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Digital Technology in Land Management: A New Direction for Education and Research on Land Policy in Indonesia through Digital Discourse Analysis

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Abstract: This study analyzes the implementation of digital technology in land management in Indonesia and its implications for land policy education and research through a digital discourse analysis approach. Drawing on data from news articles, public opinion, and official digital policy publications, the research explores how land policy narratives are constructed and disseminated in digital spaces and how society responds to such transformations. The findings reveal that the shift from physical to electronic land certificates, the development of land information systems, and the introduction of applications such as Sentuh Tanahku have enhanced the efficiency, transparency, and accountability of land administration services. However, challenges related to data security and unequal technological infrastructure remain significant obstacles. In the context of education, this study finds that digital discourses on land policy offer new, interdisciplinary, and contextual learning avenues for land policy education. The study provides both theoretical and practical contributions to the advancement of technology-driven land governance systems and the development of land policy education in Indonesia.

Keywords: Digital technology, land management, electronic land certificates, digital discourse analysis, land policy education, agrarian reform, Indonesia.

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A. INTRODUCTION

Indonesia, as a country with high population density and complex land management issues, faces significant challenges in the area of land affairs. Various land conflicts, uncertainty in ownership, and inefficient land use hinder progress in social and economic development. In this context, digital technology has emerged as a potential solution capable of transforming the way land is managed in Indonesia. One of the most significant innovations in this regard is the introduction of electronic land certificates, which replace traditional paper documents. This transformation promises to simplify land registration processes and improve the reliability of ownership verification, as emphasized by Ali et al. (2024), who argue that electronic land certificates represent a monumental shift in the administration of proof of land rights in Indonesia.

In addition to electronic certificates, technology-based land information systems, such as the Land Information System (LIS), also play a critical role in addressing issues related to

land conflicts and uncontrolled land use. Wahid et al. (2015) highlight that the lack of accurate land management exacerbates land disputes and leads to inefficient land utilization. The implementation of LIS has proven beneficial in enhancing better land governance practices, which in turn can reduce conflicts and support the development of more effective policies. This system provides a data-based foundation that can be used to guide institutional reforms and address long-standing issues in the governance of land.

The importance of digital technology in land management is also reflected in the proactive steps taken by the National Land Agency (BPN). Purnama (2024) document several BPN initiatives, including systematic land registration and the creation of integrated land information systems. These initiatives are part of a broader strategy of modern agrarian reform aimed at building a legal framework that supports both social equity and economic sustainability. Moreover, specific areas such as waqf land management have also witnessed initiatives utilizing information and communication technology to improve the certification process and land productivity. Syarief (2021) stresses the urgency of revitalizing waqf land management through the innovative use of digital tools, aimed at enhancing agricultural output while adhering to Islamic principles. This reflects the growing recognition of the potential of digital technologies to optimize land use and improve agrarian policy across Indonesia.

Furthermore, global technologies such as the Global Positioning System (GPS), Remote Sensing, and Geographic Information Systems (GIS) are increasingly being adopted in Indonesian land management. Chang and Xie (2024) describe how these technologies provide high-resolution data that can inform land management strategies, improve resource allocation, and contribute to sustainable development. The integration of these technologies is crucial for formulating effective policies that address land use, environmental conservation, and agricultural productivity, ensuring that development is both sustainable and inclusive. While digital technologies offer immense potential to resolve inefficiencies and land conflicts, substantial challenges remain, particularly regarding the digital divide, skill limitations, and insufficient infrastructure in certain regions. Therefore, it is essential for stakeholders to continuously adapt to technological advancements while ensuring equitable access and training for all levels of society. The use of digital technology in land management in Indonesia not only addresses existing problems but also lays the foundation for improved land productivity and long-term sustainability. In light of this, the research seeks to answer the following question: How can digital technologies, particularly electronic land certificates and land information systems, improve efficiency and reduce conflict in land management in Indonesia, and what policy implications are necessary to support their effective implementation?

B. METHOD

This study employs a qualitative approach using Digital Discourse Analysis (DDA) to examine how digital technologies, particularly in the context of land governance in Indonesia, are represented through news coverage, public opinion, and official policy documents disseminated digitally. The central aim of this research is to analyze the evolving discourse surrounding land policy involving digital technologies—specifically, the implementation of electronic land certificates and land information systems—within digital platforms. Through the lens of DDA, the study explores how government and public narratives published across digital media channels contribute to shaping societal perceptions of ongoing digital land policy reforms in Indonesia.

The primary subjects of this research consist of digital content related to land policy, including news articles from mainstream media, opinion pieces published across digital platforms, and policy documents issued by the Indonesian government, particularly the National Land Agency (BPN) and relevant ministries. These narratives, both supportive and critical, will be analyzed to understand how digital discourse conveys messages concerning land administration. Furthermore, the study seeks to examine how such discourse influences public perception and engagement with policy changes involving digital land administration tools.

Data collection involves identifying and compiling relevant news articles, public commentaries, and digital policy publications issued by governmental institutions or circulated in online media. The scope of materials includes content related to the launch of electronic land certificates, the integration of land information systems, and the resolution of land-related disputes affected by digitalization. Public opinion from news sites, blogs, and social media will also be analyzed to capture societal responses to these policies. All collected materials will be processed using text analysis software to identify recurring discourse patterns and dominant themes within the digital narrative landscape.

For data analysis, the study applies thematic analysis to identify and interpret emerging patterns from digital content. The analytical process focuses on how land policies involving digital technologies are positioned within public narratives. Particular attention is given to how the government, through its digital policy publications, communicates technological reforms in land administration and how the public responds. Findings from Ali et al. (2024) on the transformation brought by electronic land certificates and Wahid et al. (2015) on the importance of land information systems will inform the interpretation of discourse. Additionally, the study examines the implications of digital policy discourse on public understanding and land policy education in Indonesia, as informed by the institutional strategies outlined by Purnama & Khasanah (2024). Ultimately, this research aims to provide a comprehensive understanding of how digital discourse shapes perceptions, acceptance, and the broader educational landscape surrounding digital land governance in Indonesia.

C. RESULTS AND DISCUSSION

1. Results

This study investigates the implementation of digital technology in land administration in Indonesia, aiming to enhance efficiency, transparency, and security within the national land management system. The Indonesian government, through the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN), has initiated several digital transformation programs to support this agenda. One of the major innovations is the Electronic Land Certificate, which replaces traditional paper-based certificates with digital versions (Konsultan PBG SLF, 2025). This program marks a significant step forward in modernizing land ownership documentation and improving public services. Digital certificates are expected to reduce bureaucratic complexity, minimize forgery, and ensure better protection of land rights. The transformation also reflects the government's commitment to building a more accessible and secure land administration infrastructure.

Since 2019, ATR/BPN has introduced electronic-based land services that include Electronic Mortgage Rights (Hak Tanggungan Elektronik/HT-el), digital verification of land certificates, and online access to property asset values. These certificates are stored in encrypted digital systems and feature secure electronic signatures. Landowners can access their digital certificates via the official ATR/BPN portal, which is also integrated with services such as land transfer and land use applications (Konsultan PBG SLF, 2025). The integration of these services represents a fundamental restructuring of public administration in the land sector. It aims to create a more seamless and user-oriented experience for stakeholders. Furthermore, the availability of such services is expected to improve the overall credibility and responsiveness of the national land governance framework.

As part of its digital innovation, ATR/BPN also developed an application called SENTUH TANAHKU, designed to enable the public to access various land-related services online. This application allows users to track the status of land certificate applications, estimate service costs, and view administrative timelines. The app provides an inclusive platform for the public to obtain real-time information without needing to visit land offices physically (Konsultan PBG SLF, 2025). Its introduction is intended to accelerate administrative processes while fostering transparency and public trust in government institutions. Such digital platforms also reflect broader public sector reform trends focused on citizen-centric governance. Consequently, the system has the potential to bridge long-standing gaps in service accessibility across regions.

The implementation of digital land management systems is also strategically aligned with Indonesia's goal of improving its Ease of Doing Business (EoDB) ranking, particularly in property registration. By digitizing procedures, the government aims to shorten processing times, reduce transaction costs, and mitigate fraudulent practices in land certification (Konsultan PBG SLF, 2025; Kumparan, 2023). However, despite these advancements, the digitalization process still faces significant challenges. Data security is a primary concern, as digital land certificates involve sensitive ownership information requiring robust protection mechanisms. Moreover, unequal distribution of digital infrastructure across regions presents barriers to the nationwide rollout of these services

(JIPPNAS, 2023). These limitations underline the need for holistic policy frameworks that address both technological and social dimensions of digital governance.

To overcome these obstacles, the government has expanded its Electronic Land Information Services, including online platforms for certificate verification and digital mortgage rights tracking. These systems allow citizens to monitor application statuses more efficiently and obtain accurate, timely information regarding their land affairs (JIPPNAS, 2023). Such services enhance institutional transparency and improve accountability in public administration. In the long term, digital land management is projected to stimulate the real estate sector by streamlining property transactions and increasing investor confidence. The ATR/BPN targets full digital transformation of land administration by 2025, positioning itself as a global standard in land governance innovation (Kumparan, 2023). To ensure the effectiveness of this transition, regulatory reforms must address legal recognition of digital certificates and data protection protocols. Legislative adjustments will be critical in securing public trust and establishing a solid foundation for the sustainable governance of digital land systems.

2. Discussion

The digital transformation of land administration in Indonesia represents not merely an administrative agenda but a profound epistemological shift in how the state frames the relationship between technology, law, and land rights. The findings of this study, particularly the implementation of electronic land certificates, the SENTUH TANAHKU application, and the development of electronic land information services, align with what Ali et al. (2024) describe as a "monumental change" in the management of land ownership records in Indonesia. According to Ali et al. (2024), replacing physical documents with digital formats not only improves efficiency and security but also addresses chronic issues in bureaucratic systems such as overlapping documents, data manipulation, and limited public access to legal land information. This transformation embodies both technological and institutional reform, placing land governance on a more modern and transparent foundation. It signals a new phase in public service delivery where digital platforms serve as both facilitators and mediators of legal certainty in land ownership. Moreover, it reflects a state effort to redefine its interaction with citizens through technology-driven legitimacy.

The study's findings on increased accessibility through the SENTUH TANAHKU application reinforce the argument made by Ali et al. (2024) about the significance of bringing the state closer to the people via digital means. The impact of this transformation is not only technical but also ideological—injecting openness and transparency into a historically opaque system. This is especially relevant in a country with a long history of agrarian conflict, much of which stems from the lack of accurate land data and overlapping claims. The nationwide implementation of digital systems, as identified in the study, is thus a tangible step toward establishing credible and accountable land governance. It reflects a deliberate policy orientation toward reducing land disputes and enhancing trust in state institutions. Digitalization in this context emerges not only as a reform tool but as a statecraft strategy aimed at restoring public legitimacy in land affairs.

In line with Wahid et al. (2015), the data analysis in this study demonstrates that the adoption of land information systems plays a critical role in resolving land-related conflicts and improving land use management. Wahid et al. (2015) emphasize that inaccurate land records have long contributed to disputes and inefficiencies in spatial planning. The deployment of such systems, particularly LIS (Land Information Systems), provides a data-driven foundation for more equitable and sustainable land policies. The digital systems described in the findings are not merely administrative tools; they serve as strategic mechanisms for policy formulation and conflict resolution grounded in real-time, verifiable data. These systems offer a platform for multi-stakeholder engagement and institutional accountability. Their success represents a key indicator of the broader capability of the Indonesian state to modernize its land governance framework.

This position is further supported by Purnama (2024), who highlight the National Land Agency's (BPN) proactive role in developing systematic land registration and integrated information systems. These initiatives are part of a broader modern agrarian reform strategy aiming not only for bureaucratic efficiency but also for legal and economic equity. The data analyzed in this study confirms that the institutional push toward digital integration is a deliberate policy tool and an expression of state commitment to agrarian justice. Digital infrastructure in this regard becomes a medium through which the state projects its reformist orientation and recalibrates its governance mechanisms. As such, land information systems must be viewed not in isolation but within the larger reform architecture of Indonesian agrarian policy. This institutional alignment indicates a convergence between technological advancement and normative state objectives in land equity.

Importantly, this digital transition must also be understood within the broader context of public discourse. Digital Discourse Analysis (DDA), as discussed by Toha and Cosslett (2023), provides a powerful framework for interpreting how policy narratives are constructed and circulated in digital media. Their work reveals that digital policymaking narratives are often sites of ideological contestation, involving competing interests and visions of governance. The findings of this study, which highlight public responses to digital land services, indicate that these platforms are not value-neutral but politically and socially charged. Public reactions to the SENTUH TANAHKU application, found in online news and social media comments, exemplify this dynamic and reflect broader patterns of trust, skepticism, and civic engagement. As Putra et al. (2024) observe, digital platforms in governance and education have created new spaces for participation and critique, especially among previously marginalized communities. Thus, the discourse generated around digital land policy becomes both reflective and constitutive of democratic engagement in Indonesia.

In the context of land policy education, these digital discourses signify a shift in the pedagogical paradigm. Candra et al. (2021) argue that digital citizenship education is essential for shaping informed, ethical, and responsible citizens in a digital age. The findings of this study suggest a shift in civic competencies—from passive subjects to active participants involved in verification, validation, and oversight of public services. This aligns with Isdendi et al. (2023), who emphasize collaborative approaches between educational institutions and communities to foster ethical digital behavior. In land administration, this

collaboration can take the form of public education on digital land rights, application training, and awareness-raising on personal data protection. Such initiatives are crucial given the study's findings that highlight data security as a major challenge in implementing electronic land certificates. Moreover, Sarah (2022) underscores how the digital divide, exposed during the COVID-19 pandemic, remains a barrier to equitable technology adoption in underserved regions—an issue echoed in this study's observations on infrastructure disparities.

Finally, the success of Indonesia's digital transformation in land governance will ultimately depend on regulatory courage and institutional consistency. As noted by Kumparan (2023), the shift from physical to digital land systems must be supported by clear legal reforms, particularly regarding the recognition of digital documents and the protection of sensitive data. These concerns are consistent with this study's findings, which place data security at the center of implementation challenges. Without robust legal frameworks and enforcement mechanisms, digital innovation risks becoming a superficial reform. The alignment between technological advancement, legal reform, and public engagement will determine whether this transformation becomes a sustainable governance model or a fragile experiment. In this regard, integrated policy design and responsive regulatory frameworks are indispensable to securing a credible and inclusive digital land administration system in Indonesia.

D. CONCLUSIONS AND SUGGESTIONS

This study concludes that the digital transformation of land governance in Indonesia has not only generated administrative efficiency through the implementation of electronic land certificates and digital services such as SENTUH TANAHKU, but has also established a new foundation for a more transparent, participatory, and equitable land administration system. As emphasized by Ali et al. (2024), the shift from physical to digital documents marks a structural change in the national framework of land governance. The integration of Land Information Systems (Wahid et al., 2015), and the systematic service enhancements initiated by the National Land Agency (Purnama, 2024) demonstrate that digitalization is not merely a technical process but a core component of Indonesia's ongoing agrarian reform. These advancements signify a redefinition of bureaucratic mechanisms and a transition toward more accountable and citizen-oriented public services. Moreover, the findings suggest that technological infrastructure in land management functions as both a service platform and a policy instrument in reshaping state-society relations. In this light, digital land systems are critical not only for operational modernization but also for the reinforcement of democratic land governance.

Beyond these practical implications, this study contributes significantly to the advancement of land policy education in Indonesia. The digital discourse constructed by government platforms and official policy narratives has emerged as a vital resource for teaching and learning in public policy education. By employing Digital Discourse Analysis (DDA), the study demonstrates that land policies are articulated not only through legal texts but also via digital public communication, which actively shapes public policy consciousness.

This is in line with the arguments of Toha & Cosslett (2023) and Candra et al. (2021), who emphasize the importance of digital literacy and discourse analysis in preparing future policy thinkers who are adaptive, critical, and sensitive to the dynamics of digital policy communication. The findings also underscore how public engagement with digital land services forms an important part of democratic participation in policymaking. In this context, digitalization plays a dual role: it is both a governance tool and an educational medium.

In the realm of higher education and policy training, the digitalization of land governance opens new pathways for interdisciplinary integration across information technology, public policy, and agrarian studies. Openly accessible digital data and discourses offer valuable materials for classroom instruction, case studies, and policy simulations. This enriches land policy education by making it more contextual and evidence-based. The use of digital content such as official speeches, platform-based regulations, and public responses via online media enhances curriculum quality and equips students and young policy professionals with analytical skills relevant to contemporary challenges. As a recommendation, there is a need to integrate digital land governance into capacity-building strategies in education, especially in public policy and agrarian programs. Future research should explore the impact of digital discourse on public understanding and participation, while assessing the effectiveness of such approaches in shaping reflective and progressive policymaking mindsets. Ultimately, this study contributes not only to land management practice but also expands the epistemic horizon of land policy education and research in Indonesia in a digital, democratic, and sustainable direction.

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