International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Breaking Ground: Exploring Blockchain for Land Registration Systems

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Abstract

Land registration is a crucial aspect of property ownership and management, facilitating legal documentation, transactions, and dispute resolution. Traditional land registration systems are often plagued by inefficiencies, including slow processing times, high costs, and the risk of fraudulent activities (Abuidris et al., 2019). This paper aims to explore the potential of blockchain technology in revolutionizing land registration systems. Blockchain technology, as a decentralized and distributed public ledger, offers numerous advantages for land registration systems.This includes enhanced traceability and transparency, reduced reliance on third parties, improved security against data tampering, and increased efficiency in processing land transactions. Drawing from various sources, this paper provides insights into the benefits and applications of blockchain in land registration systems. Blockchain technology has the potential to not only streamline the land registration process but also to fundamentally transform the way property rights are recorded and managed. By leveraging the immutable and transparent nature of blockchain, the entire history of land transactions and ownership can be reliably recorded and accessed, reducing the risk of fraud and disputes

Keywords: Block-chain, Land, Hyper-ledger, land registration, secure

I. INTRODUCTION

Land registration is a process of recording detailed information regarding land, such as ownership and property size. Currently, India uses a paper-based land registration system, which involves physically registering the land. However, this system has several drawbacks. For instance, referencing any data in the future requires significant labor. Moreover, the system is not transparent, and recording property sales accurately can be challenging. The database method used for storing data is also inadequate in terms of data security. Blockchain is a distributed ledger technology
that records all transactions that take place across a peer-to- peer network. Implementing land registration using blockchain can help prevent fraudulent activities, making the system more secure. Blockchain can also prevent illegal activities involved in land transactions as it is challenging to duplicate. All contracts and ownership details are maintained in a decentralized way, eliminating the need for physical intervention. Thus, it is easier to track data transactions, improving the overall security of the system. Blockchain provides an opportunity to establish a robust system for digital identity. Using blockchain, each block in the network represents data involved in a land transaction, such as prop erty ID, property number, owner details, transaction amount, mode of payment, and last transaction details

like the amount paid for the transaction. Implementing applications using blockchain guarantees the quality of digital data.

II. PROBLEM STATEMENT AND OBJECTIVE

Land registration is a crucial process for establishing and maintaining property rights, and it is a complex process that often involves multiple intermediaries, paper-based documentation, and high transaction costs The present land registration system is prone to fraud, corruption, and inefficiency, which can result in property ownership disputes, stifle economic progress, and deprive vulnerable groups of their property rights. As a result, there is a need for a more secure, transparent, and efficient land registration system that can prevent fraud, resolve disputes, and encourage long-term land management. Blockchain technology has the ability to overcome these issues by creating a decentralized, tamper-proof, and transparent system for land registration. Building trust and community acceptability is critical to the adoption and long-term viability of a blockchain-based land registration system. In essence, the issue statement for land registration utilizing blockchain technology is how to develop and build a system that can overcome the constraints and challenges of the current .Land registration systems protect property rights, ensure legal and regulatory compliance, and foster confidence and community acceptance is crucial for the adoption and sustainability of a blockchain-based land registration system.

In summary, the problem statement for land registration using blockchain technology is how to design and implement a system that can overcome the limitations and challenges of the existing land registration system, provide secure property rights, ensure compliance with legal and regulatory frameworks, and build trust and community acceptance. This requires addressing technical, legal, and social challenges and developing a sustainable, scalable, and interoperable system that can be adopted by different countries and communities

III. LITERATURE SURVEY

In the conventional Indian land registration system, brokers act as intermediaries between buyers and sellers, collecting and preparing physical documents for property transactions. These documents are then registered with government authorities, but the process is time-consuming, vulnerable to document loss or tampering, and prone to corruption. “Land Registration System Using Blockchain” by Sai Apurva Gollapalli, Gayatri Krishnamoorthy, Neha Shivaji Jagtap and Rizwana Shaikh address these issues by proposing a more efficient and secure system using smart contracts, which streamline transactions and enhance security. [1]

The Land Registry System in India is notorious for its complexity, frequent fraudulent cases, and reliance on numerous intermediaries. R.C.Suganthe, N.Shanthi, R.S.Latha, K.Gowtham, S.Deepakkumar and R.Elango “Blockchain enable Digitization of Land Registration” in 2021 International Conference on Computer Communication and Informatics states how adopting Blockchain Technology for Land Registry Management can address these issues [2]

“Land Registry Using Blockchain - A Survey of existing systems and proposing a feasible solution” describes the pressing need for a decentralized system with robust security measures. In response to which, we introduce a blockchain- based solution for the secure storage of property papers in this paper. In this proposed system, when an individual acquires a piece of land, the government authorities issue hard copies of property papers, which our system subsequently uploads to the Inter Planetary File System (IPFS), a decentralized database. The IPFS network generates a unique hash for each document,

which is then securely stored within the Ethereum blockchain once specific conditions within smart contracts are met. These smart contracts are responsible for validating and verifying the documents with the government authorities, effectively creating an immutable, decentralized ledger that ensures easy retrieval of stored data. [3]

Land, a valuable yet complex asset, poses challenges in tracking ownership changes due to frequent shifts and fraudulent registries. These issues lead to prolonged ownership disputes and waste resources. "LandChain: A Blockchain Based Secured Land Registration System" in: 2020 Third ISEA Conference on Security and Privacy addresses these problems, a Blockchain-based system transforms physical assets into secure, immutable tokens, resolving the issues and providing efficient transaction processing using Ethereum. [4]

The property registration process, particularly concerning land, can be a complex and time-consuming procedure in developing nations such as Bangladesh. "A Novel Framework for Implementation of Land Registration and Ownership Management via Blockchain in Bangladesh" this paper sheds light on the challenges associated with traditional manual land registration methods, which include issues like transparency, centralization, authenticity, and reliability. In response to these challenges, the paper puts forth a novel approach utilizing Blockchain Technology as a solution. It delves into a comparative analysis of Blockchain-based digital land record systems implemented in various countries. Ultimately, the paper introduces a unique framework that leverages Blockchain technology to streamline the land registration process, ensuring genuine and irrefutable property rights for the citizens of Bangladesh. [5]

Land Registry documents, issued by the government as legal proof of land ownership, play a crucial role in countries like Bangladesh, where the conventional Land Registry system encounters numerous challenges. To address these issues, "Blockchain based Land Registry with Delegated Proof of Stake (DPoS) Consensus in Bangladesh" suggests adopting Blockchain technology becomes imperative. By leveraging Blockchain, a secure and transparent digital ledger can be maintained, revolutionizing the way information about land assets is managed. Nevertheless, the integration of a Blockchain-based system should be meticulously planned and executed. Our innovative proposal revolves around enhancing the DPoS consensus, thereby facilitating the creation of a private ledger system tailored for land asset transactions. This system can seamlessly coexist with the traditional Land Registry, ensuring a smooth and efficient operation. [6]

Maintaining land records in countries with vast territories and populations poses significant challenges. Relying solely on a centralized database is not foolproof, given its vulnerability to cyber-attacks and fraud. To address this issue, "Land Records System Using Hybrid Blockchain" this paper suggests implementing a hybrid blockchain solution. In this proposed land records system, the government transfers existing land records to the blockchain, with all land sales transactions securely recorded. These transactions undergo verification by government-authorized nodes, ensuring their immutability. Citizens can access their land ownership details and associated transactions but lack the capability to alter any blockchain data. This hybrid blockchain combines the strengths of public and private blockchains, offering enhanced security and reliability compared to conventional databases and paper records. [8]

Mahbub Alam Majumdar Mobasir Monim and Mohammad Muhrasim Shahriyer "Blockchain based Land Registry with Delegated Proof of Stake (DPoS) Consensus in Bangladesh" in 2021 International Conference on Science & Contemporary Technologies introduces a blockchain-based system that drastically reduces property transaction times, thwarts fraud, and enhances ownership security.

Implementing this approach in land management will benefit the government by streamlining tax collection, service delivery, and governance. [9]

IV. PROPOSED SYSTEM

The proposed system for a blockchain-based land registration system aims to enhance the transparency, security, and efficiency of existing land registration systems. The system will be based on a permissioned blockchain, where only authorized parties can participate in the network. The following sections describe the key features of the proposed system:

1. Decentralized and Transparent: The proposed system will be decentralized, which means that there will not be a single authority controlling the system. Instead, the system will be maintained by a network of nodes that will validate and record transactions. The use of blockchain technology will ensure that the system is transparent, and all transactions are visible to all authorized parties.
2. Immutable and Tamper-Proof: The use of blockchain technology will ensure that all transactions are immutable and tamper-proof. Once a transaction is recorded on the blockchain, it cannot be amended. This means that all land registration records will be secure and tamper-proof, reducing the risk of fraudulent activities.
3. Smart Contracts: The proposed system will use smart contracts to automate the land registration process. Smart contracts are self-executing contracts that can automatically validate and execute the terms of the contract. This will reduce the need for intermediaries and speed up the land registration process.
4. Digital Identity Management: The proposed system will use digital identity management to ensure that only authorized parties can participate in the network. All participants will have a unique digital identity, which will be used to verify their identity and access rights.
5. Integration with Existing Systems: The proposed system will be designed to integrate with existing land registration systems. This will ensure that the transition to the new system is seamless and does not disrupt existing land registration processes.

In conclusion, the proposed system for a blockchain-based land registration system has the potential to revolutionize the way land registration is done. The system will enhance transparency, security, and efficiency, and reduce the risk of fraudulent activities. The use of smart contracts and digital identity management will automate the land registration process and reduce the need for intermediaries. The proposed system will be designed to integrate with existing land registration systems, ensuring a seamless transition to the new system.

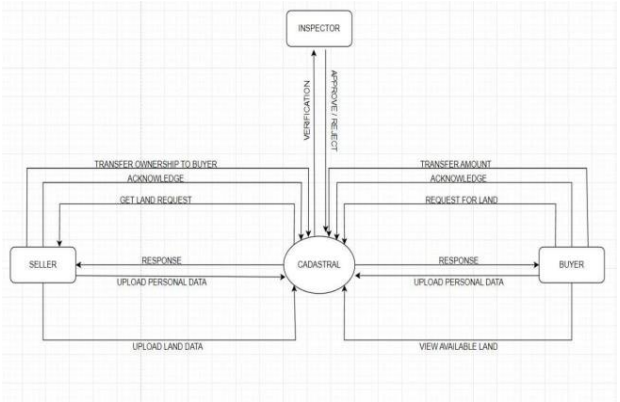

Fig 1 Land Registration System

V. CONCLUSION

The creation of a blockchain-based land registration system represents a groundbreaking development in land transactions. It offers heightened security and addresses the vulnerabilities inherent in traditional land registration methods, effectively combating fraud and other malpractices. This system ensures a transparent, efficient, and trustworthy environment. It leverages the immutability and decentralized nature of blockchain technology to safeguard the integrity of land records. This inspires confidence in property owners and potential buyers, reducing property disputes and fraudulent activities. Additionally, the system is designed for user-friendliness, simplifying land transactions. Private vendors benefit from streamlined processes, reduced paperwork, and lower costs. Government officials involved in land sales experience heightened efficiency and transparency. In summary, the blockchain-based land registration system improves the reliability, accessibility, and security of land transactions, benefiting both private vendors and government agencies. This advancement promises smoother processes and economic development opportunities while ensuring the protection of property rights.

ACKNOWLEDGMENT

A project is something that could not have been materialized without co-operation of many people. This project shall be incomplete if we do not convey my heartfelt gratitude to those people from whom I have got considerable support and encouragement.

It is a matter of great pleasure for us to have a respected **Prof. Amita Raman** as our project guide, We are thankful to her for being a constant source of inspiration.

We should also like to give our sincere thanks to **Prof. Shraddha Subhedar, H.O.D, Computer Science & Engineering in Artificial Intelligence and Machine Learning Department**, **Prof. Dinesh Singh Dhakad, Project co-ordinator** for their kind support.

We would like to express our deepest gratitude to **Dr. Manjusha Deshmukh**, our principal of Saraswati College of Engineering, Kharghar, Navi Mumbai

REFERENCES

1. Sai Apurva Gollapalli, Gayatri Krishnamoorthy, Neha Shivaji Jagtap and Rizwana Shaikh “Land Registration System Using Blockchain” in 2020 International Conference on Smart Innovations in Design, Environment, Management, Planning and Computing (ICSIDEMPC)
2. R.C.Suganthe, N.Shanthi, R.S.Latha, K.Gowtham, S.Deepakkumar and R.Elango “Blockchain enable Digitization of Land Registration” in 2021 International Conference on Computer Communication and Informatics (ICCCI)
3. Rishikesh Kadam, Vishakha Vidhani and Anushree Bane “Land Records System Using Hybrid Blockchain” in 2019 5th International Conference On Computing, Communication, Control And Automation (ICCUBEA)
4. Milon Biswas, Jabed Al Faysal and Kazi Asif Ahmed “LandChain: A Blockchain Based Secured Land Registration System” in: 2020 Third ISEA Conference on Security and Privacy (ISEA-ISAP)
5. Lokendra Singh Umrao, Subhash Chandra Patel and Santosh Kumar “Blockchain-BasedReliable-Framework-for-Land-Registration- Information-System” in 2020 IEEE Region 10 Symposium (TENSYMP)
6. Disha Shinde, Snehal Padekar, Siddharth Raut, Abdul Wasay and S. S. Sambhare “Land Registry Using Blockchain - A Survey of existing systems and proposing a feasible solution” in: 2020 IEEE

Region 10 Symposium (TENSYMP)
7. Meghali Nandi, Rajat Kanti Bhattacharjee, Amrit Jha and Ferdous A. Barbhuiya "A secured land registration framework on Blockchain" in: 2020 4th International Symposium on Multidisciplinary Studies and Innovative Technologies (ISMSIT)
8. Md Sakibul Islam, Fahmid Shahriar Iqbalt and Muhaimenul Islamt "A Novel Framework for Implementation of Land Registration and Ownership Management via Blockchain in Bangladesh" in: 2020 International Conference on Convergence to Digital World - Quo Vadis (ICCDW) Computer Science & Engineering in Artificial Intelligence and Machine Learning 2023-24 2
9. Mahbub Alam Majumdar Mobasir Monim and Mohammad Muhrasim Shahriyer "Blockchain based Land Registry with Delegated Proof of Stake (DPoS) Consensus in Bangladesh" in 2021 International Conference on Science & Contemporary Technologies (ICSCT)
10. Arif Furkan Mendi, Kadir Kaan Sakaklı and Alper Çabuk "A Blockchain Based Land Registration System Proposal for Turkey" in International Journal of Technology Diffusion (IJTD)
11. P. Tasca et al., "Digital Currencies, Decentralized Ledgers, and the Future of Central Banking," SSRN Electronic Journal, 2016.
12. J. Xu et al., "Blockchain-Based Land Registration System," in Proceedings of the 2017 IEEE International Conference on Computer and Communications (ICCC), Chengdu, China, 2017, pp. 1-6.
13. M. J. Parsons et al., "Blockchain and the Future of Developing Countries," World Development, vol. 106, pp. 242-253, 2018.
14. B. Kshetri, "Blockchain's roles in meeting key supply chain management objectives," International Journal of Information Management, vol. 39, pp. 80-89, 2018.\