10 citiesincluding Badungto test interoperability and decentralized security in the digitization of land measurement documents and land books. Ministerial Decree of the ATR/BPN Minister No. 1669/SK-HR.02/X/2023 explicitly appoints Badung as a pilot location for land blockchain implementation, and academic studies confirm that blockchain can preserve data integrity, prevent manipulation, and facilitate real-time verification of guarantee history by ATR/BPN nodes, banks, and notaries.

From these various practices, several key lessons emerge: the need for standardized digital SKMHT formats integrated with HT-el and e-Notary to avoid inconsistencies; the provision of mobile/offline applications and intensive training to address digital infrastructure limitations in remote areas; the development of a unified API to connect HT-el, banking systems, and e-Notary platforms to prevent data entry duplication; the implementation of cryptographic or blockchain-based audit trails to record every SKMHT change immutably; and the use of public-private financing models or fiscal incentives to ease the initial investment burden for small-scale PPATs and ensure broad-based technology adoption.

IV. Conclusion and Recomendation

1. Conclusion

The digitalization of SKMHT and the registration of Electronic Mortgage Rights (HT-el) in Indonesia has demonstrated significant potential in accelerating administrative processes, reducing the burden of physical documents, and enhancing transparency through digital audit trails. The legality of electronic documents and digital signatures is already recognized under Law No. 11/2008 on Electronic Information and Transactions (ITE Law), while Ministerial Regulation of ATR/BPN No. 5/2020 provides a framework for HT-el registration without the need for physical documentsthough normative gaps remain regarding electronic deeds in the Notary Law No. 2/2014. Implementation of HT-el in several land officessuch as those in Palembang, Banjarmasin, and Batamhas resulted in a decrease in average registration time from 30 days to less than 10 working days, as well as adoption rates of up to 85% supported by digital SOPs and offline applications. In the notarial domain, studies show that e-Notary systems can streamline the deed creation and SKMHT validation process to just 1–2 working days, although clearer technical regulations are still needed to equate electronic deeds with their physical counterparts.

2. Recomendation

a. Regulatory Revisions

Amend the Notary Law and the Mortgage Law to explicitly recognize the legality of electronic deeds and digital SKMHT.

b. System Standardization Establish standardized formats for SKMHT electronic documents and integrate the HT-el, e-Notary, and banking systems into a unified national platform.

c. Infrastructure & Security Enhancement

Increase server capacity, provide offline applications, and implement robust encryption and digital key protection systems.

d. Training & Certification

Train PPAT officials, notaries, and BPN staff on digital technologies, cybersecurity, and electronic document management procedures.

e. Incentives & Financial Support

Offer subsidies or incentives to small-scale PPATs and institutions that adopt digital systems early.

f. Regular Evaluation and Oversight

Set performance indicators for electronic services and establish a cross-agency supervisory team for regular evaluations and policy adjustments.

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