International Journal of Engineering & Extended Technologies Research (IJEETR)

|ISSN: 2322-0163| www.ijeetr.com | A Bimonthly, Peer Reviewed, Scholarly Indexed Journal |

| Volume 8, Issue 2, March - April 2026 |

DOI:10.15662/IJEETR.2026.0802028

Improving Land Transaction Transparency through Block chain Technology

Yamuna G, Udhayasankar T P

Annapoorana Engineering College, Salem, Tamil Nadu, India

Publication History: Received: 25.02.2026; Revised: 20.03.2026; Accepted: 25.03. 2026; Published: 28.03.2026.

ABSTRACT: Land transaction systems in many regions are often hindered by inefficiencies, lack of transparency, fraud, and disputes arising from manual record-keeping and fragmented data management. This project proposes a blockchain-based framework to enhance transparency, security, and trust in land transactions. By leveraging decentralized ledger technology, the system ensures immutability of records, real-time verification of ownership, and tamper-resistant documentation of property transfers.

The proposed model integrates smart contracts to automate transaction processes, reducing dependency on intermediaries and minimizing human errors. Each transaction is securely recorded on the blockchain, providing a transparent and auditable trail accessible to authorized stakeholders. The system also incorporates identity verification mechanisms and geospatial data integration to strengthen authenticity and prevent fraudulent claims.

A prototype implementation demonstrates how blockchain can streamline land registration workflows, reduce processing time, and enhance public trust in land governance systems. The study evaluates performance, security features, and scalability challenges, highlighting both the potential benefits and limitations of adopting blockchain in land administration.

The findings suggest that blockchain technology can significantly improve transparency and efficiency in land transactions, offering a robust solution to longstanding issues in property management systems. Future work will focus on large-scale deployment considerations, interoperability with existing government infrastructure, and regulatory compliance.

KEYWORDS: Blockchain, Land Registry, Transparency, Smart Contracts, Decentralized Systems, Property Transactions.

I. INTRODUCTION

Land ownership and property transactions form a critical component of economic development and social stability. However, traditional land administration systems in many countries continue to face persistent challenges such as lack of transparency, inefficient record management, susceptibility to fraud, and prolonged dispute resolution processes. Manual documentation, centralized databases, and limited accessibility to verified records often result in inconsistencies, duplication, and unauthorized alterations, undermining public trust in land governance frameworks.

In recent years, digital transformation initiatives have attempted to modernize land record systems; however, many of these solutions remain constrained by centralized control, making them vulnerable to data manipulation, cyber threats, and operational inefficiencies. These limitations highlight the need for a more secure, transparent, and decentralized approach to managing land transactions.

Blockchain technology has emerged as a promising solution to address these challenges. As a distributed and immutable ledger, blockchain enables secure recording and sharing of transaction data across multiple stakeholders without reliance on a central authority. Its core features—transparency, traceability, and tamper resistance—make it particularly suitable for applications in land registration and property transfer. Furthermore, the integration of smart contracts allows for the automation of transaction workflows, reducing the need for intermediaries and minimizing the risk of human error.

|ISSN: 2322-0163| www.ijeetr.com | A Bimonthly, Peer Reviewed, Scholarly Indexed Journal |

| Volume 8, Issue 2, March - April 2026 |

DOI:10.15662/IJEETR.2026.0802028

This project explores the application of blockchain technology to improve transparency in land transactions. It proposes a decentralized framework that ensures secure storage of land records, real-time verification of ownership, and a reliable audit trail of all transactions. By addressing key issues such as fraud prevention, data integrity, and process efficiency, the proposed system aims to enhance trust among stakeholders, including government authorities, buyers, sellers, and financial institutions.

The study also examines the practical challenges associated with implementing blockchain in land administration, such as scalability, legal considerations, and integration with existing systems. Through this work, the project seeks to contribute to the development of a more transparent, efficient, and trustworthy land transaction ecosystem.

II. LITERATURE REVIEW

The application of blockchain technology in land management has gained significant attention in recent years due to its potential to address transparency and security issues. Several studies have explored how distributed ledger systems can replace or enhance traditional land registration frameworks.

Research by various scholars highlights that blockchain ensures immutability and traceability of land records, thereby reducing fraud and unauthorized alterations. Countries like Sweden and Georgia have piloted blockchain-based land registries, demonstrating improved efficiency and trust in property transactions. These implementations emphasize the use of cryptographic security and decentralized consensus mechanisms to validate ownership records.

Other studies focus on the integration of smart contracts in land transactions, which automate processes such as ownership transfer, verification, and payment settlement. This reduces reliance on intermediaries such as brokers and legal authorities, lowering transaction costs and processing time.

Additionally, literature points to the importance of integrating Geographic Information Systems (GIS) with blockchain to ensure accurate mapping and validation of land parcels.

However, existing research also identifies several challenges, including scalability issues, legal and regulatory barriers, data privacy concerns, and the complexity of integrating blockchain with legacy systems. These gaps highlight the need for practical frameworks that balance technological innovation with real-world constraints.

III. RESEARCH METHODOLOGY

This study adopts a design-oriented and experimental research methodology to develop and evaluate a blockchain-based system for improving transparency in land transactions. The proposed framework is based on a decentralized architecture in which land records are securely stored on a blockchain network, with each transaction represented as a block containing ownership details, timestamps, and cryptographic signatures.

The system is implemented using a suitable blockchain platform, along with smart contracts to automate key processes such as verification, validation, and ownership transfer. A user-friendly interface is also developed to enable interaction among stakeholders, including buyers, sellers, and regulatory authorities.

To simulate real-world conditions, sample land transaction data is utilized, covering scenarios such as ownership transfers and potential disputes. Smart contracts are programmed to ensure that only authorized participants can initiate and approve transactions, thereby maintaining system integrity.

The evaluation of the proposed system is conducted using key performance metrics, including transparency, security, transaction time, cost efficiency, and data integrity. Furthermore, a comparative analysis is performed between the blockchain-based system and traditional land registration methods to assess improvements in operational efficiency, reliability, and trustworthiness.

International Journal of Engineering & Extended Technologies Research (IJEETR)

|ISSN: 2322-0163| www.ijeetr.com | A Bimonthly, Peer Reviewed, Scholarly Indexed Journal |

| Volume 8, Issue 2, March - April 2026 |

DOI:10.15662/IJEETR.2026.0802028

IV. RESULTS AND DISCUSSION

The results of the prototype implementation indicate that the proposed blockchain-based system significantly enhances transparency, security, and efficiency in land transactions. By recording all transactions on a distributed ledger, the system ensures that data is openly accessible to authorized users and cannot be altered without consensus, thereby eliminating the risk of hidden modifications and increasing stakeholder trust. The incorporation of cryptographic mechanisms strengthens data security by preventing unauthorized access and tampering.

Additionally, the use of smart contracts automates verification and approval processes, substantially reducing transaction time compared to conventional systems, where procedures may take several days or weeks.
The system also demonstrates cost efficiency by reducing the need for intermediaries such as brokers and legal agents, thereby lowering administrative expenses.

Another key advantage is improved traceability, as the blockchain maintains a complete and immutable history of ownership, facilitating quick and reliable dispute resolution. However, the study also identifies certain limitations, including scalability challenges when handling large volumes of transactions and the complexity of integrating blockchain solutions with existing legacy systems.

Moreover, the absence of comprehensive legal and regulatory frameworks may pose barriers to large-scale adoption. Despite these challenges, the findings confirm that blockchain technology has strong potential to transform land transaction systems by making them more transparent, secure, and efficient.

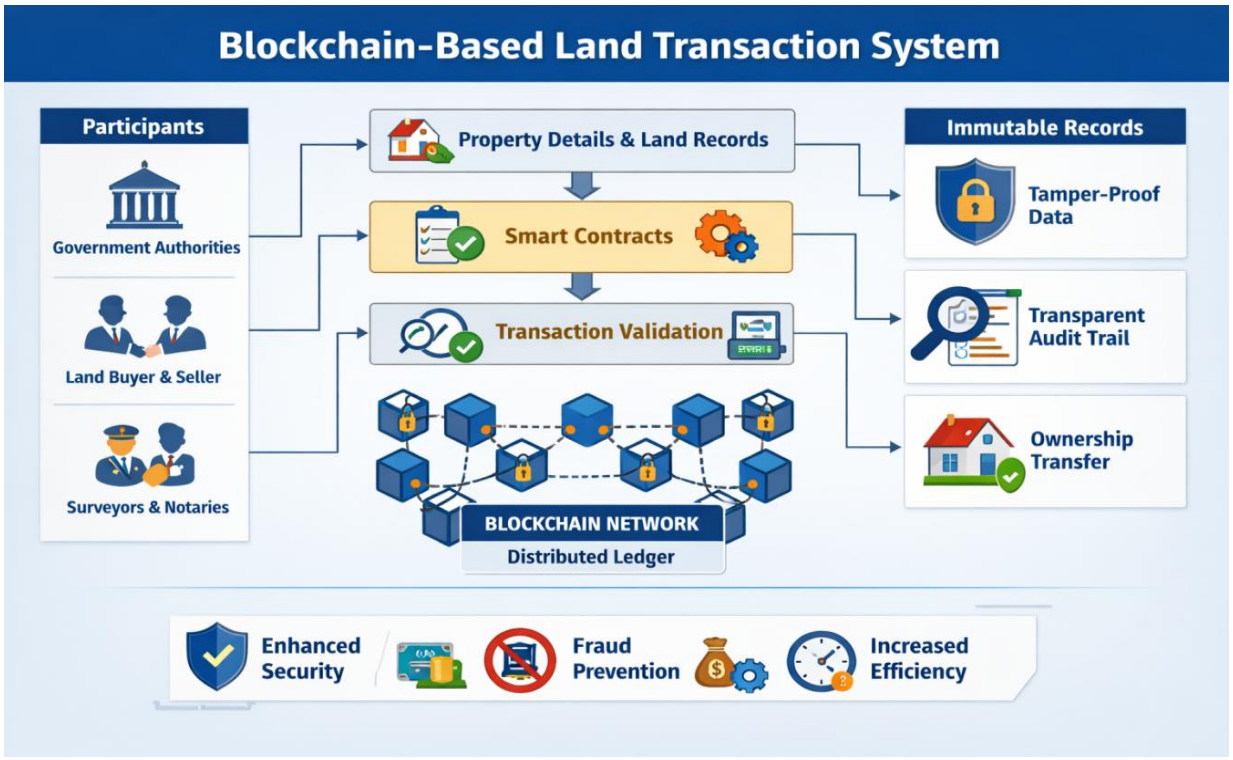

FIG: 1

|ISSN: 2322-0163| www.ijeetr.com | A Bimonthly, Peer Reviewed, Scholarly Indexed Journal |

| Volume 8, Issue 2, March - April 2026 |

DOI:10.15662/IJEETR.2026.0802028

V. CONCLUSION

Block chain technology has emerged as a promising solution for improving transparency, security, and efficiency in land transaction systems. Traditional land registry systems often suffer from problems such as data manipulation, fraud, lack of transparency, and lengthy verification processes. By introducing a decentralized and tamper-resistant digital ledger, block chain can significantly enhance the reliability of land records and ensure secure property ownership management.

The proposed block chain-based land transaction framework enables secure storage of land records, transparent verification of ownership, and automated execution of transactions through smart contracts. This approach eliminates the need for multiple intermediaries, reduces administrative delays, and ensures that all transactions are permanently recorded and easily traceable.

As a result, the risk of fraudulent land transfers and disputes can be greatly minimized. Furthermore, block chain technology provides a transparent audit trail that allows government authorities, buyers, sellers, and other stakeholders to verify property records in real time. This enhances trust among participants and strengthens the overall governance of land administration systems.

VI. FUTURE WORK

1. **Scalability Improvements**: Developing more efficient consensus algorithms to handle large-scale transactions.
2. **Integration with Government Systems**: Ensuring seamless interoperability with existing land record databases and administrative frameworks.
3. **Legal and Regulatory Frameworks**: Establishing policies and standards to support blockchain adoption in land governance.
4. **Advanced Security Mechanisms**: Incorporating biometric authentication and multi-factor verification to strengthen access control.
5. **GIS Integration**: Enhancing the system with real-time geospatial data for accurate land mapping.
6. **User Adoption Studies**: Analysing stakeholder acceptance and usability to improve system design.
7. **Pilot Implementation**: Conducting real-world trials in collaboration with government agencies to evaluate practical feasibility.

REFERENCES

1. F. Amri, P. Sihombing, and S. Efendi, "Blockchain in Land Registry," *Prisma Sains: Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA*, vol. 11, no. 1, 2023.
2. M. S. Shahariar, P. Banik, and M. A. Habib, "A Secure Land Record Management System using Blockchain Technology," *arXiv preprint arXiv:2304.13512*, 2023.
3. R. Kumar K. V., R. Gokul, and V. Nirmal Kumar, "Blockchain and Smart Contract for Land Registration using Ethereum Network," *International Journal of Engineering Research & Technology (IJERT)*, vol. 10, no. 08, 2022.
4. A. K. Yadav, D. Kumar, S. Sangam, and T. Srivastava, "Land Registry System Using Smart Contract of Blockchain Technology," *Lecture Notes in Electrical Engineering*, Springer, 2023.
5. N. Abu Bakar et al., "Securing Land Registry by Blockchain: At the Crossroads Against Land Fraud Registration," *International Journal of Academic Research in Economics and Management Sciences*, vol. 11, no. 2, 2022.
6. C.Nagarajan and M.Madheswaran - 'Stability Analysis of Series Parallel Resonant Converter with Fuzzy Logic Controller Using State Space Techniques'- Taylor &Francis, Electric Power Components and Systems, Vol.39 (8), pp.780-793, May 2011. DOI: 10.1080/15325008.2010.541746
7. C.Nagarajan and M.Madheswaran - 'Experimental verification and stability state space analysis of CLL-T Series Parallel Resonant Converter' - Journal of Electrical Engineering, Vol.63 (6), pp.365-372, Dec.2012. DOI: 10.2478/v10187-012-0054-2
8. C.Nagarajan and M.Madheswaran - 'Performance Analysis of LCL-T Resonant Converter with Fuzzy/PID Using State Space Analysis'- Springer, Electrical Engineering, Vol.93 (3), pp.167-178, September 2011. DOI 10.1007/s00202-011-0203-9
9. S.Tamilselvi, R.Prakash, C.Nagarajan,"Solar System Integrated Smart Grid Utilizing Hybrid Coot-Genetic Algorithm Optimized ANN Controller" Iranian Journal Of Science And Technology-Transactions Of Electrical Engineering, DOI10.1007/s40998-025-00917-z,2025

|ISSN: 2322-0163| www.ijeetr.com | A Bimonthly, Peer Reviewed, Scholarly Indexed Journal |

| Volume 8, Issue 2, March - April 2026 |

DOI:10.15662/IJEETR.2026.0802028

10. S.Tamilselvi, R.Prakash, C.Nagarajan,“ Adaptive sliding mode control of multilevel grid-connected inverters using reinforcement learning for enhanced LVRT performance” Electric Power Systems Research 253 (2026) 112428, doi.org/10.1016/j.epsr.2025.112428
11. S.Thirunavukkarasu, C. Nagarajan, 2024, “Performance Investigation on OCF and SCF study in BLDC machine using FTANN Controller," Journal of Electrical Engineering And Technology, Volume 20, pages 2675–2688, (2025), doi.org/10.1007/s42835-024-02126-w
12. C. Nagarajan, M.Madheswaran and D.Ramasubramanian- ‘Development of DSP based Robust Control Method for General Resonant Converter Topologies using Transfer Function Model’- Acta Electrotechnica et Informatica Journal , Vol.13 (2), pp.18-31,April-June.2013, DOI: 10.2478/aeei-2013-0025.
13. C.Nagarajan and M.Madheswaran - ‘DSP Based Fuzzy Controller for Series Parallel Resonant converter’- Springer, Frontiers of Electrical and Electronic Engineering, Vol. 7(4), pp. 438-446, Dec.12. DOI 10.1007/s11460-012-0212-0.
14. C.Nagarajan and M.Madheswaran - ‘Experimental Study and steady state stability analysis of CLL-T Series Parallel Resonant Converter with Fuzzy controller using State Space Analysis’- Iranian Journal of Electrical & Electronic Engineering, Vol.8 (3), pp.259-267, September 2012.
15. C.Nagarajan and M.Madheswaran, “Analysis and Simulation of LCL Series Resonant Full Bridge Converter Using PWM Technique with Load Independent Operation” has been presented in ICTES’08, a IEEE / IET International Conference organized by M.G.R.University, Chennai.Vol.no.1, pp.190-195, Dec.2007
16. Suganthi Mullainathan, Ramesh Natarajan, “An SPSS and CNN modelling based quality assessment using ceramic materials and membrane filtration techniques”, Revista Materia (Rio J.) Vol. 30, 2025, DOI: https://doi.org/10.1590/1517-7076-RMAT-2024-0721
17. M Suganthi, N Ramesh, “Treatment of water using natural zeolite as membrane filter”, Journal of Environmental Protection and Ecology, Volume 23, Issue 2, pp: 520-530,2022
18. S. Gupta, S. Maurya, Y. Kumar, and V. Chauhan, “Land Registry Using Blockchain,” *International Journal for Research in Applied Science and Engineering Technology (IJRASET)*, 2025.