The Role of Technology in Reducing Land Mafia Activities in the Digital Era

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Abstract

Land mafia activities have become a serious problem in many countries, including Indonesia, threatening the security of land ownership and socio-economic stability. In the digital era, technology is key in efforts to reduce this illegal practice. By utilizing Geographic Information Systems (GIS), blockchain technology, and integrated land information systems, transparency, accuracy, and efficiency of land management can be improved. Despite facing challenges such as uneven infrastructure and resistance to change, strategic steps such as improving technological infrastructure, education, strengthening cyber security, and collaboration with the private sector can help overcome these obstacles. By implementing optimal technology, it is hoped that land mafia activities can be suppressed, provide legal certainty for land owners, and support sustainable development.

Keywords: *Land; Mafia; Digital*

Introduction

In the digital era, the role of technology is increasingly vital in various aspects of life, including managing and supervising land ownership. The land mafia phenomenon, which refers to groups or individuals who carry out manipulation, fraud and abuse of authority in land matters, has become a serious problem in many countries, including Indonesia. Land mafia activities not only harm legitimate land owners but also hinder overall economic and social development. In this context, technology offers various potential solutions to reduce and even eradicate land mafia activities.[1]

Effective and transparent land management is key to a country's economic and social stability. In Indonesia, land is a very valuable asset and is often the main source of conflict. The limitations of an efficient and transparent land administration system provide gaps for the land mafia to operate. They

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[1] Yophinadiyyul Fauqalida Artha, "Efektivitas digitalisasi layanan pertanahan guna pencegahan mafia tanah di Kabupaten Ngawi," 2023.

often exploit weaknesses in the land registration system, lack of accurate data, and corruption at the bureaucratic level to manipulate land ownership.[2]

Technology has great potential to revolutionize land administration. The use of geographic information systems (GIS), integrated databases, and blockchain are some examples of technology that can increase transparency and efficiency in land management. GIS enables accurate and detailed land mapping, which helps in land monitoring and management. With accurate spatial data, the government and society can more easily identify and resolve land disputes.[3]

Blockchain, with its immutable and transparent nature, offers a solution to the problem of authenticity and security of land data. By using blockchain technology, every land transaction can be recorded permanently and cannot be changed. This prevents data manipulation and fraud, as every change in land ownership must go through a strict and transparent verification process. Several countries, such as Georgia and Sweden, have begun adopting blockchain for their land registration systems, showing positive results in reducing land disputes and illegal activities.[4]

The development of an integrated land information system allows wider and easier access to land ownership information. By digitizing land data, the government can store and manage information more efficiently, reducing the risk of loss or damage to physical data. In addition, this system can be integrated with related institutions, such as financial institutions, notaries and local governments, to ensure that all transactions and changes in land ownership are recorded properly and transparently.[5]

In Indonesia, the government has started implementing various initiatives to increase the transparency and efficiency of land management with the help of technology. The Complete Systematic Land Registration Program (PTSL) is one of the steps taken to speed up the land registration process and reduce land disputes. In addition, the National Land Agency (BPN) has developed web and mobile-based applications to provide information about land ownership status and the necessary administrative processes.

However, the implementation of this technology still faces various challenges, including uneven technological infrastructure, resistance to change from some parties, and cyber security issues. Therefore, there needs to be more intensive efforts to increase technological literacy among government officials and the public, as well as strengthening regulations to ensure that technology is used effectively and safely.

Discussion

Technology has an important role in increasing the transparency and accuracy of land management. By utilizing modern technology, various weaknesses in the land administration system that have been exploited by the land mafia can be overcome. Here are some technologies that are playing a significant role in this effort:

a. Geographic Information Systems (GIS)

Geographic Information Systems (GIS) are technologies that enable the collection, analysis and visualization of spatial or geographic data. In the context of land management, GIS enables accurate and detailed soil mapping. With accurate spatial data, the government and community can more easily identify legal land ownership and resolve land disputes.

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[2] Suci Febrianti, "Perlindungan Hukum Terhadap Pemegang Sertipikat Hak Atas Tanah Elektronik," *Indonesian Notary* 3, no. 3 (2021): 9.

[3] Aartje Tehupeiory, Ratih Lestarini, dan Haposan Sahala Raja Sinaga, "Hibah Penelitian Perguruan Tinggi UKI 2021–2022: Pencegahan dan Pemberantasan Praktik Mafia Tanah Melalui Pengoptimalan Peran Satgas Mafia Tanah," 2022.

[4] Arsyilla Destriana dan Tiurma Mangihut Pitta Allagan, "Peran Pejabat Pembuat Akta Tanah Dalam Administrasi Pertanahan Melalui Sertifikat Tanah Elektronik," *PALAR (Pakuan Law Review)* 8, no. 1 (2022): 91–106.

[5] Rizky Rahajeng Tania Putri dkk., "Efektivitas Pelaksanaan Pendaftaran E-Sertifikat Tanah di Era Digitalisasi," vol. 4, 2023.

GIS also allows the integration of data from various sources, such as topographic maps, administrative data, and land use information. This integration makes it easier to monitor changes in land use and land ownership, so that opportunities for manipulation and fraud by the land mafia can be minimized. For example, GIS can be used to map unregistered land and monitor suspicious activity in the area.[6]

GIS has various functions and uses, including:

a. Mapping and Visualization: Create digital maps and visualize spatial data for various purposes, such as urban planning, environmental monitoring, and navigation.
b. Spatial Analysis: Analyzing relationships and patterns in geographic data, such as determining the best locations for infrastructure development or identifying areas vulnerable to natural disasters.
c. Natural Resource Management: Monitoring and managing natural resources, such as forests, water, and agricultural land, for sustainable use.
d. Spatial Planning and Management: Assists in spatial planning and regional management, ensuring efficient and sustainable land use.
e. Disaster Management: Assists in emergency response planning and disaster mitigation by providing information regarding regional risks and vulnerabilities to natural disasters.

b. Blockchain Technology

Blockchain is a technology that allows recording transactions securely, transparently and irreversibly. Every transaction recorded in the blockchain is verified by a network of computers spread across various locations, thereby minimizing the risk of data manipulation.

In land management, blockchain can be used to record every land ownership transaction. Every change in ownership must go through a strict and transparent verification process, ensuring that recorded data cannot be changed or falsified. Countries such as Georgia and Sweden have begun adopting blockchain for their land registration systems, showing positive results in reducing land disputes and illegal activities.[7]

Blockchain Functions and Uses:

a. Security: Data recorded in a blockchain cannot be changed without the consent of the majority of the network, making it highly secure against manipulation.
b. Transparency: All transactions are visible to all network members, increasing transparency.
c. Decentralization: No single authority controls the blockchain, reducing the risk of centralization and fraud.
d. Efficiency: Automated processes through smart contracts can reduce the need for intermediaries and speed up transactions.

Blockchain Implementation in Land Management:

a. Land Ownership Recording: Blockchain can be used to record and verify land ownership transactions. Every change in ownership is recorded in the blockchain, reducing the risk of document forgery and ownership disputes.
b. Transparency and Accountability: All land transactions can be audited transparently, increasing public confidence in the land management system.
c. Smart Contracts: Smart contracts can be used to automate land transactions, ensuring that all contract terms are met before the transfer of ownership occurs.

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[6] Dian Cahyaningrum, "Pemberantasan mafia tanah," *Info Singkat* 8, no. 23 (2021): 1.
[7] J Michael, ALAN Cohn, dan Jared R Butcher, "Blockchain technology," *The Journal* 1, no. 7 (2018): 1–11.

d. Land Tax Management: Blockchain can help in managing and tracking land tax payments, ensuring that all transactions are properly recorded and reducing revenue leakage.

Several countries have started implementing blockchain technology for land management:

a. Sweden: Sweden has conducted trials to use blockchain in the land registration process through Lantmäteriet (Swedish Land Registration Agency). The aim is to increase efficiency and transparency in land transactions.
b. Ghana: Ghana is using blockchain to record land ownership, aiming to reduce land conflicts and increase access to credit for land owners.
c. Georgia: The State of Georgia uses blockchain technology to record land transactions, in collaboration with the company Bitfury. This implementation has increased transparency and reduced transaction costs.

Blockchain technology offers many potential benefits for land management, including increased security, transparency and efficiency. Despite facing challenges in terms of regulation, technology adoption, and scalability, the application of blockchain in land management can provide innovative solutions to problems that exist in traditional systems. With the right regulatory framework and efforts to improve technical skills, blockchain can become a powerful tool in better and sustainable land management.[8]

c. Integrated Land Information System

The Integrated Land Information System is a platform that collects and manages land data from various sources centrally. Digitization of land data allows wider and easier access to land ownership information, reducing the risk of loss or damage to physical data.

This system can be integrated with related institutions, such as financial institutions, notaries and local governments, to ensure that all transactions and changes in land ownership are recorded properly and transparently. In addition, this system allows real-time monitoring of land activities, making it easier to identify and deal with suspicious activities.[9]

Functions and Uses of the Integrated Land Information System

a. Land and Ownership Registration: Simplifies the process of registering land, recording ownership, and changing land ownership rights digitally.
b. Transparency and Accountability: Providing transparent and accountable access to information for all stakeholders, including government, society and investors.
c. Spatial Data Management: Efficiently manage spatial data for spatial planning, natural resource management and disaster mitigation.
d. Monitoring and Supervision: Monitoring land use, compliance with regulations, and early detection of inappropriate land use changes.
e. Administrative Efficiency: Increase the efficiency of land administration by reducing bureaucracy and speeding up the land service process.

Benefits of an Integrated Land Information System:

a. Increasing Legal Certainty: Providing legal certainty for land owners with an accurate and up-to-date registration system.
b. Reducing Land Conflicts: Reducing land conflicts and disputes by providing clear and transparent information regarding land ownership and boundaries.

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[8] Hartmut Müller dan Markus Seifert, "Blockchain, a feasible technology for land administration," 2019, 1–9.
[9] Shah Fahad dkk., *Sustainable soil and land management and climate change* (CRC Press, 2021).

c. Supporting Development Planning: Facilitating sustainable and data-based development planning by providing accurate information about land conditions and use.
d. Increasing Regional Income: Increasing efficiency in managing land taxes and levies, thereby increasing regional income.
e. Improving Public Services: Improving the quality and speed of land-related public services, such as land registration, certification and zoning information.

Various countries have implemented integrated land information systems successfully:

a. Netherlands: The Dutch Cadastral System provides integrated information on land ownership, land value and land use, which is accessible to the public and government.
b. Australia: Australia's National Land Information Infrastructure (NLII) system integrates land data from various government agencies to support natural resource planning and management.
c. Singapore: The Singapore Land Authority (SLA) uses GIS and blockchain technology to record and manage land information efficiently and securely.

Integrated Land Information Systems are an invaluable tool for increasing efficiency, transparency and accuracy in land management. By integrating various land-related data and information into one platform, this system can support sustainable development planning, increase legal certainty, and provide better public services. Despite the challenges, the benefits offered by integrated land information systems make them an important investment for a better land management future.[10]

Indonesia has begun to adopt various technologies to increase transparency and efficiency of land management. The following are some of the initiatives and technology implementations that have been carried out:

1. Complete Systematic Land Registration Program (PTSL)

The Complete Systematic Land Registration Program (PTSL) is an Indonesian government initiative to speed up the land registration process throughout Indonesia. Through this program, the government is trying to register all plots of land that have not been registered systematically and completely.

PTSL uses GIS technology to map and document land ownership. Data collected through this program is stored in an integrated database that can be accessed by various related agencies. This program aims to reduce land disputes and provide legal certainty for land owners.[11]

2. Web and Mobile Based Applications

The National Land Agency (BPN) has developed various web-based and mobile applications to provide information about land ownership status and the necessary administrative processes. This application allows the public to access land information easily and transparently.

For example, the "Touch My Land" application launched by BPN provides information about land status, location maps and ownership data. This application also allows the public to report land disputes or suspicious activities, so that the government can take necessary action quickly.[12]

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[10] Hualin Xie dkk., "Sustainable land use and management research: A scientometric review," *Landscape Ecology* 35 (2020): 2381–2411.

[11] Julie Frizzo-Barker dkk., "Blockchain as a disruptive technology for business: A systematic review," *International Journal of Information Management* 51 (2020): 102029.

[12] Dianto Bachriadi dan Edward Aspinall, "Land Mafias in Indonesia," *Critical Asian Studies*, 2023, 1–23.

Although technology has great potential in reducing land mafia activities, its implementation is not without challenges. The following are some of the main challenges faced in applying technology for land management in Indonesia:

a. Unequal Technology Infrastructure

One of the main challenges in implementing technology in Indonesia is the uneven technological infrastructure. Many regions, especially in rural and remote areas, still face limited access to information and communication technology. This hinders the implementation of integrated land information systems and the use of technologies such as GIS and blockchain.

b. Resistance to Change

The application of technology in land management also faces resistance from several parties, including government officials and the community. This resistance can be caused by a variety of factors, including a lack of understanding of the benefits of the technology, concerns about data security, and distrust of new systems.

c. Cyber Security

Cybersecurity is another challenge that needs to be considered in applying technology to land management. Integrated land information systems and web and mobile-based applications are vulnerable to cyber attacks. Therefore, it is important to ensure that the systems used have adequate security safeguards to protect data from unauthorized access and manipulation.

To overcome these challenges, strategic steps and effective policies are needed. The following are several recommendations to ensure the application of technology in land management can run optimally:

a) Improved Technology Infrastructure

The government needs to improve technological infrastructure throughout Indonesia, especially in rural and remote areas. Investment in a faster and more reliable internet network, as well as the provision of adequate technological tools, is essential to support the application of technology in land management.

b) Education and Training

Increasing technological literacy among government officials and the public is an important step to reduce resistance to change. The government can organize education and training programs to increase understanding of the benefits of technology and how to use it in land management.

c)   Strengthening Cyber Security

The government and related institutions need to ensure that integrated land information systems and web and mobile-based applications have adequate security protection. Using encryption technology, regular security audits, and implementing strict security protocols are some of the steps that can be taken to protect data from cyber threats.

d) Collaboration with the Private Sector

Collaboration with the private sector, including technology companies and financial institutions, can help accelerate the adoption of technology in land management. The private sector can provide innovative technological solutions and support the development of necessary infrastructure.

The role of technology in reducing land mafia activities in the digital era is very significant. Technologies such as GIS, blockchain and integrated land information systems have great potential to increase transparency, accuracy and efficiency in land management. Although there are various challenges in implementation, strategic steps such as improving technological infrastructure, education and training, strengthening cyber security, and collaboration with the private sector can help overcome these obstacles.

By implementing optimal technology, it is hoped that land mafia activities can be minimized, provide legal certainty for legal land owners, and encourage more stable economic and social development. This research provides a comprehensive overview of the potential and challenges of applying technology in land management, as well as providing recommendations that can be used by the government and other stakeholders in formulating more effective policies and strategies to overcome the land mafia problem.

Conclussion

In conclusion, technology plays an important role in reducing land mafia activities in the digital era by increasing transparency, accuracy and efficiency of land management. The use of Geographic Information Systems (GIS), blockchain technology, and integrated land information systems allows for more accurate mapping, safe and transparent transaction recording, as well as easy and real-time data access. Although there are challenges such as uneven technological infrastructure, resistance to change, and cybersecurity issues, strategic steps such as improving infrastructure, education and training, strengthening security, and collaboration with the private sector can help overcome these obstacles. By implementing optimal technology, land mafia activities can be minimized, provide legal certainty for land owners, and encourage more stable economic and social development.

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