

Digitalization Reform Of Land Certification In The Batam Free Trade Zone And Free Port Area

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ABSTRACT

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This study examines the urgency, challenges, and prospects of law enforcement in the implementation of land certificate digitalization in the Batam Free Trade Zone and Free Port Area (KPBPB Batam). The digitalization of land certificates, particularly through the application of electronic certificates, is expected to strengthen legal certainty, prevent document forgery, expedite administrative processes, and enhance transparency in land governance in Indonesia. However, the dual authority of the Batam Authority (BP Batam) and the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) creates regulatory and institutional complexities that have the potential to trigger conflicts in land management. The research method used is normative-empirical with a statute approach, case approach, and socio-legal analysis, supported by primary data in the form of interviews with BP Batam officials, ATR/BPN, notaries/PPAT, and secondary data comprising laws and regulations, legal literature, and related decisions. The results of the study indicate that although the digitalization of land certification offers significant potential to support investment and sustainable development in Batam, its implementation is still hampered by overlapping regulations, weak institutional coordination, limitations of technological infrastructure, and the unpreparedness of human resources. This study concludes that legal reform and regulatory harmonization between BP Batam and ATR/BPN are the main prerequisites for the successful digitalization of land certificates. In addition, strengthening law enforcement mechanisms, implementing the principles of good governance, and ensuring transparent oversight are key to preventing the abuse of authority and land disputes. The contribution of this research lies in enriching the discourse on land law reform in special economic zones and providing policy recommendations for the government, legal practitioners, and investors in facing the challenges of implementation.



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Introduction

The main issue of concern for the author stems from the phenomenon of dual land authority in the Batam Free Trade Zone and Free Port (KPBPB). The National Land Agency (BPN), as a state institution, has constitutional authority over land registration throughout Indonesia. On the other hand, the Batam Authority (BP), established under Law Number 36 of 2000 and its implementing regulations, is also vested with authority in land management within the area. This creates legal uncertainty, particularly regarding the implementation of the government's ongoing land certification digitalization program. This

concern has become more pronounced as communities and businesses face dual bureaucracies in managing land rights, which has implications for the slow realization of investment in Batam.¹ Furthermore, there are serious problems concerning the validity and integration of land data in the context of digitalization. Central government programs, such as electronic certificates and the Complete Systematic Land Registration (PTSL), require a single, comprehensive, and integrated land information system. However, in Batam, this system is often hampered by differences in the administrative authority between the BPN and BP Batam, which affects the validity, interoperability, and legal certainty of digital certificates. This concern aligns with Bambang Suhartono assertion that the legal certainty of land rights can only be achieved through a consistent, unified land registration system that does not allow for multiple interpretations.²

Nationally, the dynamics of Indonesian land law have undergone significant changes with the introduction of a land digitalization program. Through the PTSL policy and electronic certificates regulated in Minister of ATR/BPN Regulation Number 1 of 2021, the government is targeting the realization of a modern, transparent, and accountable national land database (NLDB). The goal is not only to provide legal certainty but also to promote public service efficiency, reduce the potential for disputes, and strengthen the protection of community rights. According to Ferry Irawan, land digitalization is a transformative instrument that supports the creation of a healthy investment climate by minimizing administrative risks and corrupt practices in land administration services.³

However, the implementation of this program cannot be separated from the specific legal context of the Batam Free Trade Zone and Free Port (KPBPB Batam). Unlike other regions, Batam has a unique land management regime based on the *lex specialis* of Law Number 36 of 2000 concerning the Batam Free Trade Zone and Freeport. Within this regulatory framework, BP Batam is granted the authority to regulate, administer, and manage land, including approving land allocation. As a result, the digitalization of land certificates carried out by the BPN cannot necessarily proceed smoothly because of differences in procedures and land data management mechanisms that remain under the BP Batam's control.

The challenges are becoming increasingly complex because of the overlap between national law and Batam's specific local legal framework. According to Mertokusumo, legal certainty can only be achieved if legal rules are enforced consistently and do not contradict other norms. In Batam, regulatory inconsistency between the BPN and BP Batam has resulted in a dualism of authority that is counterproductive to the objectives of the digital land certification reform.⁴ This also creates administrative obstacles, as applicants for land rights often face lengthy and inconsistent procedures.

However, the political-legal aspect of land administration regulation in Batam also plays a significant role. The central government seeks to enforce a unified, integrated land registration system, while BP Batam argues that its authority constitutes a special mandate to support Batam's status as a free trade zone. This difference in perspective creates regulatory tensions that contribute to the slow implementation of electronic certificates in the industry. According to Bottor Erikson, legal pluralism must be managed with the principle of harmonization rather than dualism, which leads to uncertainty.⁵

The challenges of implementing land certification digitalization in Batam involve technical, legal, and institutional issues. On the technical side, the integration of the national land information system with the BP Batam land database still faces compatibility constraints. On the legal side, existing regulations have not yet resolved authority conflicts decisively. On the institutional side, coordination between BPN and BP Batam remains sectoral rather than collaborative. According to research by Gusnia, one of the keys to successful land digitalization is the alignment of regulations and interagency commitment to developing an

¹ Soerya Respationo and Nar Yan Thapa, "Optimizing Regional Governance in Batam City Government-Business Entity Institutional Dualism," *SASI*, March 31, 2024, 87–99, <https://doi.org/10.47268/sasi.v30i1.1869>.

² Bambang Suhartono et al., *Implementasi e-Government dalam Pelayanan Publik di Unit Layanan Administrasi pada Biro Organisasi dan Tatalaksana Kementerian Dalam Negeri*, n.d.

³ Ferry Irawan Febriansyah et al., *Digital Legal Transformation: Legal Strategies for Strengthening National Cybersecurity*, 5, no. 1 (2026).

⁴ Soeryo Respationo, *LAND REGISTRATION AND CERTIFICATE ISSUANCE IN A FREE TRADE ZONE PERSPECTIVE (FTZ)*, n.d.

⁵ Bottor Erikson Pardede and Pristika Handayani, "Dualism of Land Management Authority between BP Batam and the Batam Municipal Government: Its Impact on Building Use Right Certificates," *Journal of Judicial Review* 27, no. 2 (2025), <https://doi.org/10.37253/jjr.v27i2.11162>.

integrated system.⁶ Accordingly, this study aims to examine how the digitalization reform of land certification can be implemented effectively in Batam within the framework of this complex legal system. This study focuses on the challenges of implementation and the prospects of law enforcement amid the dualism of authority, with the goal of providing both academic and practical recommendations to promote legal certainty in land affairs within KPBPB Batam. It is hoped that the results of this analysis can strengthen the government policy direction in accelerating land digitalization while positioning Batam as a model for land reform in nationally strategic areas.

The urgency of law enforcement in the field of land affairs cannot be underestimated, especially in strategic areas that serve as investment centers, such as Batam City. Protracted land disputes, overlapping land rights, and weak inter-agency coordination often pose serious obstacles to creating a healthy investment climate. Legal uncertainty regarding land ownership status causes losses not only for rights holders but also for the government and business actors seeking to invest. Therefore, the existence of clear and consistent regulations, supported by strict law enforcement, is essential to reduce the potential for disputes and provide equal legal protection to all parties.

Furthermore, legal certainty in land affairs is an absolute requirement for sustainable national economic development. Investment, both on a local and international scale, will only grow within a legal ecosystem that guarantees justice, transparency, and the protection of rights of the people.⁷ By strengthening the enforcement of land law, Indonesia, especially in strategic areas such as Batam, can optimize its role as an engine of economic growth.

The implementation of land policies that are responsive and oriented toward the public interest will promote the creation of fair land governance, prevent prolonged conflicts, and at the same time foster investor confidence in legal certainty in Indonesia.⁸ Based on the background of the problem described above, the issues to be discussed are as follows: How urgent is the digital certification reform of land in the Batam Free Trade Zone and Free Port? What are the challenges of implementing land certificate digitalization in Batam? And What is the outlook for law enforcement in supporting the effectiveness of land certification digitalization in Batam?

Law Number 5 of 1960 concerning the Basic Agrarian Principles (UUPA) constitutes the legal foundation of land affairs in Indonesia, affirming the principle of state control over land for the greatest prosperity of the people. The UUPA introduced concepts of land rights, such as Ownership Rights, Right to Cultivate, Right to Build, and Right of Use, which remain relevant to this day. However, the development of economic and investment needs has given rise to various issues, including the UUPA's limited flexibility in responding to the dynamics of development.⁹ Therefore, the UUPA is often used as a point of reference in academic analysis and legal practice for resolving agrarian conflicts.

In the national context, recent literature indicates that land law must continuously adapt to the developments of globalization, urbanization, and the needs of special economic zones such as Batam Island. The implementation of PP 18/2021 is seen as an important step in enhancing legal certainty for investment; however, it also poses challenges, such as the potential for overlapping authorities between the central and regional governments.¹⁰ Therefore, academic studies emphasize the urgency of strengthening implementing regulations, consistency in implementation, and transparent and equitable land dispute resolution mechanisms. Land regulation in Batam City has distinctive characteristics that set it apart from other regions in Indonesia. This originated from the designation of Batam as a free trade zone and free port through Law No. 36 of 2000. This regulation provides the legal basis for land management in Batam by placing the Batam Indonesia Free Zone Authority (BP Batam) as the authority vested with the power to grant land rights.¹¹ This designation indicates that land regulation in Batam is not fully subject to the national agrarian system but rather has its own regulations in accordance with the strategic objectives of economic development.

⁶ Gusnia Gusnia and Yunisa Oktavia, *Dualisme Kelembagaan antara Pemerintah Kota Batam dan BP Batam: Tantangan serta Implikasinya terhadap Tata Kelola Pemerintahan*, n.d.

⁷ Adrian Sutedi, *Hukum Pertanahan Dalam Perspektif Digitalisasi Dan Pembangunan Berkelanjutan* (Rajawali Pers, 2020).

⁸ Boedi Harsono, *Hukum Agraria Indonesia: Sejarah Pembentukan Undang-Undang Pokok Agraria, Isi, Dan Pelaksanaannya* (Djambanan, 2024).

⁹ Maria S.W. Sumardjono, *Tanah Dalam Perspektif Hak Ekonomi, Sosial, Dan Budaya* (Kompas, 2025).

¹⁰ Adrian Sutedi, *Hukum Pertanahan Dalam Perspektif Digitalisasi Dan Pembangunan Berkelanjutan*.

¹¹ Respationo, *LAND REGISTRATION AND CERTIFICATE ISSUANCE IN A FREE TRADE ZONE PERSPECTIVE (FTZ)*.

In addition, BP Batam issues various internal regulations related to the mechanism for granting land permits, extension of land rights, and provisions on tariffs and levies. These regulations aim to create legal certainty in land utilization, especially to support investments in strategic areas. However, in practice, issues such as overlapping land claims, delays in the extension of rights, and a lack of transparency in the licensing process persist.¹² Therefore, studies on land regulation in Batam are important to evaluate the extent to which these special arrangements can support economic development without neglecting the principles of justice and legal certainty.

The development of digital technology has driven the modernization of land administration in Indonesia, particularly with the introduction of regulations concerning electronic land certificates (e-certificates). This transformation is governed by Minister of ATR/BPN Regulation Number 1 of 2021 on Electronic Certificates, which stipulates that land digitalization is aimed at enhancing legal certainty, service efficiency, and preventing certificate forgery (Minister of ATR/BPN 2021).¹³ According to Winda Pitriani, the implementation of electronic certificates is a strategic step toward more transparent, rapid, and accountable public services in line with the bureaucratic reform agenda in the agrarian sector.¹⁴

However, the implementation of electronic certificates still faces technical and legal challenges. Several experts have highlighted gaps in the public's digital literacy as well as the need for data synchronization between institutions, such as the BPN, local governments, and banking institutions.¹⁵ In addition, the issue of personal data protection is a key concern, as digital-based electronic certificates are highly dependent on information system security. Therefore, recent studies emphasize the importance of strengthening supporting regulations, technological infrastructure, and public education to ensure that the digitalization of land law can proceed effectively and inclusively.¹⁶

The Legal Certainty Theory proposed by Gustav Radbruch emphasizes that law must provide certainty, justice, and utility. Legal certainty is crucial for creating a sense of security in society, particularly in the management of land rights, which are prone to conflict. In the context of land affairs in Batam, legal certainty is the foundation for preventing overlapping rights and providing guarantees for the continuity of investment.¹⁷ Thus, this theory serves as the basis for assessing the effectiveness of specific land regulations.

Furthermore, Good Governance and e-Government Theory emphasize the importance of transparency, accountability, public participation, and the utilization of technology in governmental administration. The digitalization of land affairs through electronic certificates is a tangible implementation of e-government principles aimed at increasing efficiency, reducing bureaucracy, and minimizing the potential for corruption or data manipulation.¹⁸ In the context of Batam, the implementation of a digital land system is also in line with the needs of a strategically oriented area toward global economic growth.

The Theory of Law Enforcement according to Soerjono Soekanto explains that law enforcement is influenced by five factors: the law itself, law enforcement officers, facilities and infrastructure, society, and culture. Land disputes in Batam often arise due to the weakness of officers and land administration facilities in the region. Therefore, the digitization of land law and regulatory certainty must be linked to efforts to improve the quality of officers and public understanding of their legal rights and obligations.¹⁹

¹² Respationo and Thapa, "Optimizing Regional Governance in Batam City Government-Business Entity Institutional Dualism."

¹³ Darmawan, B, *Digitalisasi Dan Tantangan Hukum Administrasi Negara* (Rajawali Pers, 2023).

¹⁴ Winda Pitriani et al., "Onrechtmatige Overheidsdaad Badan Pengusahaan Batam Dalam Pembatalan Pengalokasian Lahan di Kota Batam: Studi Kasus Putusan Nomor 17/G/2020/PTUN.TPI," *UNES Law Review* 8, no. 1 (2025): 114–29, <https://doi.org/10.31933/unesrev.v8i1.2455>.

¹⁵ Ibrahim Rusli Junior, *Peluang dan Tantangan Transformasi Digital Sertifikat Tanah Setelah Berlakunya Peraturan Menteri ATR/BPN Nomor 3 Tahun 2023*, 2023.

¹⁶ Dian Aries Mujiburohman, "Kebijakan Pendaftaran Elektronik: Perspektif Regulasi, Teknologi, dan Aksesibilitas," *Journal of Infrastructure Policy and Management* 8, no. 2 (2025): 159–74, <https://doi.org/10.35166/jipm.v8i2.118>.

¹⁷ Rizky Abdullah Maulana et al., *Kepastian Hukum Atas Hak Atas Tanah Dalam Investasi: Telaah Yuridis Normatif Terhadap UU Agraria dan UU Cipta Kerja*, n.d.

¹⁸ Bernd W. Wirtz and Peter Daiser, "A Meta-Analysis of Empirical e-Government Research and Its Future Research Implications," *International Review of Administrative Sciences* 84, no. 1 (2018): 144–63, <https://doi.org/10.1177/0020852315599047>.

¹⁹ Siti Nurkhotijah et al., "PERKUAT SUMBER DAYA MAHASISWA YANG UNGGUL MEMILIKI KEPRIBADIAN TANGGUH DAN BERKARAKTER DENGAN BAKTI SOSIAL DIDUKUNG PEMBAGIAN

By integrating the theories of legal certainty, good governance, e-government, and law enforcement, this theoretical framework can serve as a comprehensive analytical tool. Legal certainty provides a normative foundation, good governance and e-Government guide the modernization of the land system, and the theory of law enforcement explains the dynamics of implementation in the field. This combination is essential for analyzing the effectiveness of land regulations in Batam, particularly in preventing disputes, enhancing transparency, and strengthening the investment climate in the region.

Method

This study uses a normative-empirical method, namely, normative legal research supported by empirical field data. Normative research focuses on laws and regulations, legal principles, and relevant legal doctrines.²⁰ Meanwhile, empirical research was conducted to obtain an overview of the implementation practices of regulations and land dispute resolution in Batam through interviews and case studies. This method was chosen because it can provide a comprehensive understanding of normative aspects and practical realities.

The approaches used in this research include several types: statute, conceptual, case, and socio-legal approaches. The statutory approach is used to examine regulations related to land affairs in Batam, including laws (UU), government regulations (PP), and regulations issued by the Head of BPN. The conceptual approach is used to study legal theory and agrarian concepts related to the authority of the BPN, BP Batam, and PPAT. The case approach is used to analyze several land disputes that have occurred in Batam, while the socio-legal approach helps to understand how law operates within the social context of society.²¹

The research data sources consist of primary legal materials, such as legislation; secondary legal materials, in the form of literature, books, journals, and legal articles; and empirical data, obtained through interviews with BPN officials, BP Batam officials, and notaries/PPAT. In addition, case studies were conducted on several land disputes in Batam as empirical evidence of the implementation of the land law. The combination of normative and empirical data is expected to provide a comprehensive overview of the issues under study.

Data analysis was conducted using a descriptive-analytical qualitative method, systematically presenting the research findings, which are then analyzed based on legal theory, legal principles, and the implementation of law in practice.²² Qualitative analysis enables researchers to interpret data in a narrative form, resulting in comprehensive and in-depth conclusions. This method can provide both academic contributions and practical recommendations for improving regulations and land governance in Batam.²³

Results and Discussion

The Urgency of Digital Certification Reform for Land in Batam

Legal certainty in land affairs is one of the main foundations for the sustainability of investment in the Free Trade Zone and Free Port (KPBPB) Batam. From the perspective of Gustav Radbruch's theory of legal certainty, the law must be able to provide order as well as definite protection of landowners' rights, especially for investors who require guarantees for the security of their investments.²⁴

SEMBAKO KEPADA MASYARAKAT KAMPUNG TUA TELUK LENGUNG KELURAHAN KABIL KECAMATAN NONGSA RT 01 / RW 22 KOTA BATAM," *Jurnal Pengabdian kepada Masyarakat* 2, no. 1 (2024).

²⁰ Iwoeng Geovani et al., "JURIDICAL ANALYSIS OF VICTIMS OF THE ECONOMIC EXPLOITATION OF CHILDREN UNDER THE AGE TO REALIZE LEGAL PROTECTION FROM HUMAN RIGHTS ASPECTS: RESEARCH STUDY AT THE OFFICE OF SOCIAL AND COMMUNITY EMPOWERMENT IN BATAM CITY," *International Journal of Educational Review, Law And Social Sciences (IJERLAS)* 1, no. 1 (2021): 45–52, <https://doi.org/10.54443/ijerlas.v1i1.10>.

²¹ Dhea Revina Shabila et al., *THE INFLUENCE OF AI IMPLEMENTATION IN LOCAL GOVERNMENT INFORMATION SYSTEMS ON THE EFFECTIVENESS OF PUBLIC SERVICE DELIVERY IN INDONESIA*, n.d.

²² Peter Marzuki, *Penelitian Hukum* (Kencana, 2019).

²³ Soerya Respationo, *Vol. 23, No. 1, June, 2024 [PENA JUSTISIA: MEDIA KOMUNIKASI DAN KAJIAN]*, 23, no. 1 (2024).

²⁴ Eriza Yulistiana Sari and Yunita Reykasari, *ASAS KEPASTIAN HUKUM PEMBERIAN HAK ATAS TANAH KEPADA INVESTOR IBU KOTA NUSANTARA BERDASARKAN PASAL 16 A UNDANG-UNDANG NOMOR 21 TAHUN 2023 TENTANG IBU KOTA NEGARA*, n.d.

Without legal certainty regarding land rights status, investors may face the risk of land disputes that could undermine both the investment value and the credibility of the business climate in Batam. Therefore, land administration reform, particularly through the digitalization of land certification, is urgently needed to enhance investor confidence.

In the context of Batam as a KPBPB, land status uncertainty often becomes a major obstacle that incurs high costs and reduces investment attractiveness.²⁵ For example, the dual authority between the Batam Development Authority and the Batam City Government has previously been a factor complicated the land permitting process, thereby affecting perceptions of legal certainty. With the digitalization of land certificates, land administration processes can be carried out more transparently and accountably, thus minimizing maladministration practices that can erode investor confidence.

The digitalization of land certificates also serves as an instrument for preventing the forgery of such documents. According to research conducted by Rusli Isa, one of the reasons for the prevalence of land disputes in Indonesia is the existence of certificate forgery practices that are difficult to detect early in manual systems.²⁶ By implementing electronic certificates based on blockchain or other digital security systems, land ownership data authentication can be easily carried out, thereby reducing the potential for land-related crimes.

This is in line with Lawrence M. Friedman's legal system theory, which emphasizes the importance of structure, substance, and legal culture in supporting the effectiveness of law. Digitalization constitutes an innovation in the structural and substantive aspects of the law, making it more adaptive to modern challenges.²⁷

In addition, accelerating public services in the land sector is a strategic necessity in areas with high investment intensity, such as Batam. According to Lestari (2021), the digitalization of land services can cut service times by up to 50% compared to manual systems. This efficiency benefits not only the general public but also enhances Batam's competitiveness as an investment hub. Speed and certainty in obtaining land certificates provide investors with the assurance to immediately realize projects without bearing the risks of costly administrative delays.²⁸

Transparency is also a key value resulting from digitalization. According to good governance principles, transparency is a fundamental element in preventing corruption, collusion, and nepotism in the bureaucracy.²⁹ Through the electronic land certificate system, the public can monitor ownership status, land history, and administrative processes online, thereby reducing the scope for illegal practices. For investors, this transparency fosters confidence that every process undertaken operates within a clear and accountable framework.

Digitalization reform in the land certification system has become an urgent necessity, especially in strategic areas such as the Batam Free Trade Zone and Free Port (KPBPB) in Indonesia. Legal certainty in land affairs plays a fundamental role in creating a conducive investment climate. Land as an object of rights serves both social and economic functions, making the existence of valid and reliable land certificates a primary instrument for ensuring legal certainty of ownership and usage rights to land. In the context of KPBPB Batam, legal certainty in land affairs greatly influences the interest of both foreign and domestic investors, considering that this area is a center for industry, trade, and international logistics.³⁰

²⁵ Nicolas Roing Mbalur et al., *Perlindungan Hukum terhadap Keamanan Data Pribadi Pemegang Sertipikat Tanah Elektronik Dikaitkan dengan Kebocoran Data Berdasarkan Peraturan Menteri ATR/BPN No. 3 Tahun 2023*, 6, no. 2 (2026).

²⁶ Rusli Isa Trezy Andhika, *Sertipikat Elektronik: Transformasi Digital, Kepastian Hukum, Dan Tantangan Implementasi Dalam Sistem Administrasi Pertanahan Di Gorontalo*, November 1, 2025, <https://doi.org/10.5281/ZENODO.17499101>.

²⁷ Mirtha Ilmi et al., "Transformasi Digital Layanan Sertipikat Tanah Elektronik Di Kantor Pertanahan Kabupaten Tulungagung," *Perspektif Administrasi Publik Dan Hukum* 3, no. 1 (2026): 113–25, <https://doi.org/10.62383/perspektif.v3i1.943>.

²⁸ Susilo Widiyanto et al., "Tantangan Menuju Penerapan Sertipikat Elektronik Di Kota Dan Kabupaten Magelang," *Publikauma: Jurnal Administrasi Publik Universitas Medan Area* 10, no. 2 (2022): 97–106, <https://doi.org/10.31289/publika.v10i2.7452>.

²⁹ Agus Dwi Yudianto et al., "Transformasi Pelayanan Pertanahan: Tantangan Dan Solusi Dalam Implementasi Sistem PTP Berbasis Digital Di Kantor Pertanahan Kabupaten Bandung," *Jurnal Praktik Keinsinyuran* 2, no. 2 (2025): 179–88, <https://doi.org/10.25170/jpk.v2i2.6301>.

³⁰ Hanafi Hanafi et al., "Kewenangan Badan Pengusahaan Batam Dalam Eksekusi Lahan Di Kota Batam," *JURNAL USM LAW REVIEW* 8, no. 3 (2025): 1414–39, <https://doi.org/10.26623/julr.v8i3.12625>.

Furthermore, land certificate digitalization can be viewed as an application of Gustav Radbruch's theory of legal certainty, which emphasizes the importance of the law in providing clarity, order, and protection of rights. Digitalization can reduce agrarian disputes that often arise due to overlapping certificates, document forgery, and weaknesses in conventional administrative systems. With a digital-based system, every land transaction is recorded in an integrated database, allowing certificate validity to be verified quickly, accurately, and transparently.³¹

From the perspective of good governance theory and e-government, the digitalization of land certificates is an expression of the modernization of public services that emphasizes the principles of transparency, accountability, effectiveness, and efficiency. The government, through the National Land Agency (BPN), is required to provide land services that are free from corruption, collusion, and nepotism, while also encouraging public participation in the oversight.³² Electronic systems can minimize direct contact between officials and the public, thus reducing the potential for abuse of authority and speeding up administrative services.

From the perspective of Soerjono Soekanto's theory of law enforcement, the digitization of land certificates can strengthen legal effectiveness. Soekanto, states that law enforcement is influenced by factors of legal substance, law enforcement officers, facilities and infrastructure, and the legal culture of the community.³³

Digitalization of land certificates can improve infrastructure factors through technology-based systems, strengthen legal substance through clear regulations regarding electronic services, and at the same time foster a legal culture in society that is more adaptive to digital transformation. Thus, the digital reform of land certification in Batam is not only an administrative necessity but also a strategic step to reinforce legal certainty, encourage an investment climate, and build transparent and modern land governance.

Thus, the urgency of reforming digital land certification in Batam cannot be postponed any longer. Digitalization is not merely a technical transformation but a strategic effort to strengthen legal certainty in land affairs as the main pillar of the investment climate. The implementation of electronic land certificates supports the creation of strong formal legal guarantees, minimizes document forgery, accelerates public services, and strengthens bureaucratic transparency in the land sector. This demonstrates that the development of land law that is adaptive to the digital era is an absolute requirement for making Batam a modern, efficient, and globally competitive investment area.

The implementation of electronic certificates is regulated as part of the modernization of land governance in national strategic areas, including the Batam Free Trade Zone and Free Port (KPBPB). Based on Government Regulation Number 41 of 2021 concerning the Implementation of Free Trade Zones and Free Ports, the management of this area falls under the authority of the Batam Business Agency (BP Batam), which plays a central role in issuing business permits and managing Land Management Rights (HPL). Electronic certificates have been introduced to replace physical certificates with a digital instrument that is more secure, efficient, and transparent, while also supporting efforts to prevent disputes and overlapping ownership.

Government Regulation Number 25 of 2025 concerning the Amendment to Government Regulation Number 41 of 2021 concerning the Administration of Free Trade Zones and Free Ports, which is an amendment to Government Regulation Number 41 of 2021 concerning the Administration of Free Trade Zones and Free Ports, reaffirms the importance of service digitalization in KPBPB Batam, including the integration of land information systems between BP Batam and the Ministry of ATR/BPN.

This is intended to ensure that HPL data, as well as data on the right to cultivate (HGU), right to build (HGB), and right-of-use titles located above HPL, are managed through a single, electronically verifiable database. Accordingly, electronic certificates serve not only as legal documents but also as part of a data management system that is synchronized across institutions.

³¹ Rico Nur Ilham et al., *Comparative Study of Cryptocurrency Digital Investment Based on Currency Laws and Global Economic Regulations: A Case Study of the Big Four ASEAN Countries*, November 30, 2025, <https://doi.org/10.5281/ZENODO.20552796>.

³² Mujiburohman, "Kebijakan Pendaftaran Elektronik."

³³ Diya Ul Akmal et al., *Reformasi Hukum Pertanahan: Perlindungan Hukum Hak Atas Tanah Terhadap Pengalihan Hak Secara Melawan Hukum*, n.d.

The electronic certificate mechanism in Batam is implemented through a system involving electronic land registration, data validation by ATR/BPN, and the issuance of electronic certificates by BP Batam as the HPL administrator. These digital documents have the same legal force as physical certificates, as affirmed by the implementing regulations of the Ministry of ATR/BPN. This process is expected to streamline bureaucracy, accelerate land administration services, and minimize instances of maladministration that often occur with conventional land certificates.

However, the implementation of electronic certificates in Batam faces serious challenges due to the dual authority of BP Batam and ATR/BPN. On the one hand, BP Batam has full authority over HPL management; on the other, ATR/BPN holds national authority in land registration. Therefore, Government Regulation Number 25 of 2025 concerning Amendments to Government Regulation Number 41 of 2021 on the Administration of Free Trade Zones and Free Ports emphasizes the need for a mechanism for data synchronization and institutional coordination in the FTZ. This is carried out so that every issuance of an electronic certificate remains integrated with the national land registration system.³⁴

The synchronization of land data is also important in the context of law enforcement and investment certainty. Electronic certificates managed through an integrated system enable the rapid identification of legitimate owners, land rights status, and history of rights transfers. Thus, the potential for forgery, duplication, or disputes is minimized. The integration between BP Batam and ATR/BPN through this digital system is a concrete manifestation of good governance principles in land management, as emphasized by the theory of legal certainty and the principle of transparency in public administration.

Prospectively, electronic certificates in Batam serve as a model for national land law reform that integrates efficiency, accountability, and legal certainty in land ownership. The implementation of this policy in the strategic KPBPB Batam area will become a barometer for the success of land digitalization in other regions of Indonesia. The successful integration of Batam's land data system with ATR/BPN will also strengthen the investment climate and guarantee legal protection for rights holders, while serving as an instrument of law enforcement in preventing land disputes and misuse.

Challenges in Implementing Land Certification Digitalization in Batam

One of the biggest challenges in implementing the digitalization of land certification in Batam is the dual authority between BP Batam and BPN. Since the enactment of Law Number 36 of 2000 concerning the Establishment of the Batam Free Trade Zone and Free Port Area, BP Batam has been authorized to manage land through the Right to Manage (HPL).³⁵ However, at the national level, land registration authority remains under the National Land Agency (BPN) based on Law Number 5 of 1960 concerning UUPA. This situation has caused a tug-of-war over authority, which has implications for the slow synchronization process of electronic certificate data.³⁶

This dualism also has the potential to cause overlapping policies, in which a single plot of land can be administered differently by BP Batam and the BPN. In practice, both the public and investors are often confused about which institution has the authority to issue or validate land rights in Batam. If not promptly addressed, this dualism of authority will undermine legal certainty in land affairs and ultimately harm the investment climate in this strategic area.³⁷

In addition to institutional issues, regulatory obstacles exist in the form of harmonization between central and regional laws. Government Regulation Number 41 of 2021 and its amendment through Government Regulation Number 25 of 2025 provide a normative framework for land management in free trade zones. However, its implementation in the field often clashes with derivative regulations issued by BP Batam or ATR/BPN. This highlights the need for regulatory harmonization to avoid legal disharmony that could delay the digitalization agenda.³⁸

³⁴ Widiyantoro et al., "Tantangan Menuju Penerapan Sertipikat Elektronik Di Kota Dan Kabupaten Magelang."

³⁵ Soerya Respationo et al., *Constructive Analysis Of Agriculture/Land Policy Land Object Of Agrarian Reform On The Settlement Dimensions Land Tenure In Forest Area*, n.d.

³⁶ Arifin, Z., *Politik Hukum Pertanahan Di Indonesia* (Prenadamedia, 2021).

³⁷ Muhammad Resa et al., *Tinjauan Hukum Agraria dalam Implementasi Surat Hak Guna Bangunan di Batam Kepulauan Riau*, n.d.

³⁸ Dhandy Parindo et al., "EVALUASI PEMBANGUNAN PROYEK NASIONAL DAN RELOKASI MASYARAKAT MELAYU," *Jurnal Hukum Indonesia* 3, no. 1 (2024): 1–9, <https://doi.org/10.58344/jhi.v3i1.662>.

Regulatory barriers are also evident from the absence of comprehensive technical regulations governing the procedures for electronic certificates in the KPBPB Batam. Although the Ministry of ATR/BPN issued Permen ATR/BPN Number 1 of 2021 on Electronic Certificates, its implementation has not fully accommodated the particularities of Batam as a region with a special legal regime. This lack of clarity may give rise to divergent interpretations and open the potential for misuse by certain parties.

From a technical perspective, the digitalization of land certification in Batam still faces serious issues related to technological infrastructure, data security, and human resource unpreparedness. The implementation of electronic certificates requires an integrated database system, servers that meet high security standards, and encryption mechanisms to prevent forgery.³⁹ However, factual conditions indicate that the readiness of information technology infrastructure in several land offices in Batam is still not optimal.

Data security is a crucial issue. Cases of government data breaches in several ministries demonstrate that digitization without cybersecurity safeguards opens new avenues for land-related crimes, such as data manipulation or electronic certificate hacking. This indicates the necessity of a comprehensive digital security strategy to ensure that electronic certificates provide legal certainty.⁴⁰

In addition, human resource readiness is a critical factor. Land administration officials at BP Batam and ATR/BPN are required to have digital competencies to manage the electronic certificate system. Limited training and technological adaptation present obstacles that can slow down the digital transformation process. The shift in paradigm from conventional administration to an electronic system requires time, strategy, and consistent human resource development.⁴¹

Equally important, there is potential for conflicts of interest among the government, investors, and the public. The government seeks to promote digitalization as a means of transparency and efficiency, whereas investors prioritize legal certainty for their investments. However, local communities are often disadvantaged because of a lack of outreach and transparency in the implementation of digitalization policies. Therefore, land digitalization must be designed as an inclusive instrument capable of balancing the interests of all stakeholders, not just those of the state or investors.

Prospects for Law Enforcement to Support the Effectiveness of Land Certification Digitalization in Batam

One of the main prospects for supporting the digitalization of land certification in Batam is through a strategy of harmonizing land regulations between the National Land Agency (BPN) and the Batam Indonesia Free Zone Authority (BP). The dualism of authority, which has thus far led to legal uncertainty, can be addressed by formulating clear implementing regulations regarding the division of authority, particularly in the management of Land Management Rights (HPL) by BP Batam and land registration by BPN. This harmonization must be articulated in the form of a joint regulation or binding memorandum of understanding so that both institutions can carry out their functions synergistically.⁴²

Furthermore, regulatory harmonization must emphasize legal certainty as a prerequisite for investment in the Batam Free Trade Zone and Free Port (KPBPB). Legal certainty will be difficult to achieve if normative conflicts persist between central government regulations, BP Batam regulations, and BPN policies. Therefore, regulatory reform should not only focus on synchronization but also on simplifying rules to make them more efficient, adaptive, and capable of supporting the digitalization of land certificates as an instrument of land administration modernization.⁴³ In addition, the prospects for law enforcement in the digitalization of land certification also require strengthening dispute resolution instruments through both litigation and non-litigation mechanisms. Litigation mechanisms in court must ensure the availability of procedural legal instruments that can accommodate electronic evidence, including

³⁹ Yudiyanto et al., "Transformasi Pelayanan Pertanahan."

⁴⁰ Farista Dewi Anindyati et al., "Implementation of Electronic Land Certificate Policy: A Case Study in Denpasar City," *Marcapada: Jurnal Kebijakan Pertanahan* 5, no. 1 (2025): 1–18, <https://doi.org/10.31292/mj.v5i1.161>.

⁴¹ Hermi Amalia, *EFEKTIVITAS TATA KELOLA PEMERINTAHAN DALAM MENINGKATKAN KUALITAS PELAYANAN PUBLIK DI INDONESIA*, 1, no. 3 (2025).

⁴² Respationo, *LAND REGISTRATION AND CERTIFICATE ISSUANCE IN A FREE TRADE ZONE PERSPECTIVE (FTZ)*.

⁴³ Junior, *Peluang dan Tantangan Transformasi Digital Sertifikat Tanah Setelah Berlakunya Peraturan Menteri ATR/BPN Nomor 3 Tahun 2023*.

digital land certificates. However, non-litigation dispute resolution through mediation, arbitration, or special mechanisms within BP Batam and BPN must be strengthened to accelerate the resolution of land conflicts.⁴⁴ Strengthening non-litigation instruments has become important, given that land disputes in Batam often involve multiple parties, such as the community, developers, and foreign investors. Digitally based alternative dispute resolution (ADR) mechanisms can be an efficient solution, especially for accelerating the process and reducing dispute resolution costs. Thus, the prospect of land certificate digitalization must always be accompanied by the reform of dispute resolution instruments that are consistent with the principles of due process of law.⁴⁵

The next prospect concerns implementing good governance principles, transparency, and digital accountability. The digitalization of land certification can serve as an instrument to narrow the space for corruption, manipulation, and land mafia practices, as long as it is accompanied by transparent governance. The principle of public data openness is key to building trust among the public and with investors. Electronic land certificates enable easier access to land information but must still be accompanied by privacy protection and data security.

Furthermore, implementing good governance principles in the context of land digitalization demands institutional accountability. As authorities, BP Batam and BPN must be able to account for every policy and action to the public. Transparency in the process of land certificate digitalization can be achieved through regular digital audits, open data publication, and implementing an effective online complaint system. With these mechanisms, digitalization becomes not only a technological innovation but also an instrument for realizing clean governance.

Next, a digital-based land reform roadmap in KPBPB Batam is imperative to strengthen law enforcement prospects. This roadmap must encompass short-, medium-, and long-term targets, ranging from the integration of BP Batam land data with BPN and enhancement of human resource capacity to the development of an international-standard digital security system. The roadmap must also consider Batam's characteristics as a free trade zone with land law dynamics distinct from other regions in Indonesia.⁴⁶

Finally, the prospects for digitalizing land certification in Batam will only succeed if they are supported by cross-sectoral synergy. In addition to BP Batam and BPN, the roles of the local government, external oversight bodies such as the Ombudsman and Komnas HAM, as well as civil society participation, are crucial in ensuring that this reform proceeds in accordance with the principles of fair law. With multi-stakeholder support, land digitalization in Batam could serve as a national model for building a land administration system that is transparent, accountable, and oriented toward legal certainty to support investment.

The prospects for law enforcement in supporting the digitalization of land certification can be examined through Gustav Radbruch's Theory of Legal Certainty. The digitalization of land certificates serves as an instrument for ensuring legal certainty, particularly by guaranteeing the authenticity of documents and preventing the falsification or duplication of certificates. Legal certainty is greatly needed in Batam, which is a strategic area for international investment.

Without a definite and transparent land administration system, investors face high legal risks, potentially disrupting sustainable development objectives in KPBPB Batam. Thus, the digitization of land certification constitutes a concrete embodiment of efforts to uphold legal certainty, as emphasized by Radbruch, namely, that the law must guarantee predictability and the protection of rights.

Furthermore, from the perspective of Good Governance Theory and e-Government, land digitalization can be seen as part of a reform towards clean, transparent, and accountable government administration. An integrated electronic land certificate system between BP Batam and BPN will reduce opportunities for corruption, illegal levies, and mafia-like land activities. The principle of transparency enables the public, including communities and investors, to access land information more easily, whereas the principle of accountability requires officials to be responsible for land administration actions. This aligns

⁴⁴ Ari Wibowo, *Resolution of Land Disputes through Mediation at the Sleman District Land Office*, 15, no. 01 (n.d.).

⁴⁵ Rico Nur Ilham et al., *Comparative Study of Cryptocurrency Digital Investment Based on Currency Laws and Global Economic Regulations*.

⁴⁶ Yudiyanto et al., "Transformasi Pelayanan Pertanahan."

with the concept of e-Government, which positions technology as an instrument to enhance the effectiveness and efficiency of public services.⁴⁷

When viewed from the perspective of Soerjono Soekanto's Theory of Law Enforcement, the prospects for digitalizing land certification depend not only on regulations but also on the law enforcement structure, legal culture, and supporting infrastructure. Digitalization will not succeed if officials at BP Batam or BPN lack the capacity and integrity to implement the new system.

Likewise, the legal culture of society must also be directed toward legal awareness in utilizing digital land services. This means that the success of land certificate digitalization in supporting legal certainty in land affairs is not only a technical issue but also a sociological one related to the behavior of officials and the community.

By integrating these three theories, the prospects for law enforcement in the digitalization of land certification in Batam can be mapped more comprehensively. Legal certainty ensures that the substance of land law operates in accordance with regulations; the principle of good governance (e-Government) guarantees transparent management free from abuse; and the theory of law enforcement emphasizes the importance of synergy among regulations, law enforcement officials, and public awareness. Thus, the digitalization of land certification is not merely a technological innovation but also part of a sustainable reform in land law to support the investment climate in Batam, Indonesia.

Conclusion

This study finds that the digitalization of land certification in the Batam Free Trade Zone and Free Port (KPBPB Batam) constitutes a strategic legal reform aimed at strengthening legal certainty, transparency, and efficiency in land administration. The research demonstrates that digital land certification has significant potential to reduce land disputes, prevent fraudulent practices, improve public services, and enhance investment confidence in Batam. However, the effectiveness of this reform remains constrained by overlapping institutional authority between BP Batam and the National Land Agency (BPN), regulatory inconsistencies, technological infrastructure limitations, data security concerns, and socio-cultural resistance toward digital transformation.

The scientific contribution of this research lies in the development of a legal governance perspective on digital land administration within a special economic and free trade zone framework. This study enriches the discourse on land law reform by emphasizing that digital transformation in land certification must be supported not only by technological innovation but also by institutional harmonization, regulatory integration, and good governance principles. The findings provide a conceptual basis for policymakers in designing a more integrated and accountable land administration system in strategic economic regions.

Nevertheless, this research has limitations. The analysis primarily focuses on the legal and institutional dimensions of land certificate digitalization in Batam and does not comprehensively examine technical implementation aspects, cybersecurity effectiveness, or comparative experiences from other special economic zones. Furthermore, empirical data regarding stakeholder perceptions and long-term implementation outcomes remain limited.

Future studies are therefore recommended to conduct comparative analyses between Batam and other digital land administration systems, examine the effectiveness of cybersecurity frameworks in electronic land services, and assess the socio-economic impacts of digital land certification on investment growth and public trust. Such studies would contribute to the formulation of a more comprehensive and sustainable model of digital land governance in Indonesia.

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⁴⁷ Sari and Reykasari, *ASAS KEPASTIAN HUKUM PEMBERIAN HAK ATAS TANAH KEPADA INVESTOR IBU KOTA NUSANTARA BERDASARKAN PASAL 16 A UNDANG-UNDANG NOMOR 21 TAHUN 2023 TENTANG IBU KOTA NEGARA*.

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Author Contributions Statement

SN conceived the study, conducted the primary research, collected and analyzed the data, and prepared the original manuscript draft. SR contributed to the conceptualization of the research framework, provided academic supervision, validated the legal analysis, and critically reviewed and revised the manuscript for important intellectual content. KR contributed to data interpretation, literature review, methodological refinement, manuscript editing, and language improvement. All authors participated in discussing the results, reviewed the final version of the manuscript, and approved its submission for publication.

AI Usage Statement

The authors declare that Artificial Intelligence (AI) tools were used solely for limited supportive functions during the preparation of this manuscript. Specifically, ChatGPT and Paperpal were utilized for language editing, grammar checking, and improving the clarity, coherence, and readability of the text. These tools were not used to generate the research ideas, formulate research questions, conduct legal analysis, interpret data, evaluate findings, or draw scholarly conclusions. All intellectual contributions, research design, data analysis, legal reasoning, interpretations, and conclusions presented in this article were developed independently by the authors. The authors have carefully reviewed and verified all content generated with AI-assisted support and accept full responsibility for the originality, accuracy, validity, and academic integrity of the manuscript. In accordance with established ethical standards in scholarly publishing, AI tools are not recognized as authors and have not been credited as contributors to this work.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article. The authors have no financial, professional, institutional, or personal relationships that could have influenced the research, analysis, interpretation, or presentation of the findings reported in this manuscript.

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