AI+DAO: Revolution in India's Decentralised Financial Ecosystem

AUTHORS: Aarti Dhingra[1], Kesab Jhunjhunwalla[2]

AFFILIATIONS:

[1]Aarti Dhingra, Department of Commerce, University of Delhi, Delhi, India,
aarudhingra2222@commerce.du.ac.in

[2]Kesab Jhunjhunwalla, Department of Commerce, University of Delhi, Delhi, India,
kesabjhunjhunwalla@gmail.com

Abstract

Decentralized Autonomous Organizations (DAOs), with a global market size estimated at over USD 30 billion as of 2024, are rapidly transforming governance and finance across blockchain ecosystems. In the Indian context, DAOs have the potential to unlock a ₹2.5-3 lakh crore market over the next decade, particularly by enhancing transparency, efficiency, and financial inclusion in India. However, India faces critical challenges in DAO adoption-including legal uncertainty, scalability constraints, governance loopholes, cybersecurity vulnerabilities, and low user trust. This research investigates these implementation barriers and explores how Artificial Intelligence (AI) can be employed to resolve them effectively. It examines AI-driven solutions such as smart contract auditing tools, legal compliance engines, fraud detection algorithms, and intelligent consensus models to address key risks. The study also identifies private AI technologies currently available to tackle these domain-specific issues. By integrating AI with DAOs, this research demonstrates how India can accelerate the safe and efficient deployment of decentralized governance, thus advancing its financial ecosystem.

Keywords: AI, DAO, Decentralised Finance, Smart Contracts

Introduction:

In recent years, the rapid evolution of technology has reshaped how communities, economies, and institutions function. Among these transformative innovations, Decentralised Autonomous Organisations (DAOs) have emerged as a groundbreaking model, offering trustless, self-governing systems built on blockchain technology. With their global market size surpassing USD 30 billion as of

2024 (Messari, 2024), DAOs are no longer just experimental concepts-they represent a tangible shift towards collective, transparent, and programmable governance.

In a nation like India, where digital finance is growing rapidly and the need for inclusive, scalable systems is urgent, the DAO model holds enormous promise. Estimates suggest that DAOs could contribute up to ₹2.5-3 lakh crore to the Indian economy within the next decade by enabling transparent public programs, community-led microfinance, and digital cooperatives. However, despite their potential, DAOs remain at the margins of India's financial and legal mainstream. Their adoption is constrained by multiple challenges, including legal ambiguity and cyber risk, as well as technical complexity, governance gaps, and a lack of trust among end users.

This paper argues that Artificial Intelligence (AI) with its ability to process complex datasets, predict anomalies, and automate compliance-can play a critical role in addressing these bottlenecks. By integrating AI tools like smart contract verifiers, legal logic engines, fraud detection systems, and intelligent voting mechanisms, the path to safe and efficient DAO implementation in India can be significantly strengthened.

This research explores how the fusion of AI and DAO technologies can not only tackle key adoption challenges but also accelerate the evolution of India's Decentralised Financial Ecosystem, making it more inclusive, transparent, and resilient to systemic risks.

Objectives of the paper

This study aims for the following objectives:

1. To identify the key challenges in the adoption and implementation of DAOs in India.
2. To explore how Artificial Intelligence (AI) can address the current and emerging challenges faced by DAOs in India.
3. To evaluate existing AI tools and technologies applicable to DAO frameworks.
4. To develop an AI-assisted DAO framework for effective implementation in India.

Literature Review

[1] Jha (2023) critically examines the multifaceted obstacles hindering effective decision-making in DAOs, including coordination bottlenecks, low voter participation, token-based power imbalances, rigid smartcontract governance, and legal ambiguities. By analysing prominent DAOs, such as MakerDAO, Uniswap, MolochDAO, and others, the authors highlight how decentralisation often fails to ensure equitable influence, responsiveness, or dispute resolution. The paper underscores how structural flaws, technical vulnerabilities, and inconsistent stakeholder engagement erode governance effectiveness. These challenges

suggest that integrating AI tools-such as automated proposal summarisation, adaptive voting systems, and predictive governance analytics-could enhance inclusivity, clarity, and resilience in DAO decision-making frameworks.

[2] IBC News (2024) offers a comprehensive understanding of DeFi as a blockchain-powered alternative to traditional finance. It outlines how smart contracts eliminate intermediaries to enable services like lending, trading, and yield farming. However, DeFi's reliance on unaudited protocols and open-source code presents major risks, including hacks, bugs, and decision failures. These vulnerabilities make DAO governance and coordination fragile in emerging markets like India. The paper emphasises the need for robust technical and regulatory frameworks. In this context, AI has the potential to enhance DAO reliability by automating auditing, detecting contract flaws, and optimising proposal evaluation and voting mechanisms.

[3] Ikeda et al. (2025) propose a dual-AI framework for DAOs that enhances financial security by detecting anomalies in crypto-asset trading. The first AI combines multiple network-based indicators using a Boltzmann machine to identify suspicious patterns, while the second is a conversational agent guiding traders through alerts and decision support. This integrated system aims to restore trust by enabling informed, real-time interventions during market volatility. The model emphasises collaboration between AI, developers, regulators, and DAO members, envisioning intelligent wallets within DAOs. Such AI-infused decision-making tools can significantly strengthen DAO governance, particularly for regulated and evolving financial ecosystems like India's.

[4] Victorie, Vasuki, and Ganapathy (2024) examine how AI can enhance governance in cryptocurrency communities and DAOs. The paper highlights the use of machine learning, NLP, and predictive analytics to analyse community sentiment, predict voting outcomes, and automate governance functions. Models like LSTM achieved up to 90% accuracy, demonstrating strong potential. Key challenges addressed include algorithmic bias, data privacy, and ethical oversight. This study is highly relevant to Indian DAOs, where issues like transparency and efficiency persist. By proposing a scalable AI-driven governance framework, the paper offers both a technical and ethical approach to improving decentralised decision-making.

[5] IBC News (2024) highlights blockchain's transformative role in enhancing financial inclusion across India by reducing transaction costs, enabling secure microfinance, and accelerating peer-to-peer remittances. The technology supports smart contracts for microloans and leverages initiatives like the digital rupee to streamline subsidy delivery and cross-border payments. Despite its promise, barriers such as regulatory ambiguity, infrastructure gaps, and digital illiteracy persist. In this context, AI can be instrumental: automating identity verification, analysing lending risk, simplifying smart contract

execution, and facilitating inclusive user interfaces. Together, AI-augmented blockchain and DAO models could foster resilient and equitable finance in India's underserved regions.

[6] Ma et al. (2024) analyse governance across 16,427 DAOs on nine blockchains, identifying major vulnerabilities in governance contracts, documentation, and proposals. They found that over 60% of proposals had inconsistencies between descriptions and executable code, risking transparency and security. Case studies like Beanstalk and VPANDA reveal how vague proposals and centralised controls led to significant financial losses. The study advocates for AI-powered detection tools to flag such governance flaws early. These findings are highly relevant for Indian DAOs, which can adopt AI-driven validation to ensure proposal clarity, strengthen contract integrity, and enhance overall governance reliability and transparency.

[7] Narayan et al. (2024) show that AI can significantly enhance DAO (Decentralised Autonomous Organisation) frameworks in India. AI boosts smart contracts by enabling real-time adaptation, anomaly detection, and fraud prevention. It also aids governance with reputation-based voting, proposal summarisation, sentiment analysis, and identity verification, thereby improving transparency and participation. Additionally, combining smart contracts with predictive AI and human-in-the-loop oversight helps pre-empt risks and maintain accountability. Altogether, AI offers India a path to overcome legal ambiguity, regulatory gaps, and technical limitations to build secure and efficient DAOs.

[8] Outlook India (2025) highlights the transformative role of AI in advancing DAOs by addressing inefficiencies, security vulnerabilities, and scalability challenges. AI assists in decision-making by filtering proposal discussions, identifying relevant content, and delivering predictive insights that streamline governance. It also strengthens integrity by detecting manipulative behaviour, such as Sybil attacks, and flagging biased voting patterns. Moreover, AI augments smart contracts, enabling adaptability to real-time events rather than remaining static code. This integration enhances transparency, speeds up proposal assessment, and fortifies defence mechanisms, making a strong case for AI-driven governance solutions in Indian DAOs.

[9] Irfan et al. (2024) present AI-driven decentralised finance and the future of finance, a comprehensive exploration of how artificial intelligence can enhance decentralised financial systems. Highlighted AI applications include optimising smart contract efficiency, automating fraud detection, reinforcing security, risk management, and tailoring user experiences. The authors also discuss regulatory challenges and ethical considerations, offering a strategic roadmap for integrating AI into DeFi governance frameworks. For Indian DAOs, these insights suggest practical pathways to automate vulnerable contract validation, detect malicious behaviour, and adapt governance processes in real time, addressing transparency, security,

and scalability concerns.

[10] Buterin (2022) introduces advanced governance models such as soulbound tokens and reputation-based systems, which can be enhanced through AI to reduce token concentration and improve democratic participation.

[11] Weyl et al. (2022) emphasize decentralized governance innovations like quadratic voting, which, when integrated with AI-driven simulations, can optimise fair decision-making outcomes.

[12] Chainalysis (2025) highlights the increasing role of AI in detecting fraud, illicit transactions, and governance manipulation within blockchain ecosystems, reinforcing trust and security. These studies collectively indicate that AI not only enhances technical robustness but also addresses deeper governance challenges such as inequality, voter apathy, and security risks. In the Indian context, such AI-enabled mechanisms can significantly improve regulatory compliance, inclusivity, and the scalability of DAO frameworks.

Methodology

This study adopts an exploratory qualitative research design to examine the challenges associated with the implementation of Decentralised Autonomous Organisations (DAOs) in India and to evaluate the potential of Artificial Intelligence (AI) in addressing these challenges. The exploratory approach is appropriate given the emerging nature of DAOs and the limited structured research available in the Indian context. The study focuses on identifying patterns, gaps, and solution frameworks rather than testing predefined hypotheses.

The research is based entirely on secondary data sources. Data has been collected from a wide range of credible and relevant sources, including:

1. Academic journals and research papers on DAOs, blockchain, and AI
2. Government publications and regulatory discussions related to digital finance and decentralised systems in India
3. Industry reports and whitepapers (e.g., blockchain and DeFi reports)
4. Reputed websites and platforms such as the Indian Blockchain Council and other fintech resources

These sources were selected to ensure a comprehensive understanding of both the technical challenges of DAOs and the practical applicability of AI solutions in the Indian ecosystem.

The study employs qualitative content analysis to interpret the collected data. The analysis was conducted in three stages:

1. Data Coding and Classification

The collected information was systematically coded into key thematic categories such as governance challenges, legal issues, technical vulnerabilities, and user adoption barriers.

2. Thematic Analysis

Identified themes were analysed to understand recurring patterns and relationships between DAO challenges and AI-based solutions. This step helped in mapping specific AI tools (e.g., NLP, fraud detection, smart contract auditing) to corresponding DAO issues.

3. Synthesis and Interpretation

The findings were synthesised into structured tables and frameworks to improve clarity and presentation. This process enabled the development of an AI-powered DAO framework tailored to the Indian context.

TABLES

Table 1: DAO Problems in India

Sl. No.	Problem	Description
1	Legal Uncertainty	Indian laws don't officially recognise DAOs as legal entities, which creates challenges in taxation, liability, and regulatory oversight.
2	Governance Inefficiencies	Token-based voting is often inefficient and susceptible to manipulation by large stakeholders.
3	Lack of Transparency in Proposals	Community members may not fully understand complex proposals due to poor documentation or language barriers.
4	Low Participation & Voter Apathy	Many members don’t engage in DAO decision-making due to complexity or lack of incentives.
5	Onboarding & Education	It is difficult for new users to understand DAO processes, especially those unfamiliar with crypto or blockchain.
6	Risk & Fraud Detection	Pseudonymous operations make it harder to identify fraud, collusion, or manipulation.
7	Regulatory Compliance	DAOs struggle to meet KYC/AML, tax reporting, and SEBI/RBI rules, especially in a DeFi context.
8	Smart Contract Security	Vulnerable or buggy smart contracts can lead to hacks and loss of funds.
9	Language & Accessibility Barriers	DAOs built in English-only formats limit participation from regional communities.

Table 2: AI solutions to DAO challenges in India

Sl. No.	AI Solutions	Description
1	Legal Clarity & Compliance	AI legal assistants can monitor Indian regulatory changes and auto-suggest DAO compliance adjustments (e.g., with RBI/SEBI norms).
2	Governance Optimization	AI can detect manipulative voting behaviour, simulate outcomes of proposals, and recommend more balanced governance models (like quadratic voting).
3	Proposal Summarization	NLP models can summarise proposals in simple language or translate them into regional Indian languages to improve understanding.

4	Incentive Engine	AI algorithms can personalise engagement incentives (like gamified rewards or reputation boosts) to reduce voter apathy.
5	Personalized Learning	AI tutors can guide new members through DAO operations using chatbots, voice assistants, or gamified onboarding.
6	Risk Monitoring & Fraud Detection	AI models trained on blockchain patterns can detect suspicious wallet behaviour or fraudulent transactions.
7	Automated Compliance Checks	AI can flag high-risk wallets, enforce KYC policies (via facial recognition or document scanning), and assist with tax reporting.
8	Smart Contract Auditing	AI tools can scan smart contracts for known vulnerabilities, suggest fixes, and simulate execution scenarios.
9	Multilingual Support	AI language models like ChatGPT can translate DAO content into Indian languages (Hindi, Tamil, Bengali, etc.), increasing inclusivity.

Table 3: Available AI tech solutions for DAO challenges in India

Function	**AI Tool/ API**	**Used by/ Example**	**Use in DAO**
NLP & Translation	OpenAI GPT-4, Azure Translator, BERT	DAOhaus, Aragon	Multilingual proposal summary, chatbots
Regulatory AI	LexisNexis Regulatory AI, RegTech APIs	Used by banks & fintechs	Parse SEBI, RBI updates and flag compliance issues
Governance AI	DeepDAO, quadratic voting AI	Gitcoin DAO, Balancer DAO	Prevent vote rigging, simulate better models
Smart Contract AI Audit	CertiK AI, ChainGPT, MythX	Binance, Polygon, Aave	Auto-checks for smart contract vulnerabilities
KYC/AML AI	Synapse, Onfido, Trulioo, Worldcoin	Used by DeFi gateways	Scan identity docs, perform liveness checks
Risk Analytics	Chainalysis, Elliptic AI, Covalent AI	Used in crypto fraud detection	Flag suspicious wallet behaviour
Tax AI	ClearTax AI, TokenTax, CoinTracker	Integrated with Indian tax reporting tools	Auto-generate ITR-ready reports for DAO token holders

Results

Table 1 highlights some of the biggest challenges DAOs (Decentralised Autonomous Organisations) face, especially in the Indian landscape. While DAOs hold great promise for transparent, community-driven governance, bringing them into real-world use hasn't been easy. From unclear legal recognition and language barriers to technical problems like buggy smart contracts and low voter participation, these issues make it hard for DAOs to thrive. Each problem listed here reflects a real-world hurdle- whether it's users

struggling to understand how DAOs work or regulators finding it tough to keep up with this new tech. Understanding these challenges is the first step in finding smart, tech-enabled solutions to make DAOs more accessible, secure, and effective for everyone.

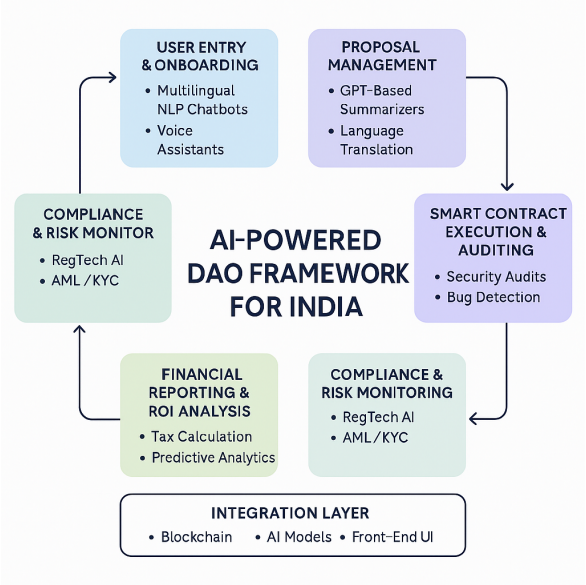
Table 2 outlines how Artificial Intelligence (AI) can help tackle some of the key challenges that DAOs face, particularly in India. While the DAO model holds promise for transparent, community-driven governance, it's clear that a tech-first approach is needed to overcome real-world issues like legal uncertainty, voter apathy, and language barriers. AI brings a powerful toolkit to the table, from summarising complex proposals in simple terms and spotting fraud, to translating DAO content into regional languages and making smart contracts safer. Each solution listed here shows how AI can not only make DAOs more secure and efficient but also more accessible and inclusive for a wider range of users.

Table 3 presents a snapshot of real-world AI tools and APIs that are already being used or have strong potential to support DAO ecosystems. It connects specific AI functions like language processing, smart contract auditing, regulatory compliance, and fraud detection with practical tools and examples from the industry. Whether it's OpenAI's GPT-4 helping summarise DAO proposals in regional languages or platforms like Chainalysis flagging suspicious crypto activity, each tool plays a critical role in making DAOs safer, more compliant, and more user-friendly. For anyone looking to implement or improve a DAO in India, this table acts as a practical guide to the AI technologies that can make it happen.

The proposed AI-Powered DAO Framework for India in figure 1 aims to address critical challenges in Decentralized governance by leveraging advanced artificial intelligence solutions. This framework integrates multilingual NLP chatbots, GPT-based summarizers, and automated compliance monitoring to streamline user onboarding, proposal management, and regulatory adherence. It incorporates security audits, bug detection, predictive analytics, and RegTech tools to ensure transparency, efficiency, and trust in DAO operations. With blockchain, AI models, and a robust front-end interface forming the integration layer, this model is tailored to India's linguistic diversity, regulatory landscape, and growing need for secure, scalable Decentralized governance systems.

FIGURE LEGENDS

Figure 1: AI-Powered DAO Framework for India



Conclusion

This study demonstrates that integrating Artificial Intelligence with DAOs can effectively address key barriers such as legal uncertainty, governance inefficiencies, low participation, and cybersecurity risks in India. AI tools like smart contract auditors, fraud detection systems, and sentiment analysis engines enhance transparency, trust, and decision-making within the decentralised frameworks. These technologies offer scalable and adaptable solutions that are crucial for India's evolving digital finance ecosystem. However, for successful implementation, supportive regulation, ethical AI deployment, and user education are equally essential. By leveraging AI-driven automation and insight, India can accelerate the secure and inclusive adoption of DAOs, paving the way for decentralized governance models that are both resilient and community-centric.

Implications

This study carries significant implications for theory, practice, policy, and society by highlighting how Artificial Intelligence can strengthen the adoption of DAOs in India. Theoretically, it extends governance and DeFi literature by proposing an AI-powered DAO framework that links automation, compliance, and inclusivity with decentralized systems. Practically, it offers a roadmap for businesses and startups to build more secure, transparent, and scalable DAOs, while also improving user participation through multilingual support and AI-based onboarding. A promising area for future research is the development of a unified, intelligent AI framework-a single tool or platform capable of addressing multiple DAO challenges, including legal compliance, fraud detection, governance, and user trust. Creating such an integrated "one-stop solution" could revolutionise how Decentralized systems operate and scale, especially in complex markets like India.

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