The Feasibility of Decentralized Social Governance: Can DAO Replace Traditional Government Organizations?

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Abstract

Decentralized Autonomous Organizations (DAOs) have emerged as a revolutionary alternative to traditional governance structures, offering transparency, efficiency, and communitydriven decision-making. This paper explores the core characteristics of DAOs, their potential applications in social governance, and their challenges compared to traditional government institutions. Through case studies, including CityDAO, Gitcoin Grants, UkraineDAO, VitaDAO, Proof of Humanity, and Kleros, we analyze real-world implementations of DAO governance. Despite the advantages, DAOs face legal uncertainties, governance inefficiencies, and security vulnerabilities that hinder their broader adoption. The study further examines the prospects of integrating DAOs into traditional governance frameworks and the future evolution of decentralized governance models. Addressing these challenges through technological innovation and regulatory adaptation will be crucial for DAOs to play a sustainable role in global governance.

Keywords DAO, decentralized governance, smart contracts, blockchain, public administration

1 Introduction

1.1 Research Background: Governance Challenges in the Digital Era and Emerging Decentralized Governance Models

The rapid advancement of digital technologies has led to profound changes in governance structures worldwide. Traditional governance models, which rely on hierarchical decision-making and centralized control, are increasingly challenged by inefficiencies, bureaucracy, and lack of transparency. The digital era has introduced new expectations for governance, emphasizing transparency, efficiency, and inclusivity. As societies become more interconnected through digital infrastructures, the demand for decentralized governance models that leverage emerging technologies has grown significantly.

Decentralized governance refers to a system in which decision-making power is distributed among stakeholders rather than concentrated in a central authority. Blockchain technology and smart contracts have enabled new forms of decentralized governance, particularly in the form of Decentralized Autonomous Organizations (DAOs). These entities leverage programmable governance mechanisms to execute decisions based on predefined rules, reducing the need for intermediaries and enhancing transparency. DAOs offer an alternative to traditional governance structures, promoting direct participation, automated execution, and immutable accountability.

The increasing interest in decentralized governance models stems from their potential to address some of the most pressing governance challenges, including corruption, inefficiency, and lack of public trust. By leveraging distributed ledger technology and consensus mechanisms, DAOs provide a framework for participatory governance that is resistant to manipulation and external influence. The transition to decentralized governance, however, presents complex challenges that must be carefully examined, particularly regarding scalability, security, and legal recognition.

1.2 Definition and Fundamental Principles of DAOs

A Decentralized Autonomous Organization (DAO) is a blockchain-based entity that operates without centralized control. DAOs function through smart contracts, which encode governance rules into self-executing algorithms. These organizations are governed by token-holding members who participate in decision-making processes through blockchain-enabled voting mechanisms. Unlike traditional organizations, DAOs eliminate hierarchical management structures, enabling a more direct and democratic approach to governance.

The core principles of DAOs include transparency, decentralization, automation, and communitydriven governance. Transparency is achieved by recording all governance decisions and financial transactions on a public blockchain, ensuring that all members have access to organizational activities. Decentralization refers to the distributed nature of decision-making, where governance power is distributed among token holders rather than concentrated in a central authority. Automation is facilitated through smart contracts, which execute predefined rules and actions without requiring manual intervention. Community-driven governance emphasizes the role of members in shaping the organization's direction through collective decision-making.

DAOs can take various forms, ranging from investment funds and grant distribution platforms to digital cooperatives and decentralized service providers. Some DAOs focus on financial management, allowing participants to pool resources and allocate funds based on community votes. Others operate as decentralized governance platforms, enabling members to coordinate decisionmaking in digital and real-world environments. The flexibility of DAOs has contributed to their growing adoption across diverse industries, including finance, technology, social impact, and policy development.

1.3 Research Objectives and Core Questions

The primary objective of this study is to assess the feasibility of decentralized social governance through DAOs and evaluate their potential to replace traditional government organizations. This research aims to explore the benefits, challenges, and limitations of DAOs in governance, analyzing how they compare to centralized governance structures in terms of efficiency, security, and adaptability.

Several core questions guide this study. First, what are the key advantages and disadvantages of DAO-based governance compared to traditional government institutions? Second, how do DAOs address common governance challenges such as corruption, inefficiency, and lack of transparency? Third, what are the technological, legal, and ethical barriers to widespread DAO adoption in public governance? Fourth, can DAOs effectively manage large-scale governance processes that require adaptability, conflict resolution, and enforcement of regulations? Finally, how can traditional government institutions integrate DAO principles into their frameworks to improve governance outcomes?

By addressing these questions, this research aims to provide a comprehensive analysis of DAO governance models, offering insights into their real-world applicability and potential impact on the future of governance.

1.4 Literature Review

Existing literature on DAOs and decentralized governance provides a foundation for understanding their theoretical and practical implications. Scholars and practitioners have examined various aspects of DAO governance, including technical infrastructure, decision-making mechanisms, and legal considerations.

Research on blockchain governance has explored the role of smart contracts in enabling decentralized decision-making. Studies highlight how blockchain-based governance models reduce reliance on intermediaries, ensuring that organizational rules are executed as programmed. Some scholars argue that DAOs represent a paradigm shift in governance, promoting greater transparency, efficiency, and accountability compared to traditional hierarchical models.

Other studies focus on the governance challenges of DAOs, particularly issues related to security, legal recognition, and decision-making efficiency. Security concerns arise from vulnerabilities in smart contract code, which can be exploited by malicious actors. The legal status of DAOs remains uncertain in many jurisdictions, as regulatory frameworks have not yet adapted to recognize decentralized entities as legal organizations. Furthermore, decision-making within DAOs can be slow and inefficient, as decentralized governance often requires extensive deliberation and consensus-building among members.

Empirical research on DAO implementations has examined real-world case studies of decentralized governance in action. Projects such as MakerDAO, Aragon, and CityDAO have demonstrated both the potential and limitations of DAO-based governance models. MakerDAO, a decentralized finance (DeFi) project, showcases how DAOs can successfully manage financial systems through decentralized governance. Aragon provides a platform for creating and managing DAOs, highlighting their adaptability in digital governance structures. CityDAO represents an experiment in decentralized land governance, illustrating how blockchain-based governance can extend into physical infrastructure management.

Despite the growing body of research on DAOs, significant gaps remain in understanding their scalability, regulatory integration, and long-term sustainability. This study seeks to bridge these gaps by analyzing DAO governance from multiple perspectives, contributing to the broader discourse on the evolution of governance models in the digital age.

The rise of DAOs presents a compelling alternative to traditional governance structures, offering decentralized, transparent, and community-driven decision-making processes. However, their widespread adoption in public governance faces significant challenges, including legal uncertainties, security risks, and decision-making inefficiencies. By critically examining the feasibility of DAOs as governance mechanisms, this study aims to contribute to the ongoing discussion on decentralized governance and its implications for the future of societal organization. Through an interdisciplinary approach that integrates technology, law, and policy analysis, this research will provide a comprehensive assessment of whether DAOs can effectively replace or complement traditional government organizations.

2 Core Characteristics and Governance Potential of DAO

2.1 Fundamental Operating Mechanisms of DAO: Smart Contracts, Governance Tokens, and On-Chain Decision-Making

Decentralized Autonomous Organizations (DAOs) function based on blockchain technology, leveraging smart contracts, governance tokens, and on-chain decision-making to establish decentralized governance structures. Smart contracts serve as the foundation of DAO operations, encoding rules and executing actions automatically when predetermined conditions are met. These contracts eliminate the need for intermediaries, ensuring that governance mechanisms remain autonomous and tamper-proof.

Governance tokens play a crucial role in DAO ecosystems by granting voting rights to participants. Token holders can propose changes, vote on governance decisions, and influence the direction of the organization. The distribution of governance tokens determines the degree of influence individuals have, allowing for a more democratic or plutocratic governance structure depending on the tokenomics design.

On-chain decision-making ensures that all governance activities occur transparently on the blockchain. Proposals, voting outcomes, and financial transactions are publicly recorded, allowing stakeholders to verify and audit the decision-making process. This transparency is one of DAO's defining attributes, fostering trust and reducing the likelihood of corruption or mismanagement.

2.2 DAO Governance Models: Consensus-Driven, Code-as-Law, and Automated Execution

DAO governance models differ from traditional hierarchical structures by emphasizing consensusdriven decision-making, code-as-law principles, and automated execution. Unlike centralized organizations where authority is concentrated, DAOs operate through distributed governance, relying on consensus among members to implement changes.

Consensus-driven governance requires a majority or supermajority of token holders to approve proposals before they are executed. Different DAOs adopt various consensus mechanisms, such as simple majority voting, quadratic voting, or delegated governance, to optimize decisionmaking efficiency while maintaining fairness.

The code-as-law principle implies that governance rules are enforced through smart contracts rather than human administrators. This principle minimizes subjectivity and ensures that all participants adhere to predefined protocols. Once a proposal is approved, smart contracts execute decisions automatically, eliminating delays associated with manual intervention.

Automated execution enables DAOs to function with minimal human oversight, reducing administrative costs and enhancing operational efficiency. Financial disbursements, contract enforcement, and policy changes occur seamlessly without requiring intermediary approval, making DAOs more agile than traditional bureaucratic institutions.

2.3 Potential Advantages of DAO in Social Governance: Transparency, Cost Efficiency, High Efficiency, and Global Collaboration

DAOs introduce several advantages to social governance, making them attractive alternatives or complementary structures to traditional governance models.

Transparency is a key strength of DAOs. Since all transactions and decisions are recorded on the blockchain, stakeholders can independently verify governance actions. This level of transparency reduces opportunities for corruption and enhances accountability, a stark contrast to conventional government organizations, which often operate with limited public oversight.

Cost efficiency is another significant advantage. Traditional governance structures require substantial administrative overhead, with funding allocated to salaries, compliance, and intermediary services. DAOs, by contrast, automate most of these processes, significantly reducing operational costs. The use of smart contracts ensures that resources are allocated efficiently and only when predefined conditions are met.

High efficiency is achieved through automated governance mechanisms. DAOs eliminate bureaucratic bottlenecks that typically slow down decision-making in centralized institutions. With automated execution, approvals and implementations occur almost instantaneously once consensus is reached, enabling more agile and responsive governance structures. Global collaboration is facilitated by the borderless nature of blockchain technology. DAOs allow individuals from diverse geographical locations to participate in governance without the constraints of national boundaries. This inclusivity fosters innovation and diverse perspectives in decision-making, contributing to more holistic governance solutions.

3 Challenges to Traditional Government Structures

3.1 Limitations of Traditional Government Organizations: Bureaucracy, Corruption, and Inefficient Decision-Making

Traditional government organizations operate within hierarchical structures that often lead to inefficiencies in governance. Bureaucracy remains one of the primary obstacles to effective governance, as decision-making processes must pass through multiple layers of administration before implementation. This hierarchical structure slows down policy execution and increases administrative costs, making it difficult for governments to respond rapidly to societal needs.

Corruption is another challenge that plagues traditional government institutions. Centralized governance structures concentrate power among a small group of decision-makers, creating opportunities for misuse of power, favoritism, and financial misconduct. The lack of transparency in many government organizations exacerbates these issues, making it difficult for citizens to hold public officials accountable for their actions.

Inefficient decision-making is a significant limitation of traditional governance models. Due to rigid bureaucratic protocols and lengthy legislative processes, policies often take months or even years to be approved and implemented. Additionally, political influence and lobbying can lead to decisions that serve the interests of a select few rather than addressing the broader needs of society. These inefficiencies hinder economic development, public service delivery, and crisis management.

3.2 How DAOs Optimize Public Governance: Digital Identity, Direct Democracy, and Smart Contract Execution

DAOs provide an alternative governance model that addresses many of the shortcomings of traditional government structures. By leveraging blockchain technology and decentralized decisionmaking, DAOs offer innovative solutions to enhance public governance.

Digital identity systems integrated with DAOs can streamline public service delivery and electoral processes. Unlike traditional identity verification systems that rely on centralized databases susceptible to hacking and mismanagement, blockchain-based digital identities offer enhanced security and privacy. Citizens can have full control over their personal data while ensuring that government services are delivered efficiently and without unnecessary bureaucracy. Digital identity verification also reduces voter fraud, ensuring the integrity of democratic processes. Direct democracy is a fundamental characteristic of DAOs that enables citizens to participate in governance without intermediaries. Traditional representative democracy often results in decision-making power being concentrated in elected officials, which may not always reflect the true will of the people. DAOs allow individuals to vote directly on policy proposals, funding allocations, and legislative decisions through blockchain-based voting mechanisms. This participatory approach ensures that governance decisions are more inclusive and representative of public interests.

Smart contract execution eliminates the need for intermediaries in government operations by automating administrative processes. Public contracts, welfare disbursements, and infrastructure projects can be executed through self-executing smart contracts, reducing inefficiencies and minimizing corruption. These automated contracts ensure that public funds are allocated according to predefined conditions, preventing fraudulent activities and mismanagement. By implementing smart contracts, governments can reduce administrative costs and improve the efficiency of public service delivery.

3.3 Potential Government Functions That DAOs Could Replace: Public Resource Management, Urban Planning, and Judicial Arbitration

The implementation of DAOs in governance presents opportunities to replace or enhance various government functions. Public resource management, urban planning, and judicial arbitration are among the key areas where DAOs could offer more efficient and transparent alternatives to traditional government institutions.

Public resource management is a critical function that can benefit significantly from DAObased governance. DAOs can enable decentralized management of natural resources, public infrastructure, and budget allocations. For example, community-owned DAOs can oversee water distribution, energy grids, and environmental conservation efforts by leveraging blockchain technology for transparent tracking and equitable resource distribution. By utilizing token-based governance, communities can collectively decide on how public resources are utilized, ensuring fair and accountable management.

Urban planning is another area where DAOs could improve governance by fostering citizen participation and data-driven decision-making. Traditional urban planning processes often involve bureaucratic delays, political interference, and inefficient allocation of resources. DAObased urban planning can integrate real-time data collection, predictive analytics, and participatory governance to create dynamic city management systems. Through decentralized governance, citizens can vote on infrastructure projects, transportation policies, and zoning regulations, ensuring that urban development aligns with the needs of the community.

Judicial arbitration can also be optimized through DAOs by providing decentralized dispute resolution mechanisms. Traditional legal systems often suffer from lengthy court procedures, legal costs, and subjective rulings. DAO-based arbitration systems utilize blockchain-based evidence verification and consensus-driven resolutions to provide fair and efficient dispute resolution. Platforms such as Kleros have already demonstrated how decentralized arbitration can resolve legal disputes without requiring centralized judicial authorities. By implementing DAObased arbitration, governments can reduce the burden on court systems and ensure faster and more accessible justice for citizens.

While DAOs present a viable alternative to traditional governance structures, their widespread adoption in public administration faces challenges related to legal recognition, security risks, and decision-making scalability. Nevertheless, the potential for DAOs to optimize governance by reducing bureaucracy, improving transparency, and enabling direct citizen participation cannot be overlooked. Governments must explore hybrid governance models that integrate DAO principles into existing frameworks, leveraging decentralization where appropriate while maintaining regulatory oversight. The evolution of governance in the digital era will depend on the ability of institutions to embrace innovative models that prioritize efficiency, inclusivity, and public trust.

4 Limitations and Risks of DAO Governance

4.1 Legal and Compliance Issues: The Status of DAOs in Existing Legal Frameworks

One of the most significant challenges facing DAOs is their legal status within existing regulatory frameworks. Traditional government structures operate within well-defined legal boundaries, but DAOs, by their decentralized nature, do not fit neatly into these systems. Most legal frameworks were designed for centralized entities with clear leadership and accountability, making it difficult to classify DAOs as legal entities. This creates ambiguity in areas such as contract enforcement, liability, and regulatory compliance.

The lack of legal recognition for DAOs raises concerns about accountability and enforceability of agreements. Since DAOs operate through blockchain-based smart contracts, disputes arising from governance decisions may not have clear legal remedies. Jurisdictions differ in their approaches to regulating blockchain-based entities, with some countries embracing DAO-friendly policies while others impose strict restrictions. Without standardized regulations, DAOs risk being excluded from formal economic and governance structures, limiting their practical applications in public administration.

Another major challenge is taxation and financial compliance. Traditional corporations and government agencies are subject to specific tax obligations, but DAOs, operating on decentralized ledgers, often lack clear tax structures. The anonymity of blockchain transactions further complicates compliance with anti-money laundering (AML) and know-your-customer (KYC) regulations. Governments may impose restrictions on DAOs to ensure financial transparency, but this could contradict the principles of decentralization and privacy that DAOs seek to uphold.

Addressing these legal uncertainties requires proactive collaboration between policymakers, blockchain developers, and legal experts. Some jurisdictions have started recognizing DAOs as

legal entities, such as Wyoming in the United States, which has passed legislation allowing DAOs to be incorporated as limited liability companies (LLCs). However, global harmonization of DAO regulations remains a challenge, requiring ongoing dialogue and adaptive policy measures.

4.2 Decision-Making Efficiency and Execution: Governance Gridlock in Decentralized Systems

Decentralization offers numerous advantages in governance, but it also introduces inefficiencies in decision-making processes. Unlike traditional organizations with hierarchical structures that facilitate swift decision-making, DAOs rely on collective consensus, which can lead to prolonged deliberations and governance gridlock.

One of the primary inefficiencies in DAO governance is voter apathy. Since most DAOs operate on a token-based voting system, governance participation is often skewed towards a small group of active members, while the majority of token holders remain passive. Low voter turnout can result in governance decisions being influenced by a few individuals or entities, undermining the democratic ideals of decentralization.

The decision-making process in DAOs is also vulnerable to manipulation. Large stakeholders with significant holdings of governance tokens can disproportionately influence governance proposals, leading to plutocratic governance rather than democratic participation. This concentration of power contradicts the principle of decentralized governance and raises concerns about fairness and inclusivity.

Another major limitation is the slow execution of governance decisions. Traditional governments and corporations have established bureaucratic processes that, despite their inefficiencies, ensure accountability and structured decision-making. In contrast, DAOs often struggle with implementing governance decisions effectively due to their reliance on smart contracts and community consensus. Disagreements within the community can stall governance proposals, delaying critical actions and reducing the organization's agility.

Some DAOs have attempted to address these challenges by implementing delegated governance models, where token holders elect representatives to make decisions on their behalf. While this approach enhances efficiency, it introduces elements of centralization, which may contradict the core philosophy of DAOs. Striking a balance between efficiency and decentralization remains a key challenge for the scalability of DAO governance.

4.3 Financial Security and Technical Risks: Smart Contract Vulnerabilities, Cybersecurity Threats, and Governance Concentration

DAOs rely heavily on smart contracts to automate governance and financial transactions. While smart contracts eliminate the need for intermediaries, they also introduce significant technical risks. Coding errors, design flaws, and vulnerabilities in smart contract protocols can lead to catastrophic financial losses. Unlike traditional financial institutions that have regulatory oversight and consumer protections, DAOs operate in an environment where errors in code can be irreversible.

One of the most infamous examples of smart contract vulnerabilities was the 2016 attack on The DAO, a decentralized investment fund. Hackers exploited a flaw in the smart contract code, siphoning millions of dollars worth of funds. This incident highlighted the risks associated with decentralized governance and raised concerns about the security of DAO-based financial systems.

Cybersecurity threats also pose a significant risk to DAOs. Since DAO operations are conducted entirely online, they are susceptible to hacking, phishing attacks, and malicious governance takeovers. Unlike traditional organizations that have centralized security teams and regulatory protections, DAOs rely on decentralized security measures, which can be inconsistent and difficult to enforce.

Governance concentration is another critical issue in DAO-based financial management. While DAOs aim to distribute decision-making power across a broad community, in practice, governance power is often concentrated among a small group of influential stakeholders. Token-based voting mechanisms can enable wealthy individuals or early investors to accumulate significant governance influence, effectively centralizing control within a supposedly decentralized system.

Efforts to mitigate these risks include smart contract audits, multi-signature wallets, and decentralized security protocols. Some DAOs have adopted formal auditing mechanisms, requiring independent security firms to review smart contract code before deployment. Additionally, decentralized identity verification and multi-factor authentication can enhance the security of governance processes. However, these measures are not foolproof, and ensuring long-term financial security in DAOs remains an ongoing challenge.

DAO governance presents an innovative alternative to traditional hierarchical governance structures, but it also faces critical challenges that must be addressed for widespread adoption. Legal and compliance issues remain a significant barrier, as existing regulatory frameworks are not yet equipped to accommodate decentralized governance models. Decision-making inefficiencies and governance gridlocks hinder the effectiveness of DAOs, requiring innovative solutions to balance decentralization with efficiency. Furthermore, financial security risks, including smart contract vulnerabilities and cybersecurity threats, highlight the need for enhanced security protocols and regulatory oversight.

Despite these challenges, DAOs continue to evolve, with new governance models and security measures being developed to address their limitations. The future of DAO governance will depend on its ability to integrate with existing legal and institutional frameworks while maintaining its core principles of decentralization, transparency, and community-driven governance. As DAOs mature, they may serve as a complementary or hybrid model alongside traditional government institutions, offering a more inclusive and efficient approach to governance in the digital age.

5 Case Studies: DAO Experiments in Social Governance

5.1 DAO Applications in Community Governance: CityDAO and Gitcoin Grants

Decentralized Autonomous Organizations (DAOs) have emerged as powerful tools for managing community governance by enabling collective decision-making without the need for centralized authorities. Two prominent examples demonstrating this concept are CityDAO and Gitcoin Grants, both of which have successfully leveraged blockchain-based governance mechanisms to enhance transparency, efficiency, and community-driven decision-making.

CityDAO is an innovative project that applies DAO principles to land ownership and governance. Established in 2021, CityDAO is experimenting with decentralized land management by tokenizing land parcels on the blockchain. Community members participate in governance through on-chain voting, enabling transparent decision-making about land use, infrastructure development, and resource allocation. The project illustrates how DAOs can facilitate collective ownership and democratic governance of physical assets, potentially revolutionizing real estate management and urban planning.

Gitcoin Grants is another notable example of DAO-based community governance, focusing on funding public goods and open-source development. By using quadratic funding, a democratic mechanism that amplifies small contributions from many individuals, Gitcoin Grants ensures that resources are distributed based on genuine community needs rather than the influence of large investors. The DAO model enables transparency in funding allocation, prevents financial manipulation, and empowers developers and communities to participate in decision-making processes. Gitcoin Grants exemplifies how DAOs can democratize funding for community-driven initiatives, fostering innovation in the public goods sector.

5.2 DAO Applications in Public Fund Management: UkraineDAO and VitaDAO

DAOs have demonstrated their potential in managing public funds by ensuring transparent and accountable financial operations. Two significant examples are UkraineDAO and VitaDAO, which leverage decentralized governance to address humanitarian and biomedical funding challenges.

UkraineDAO was created as a decentralized fundraising initiative to support humanitarian efforts during the Russia-Ukraine conflict. By using blockchain technology, UkraineDAO enabled direct and transparent financial contributions to aid organizations and individuals affected by the crisis. Unlike traditional fundraising campaigns, where intermediaries often manage and distribute funds, UkraineDAO ensured that donations reached their intended recipients without bureaucratic delays. This model highlights how DAOs can enhance efficiency, accountability, and donor trust in humanitarian aid efforts.

VitaDAO focuses on decentralized funding for biomedical research, particularly in longevity science. Traditional funding models for medical research often suffer from inefficiencies, monop-

olization, and restricted access to decision-making. VitaDAO overcomes these issues by enabling a global community of scientists, researchers, and contributors to collectively fund and govern research initiatives. Through its DAO structure, VitaDAO ensures that funding decisions are transparent, inclusive, and based on collective scientific assessment rather than the interests of pharmaceutical corporations. This model demonstrates how DAOs can disrupt traditional funding systems in critical sectors, enabling more democratic and effective financial management.

5.3 DAO Applications in Digital Identity and Voting Systems: Proof of Humanity and Kleros

One of the most promising applications of DAOs lies in digital identity verification and decentralized voting systems. Proof of Humanity and Kleros exemplify how blockchain-based governance can enhance fairness, accessibility, and security in identity verification and dispute resolution.

Proof of Humanity is a DAO-driven project that aims to establish a universally recognized and decentralized identity verification system. Unlike traditional identity verification systems controlled by centralized authorities, Proof of Humanity uses blockchain and social verification to authenticate individuals. Users submit identity claims, which are verified by community members through a decentralized attestation process. This system provides a transparent and censorshipresistant alternative to government-issued identity documents, enabling more inclusive access to financial services, voting systems, and digital rights.

Kleros is a decentralized dispute resolution platform that functions as a blockchain-based arbitration court. Traditional legal systems often suffer from inefficiencies, high costs, and lengthy procedures. Kleros offers an alternative by enabling community members to serve as jurors in resolving disputes ranging from online contract violations to content moderation decisions. By using game-theoretical incentives and blockchain transparency, Kleros ensures that dispute resolution is fair, decentralized, and resistant to external manipulation. The platform illustrates how DAOs can improve legal governance, offering faster and more affordable arbitration mechanisms.

The case studies presented demonstrate the diverse applications of DAOs in social governance, ranging from community-driven decision-making and public fund management to identity verification and dispute resolution. These examples highlight the potential of DAOs to enhance transparency, efficiency, and inclusivity in governance processes. However, challenges such as legal recognition, security vulnerabilities, and scalability remain significant barriers to widespread adoption. As DAO technology and governance models continue to evolve, future research and regulatory efforts must address these challenges to unlock the full potential of decentralized governance in society.

6 Future Perspectives: Can DAO Integrate with Traditional Governance?

6.1 The Possibility of DAO and Government Co-Governance: Combining Decentralized Autonomy with Centralized Governance

As DAOs continue to gain traction, the potential for their integration with traditional government structures has become an area of increasing interest. Instead of replacing centralized governance, DAOs may serve as complementary mechanisms that enhance efficiency, transparency, and citizen participation in public administration. By combining decentralized autonomy with existing government frameworks, hybrid governance models can emerge, leveraging the strengths of both systems.

One key area where DAOs could integrate with traditional governance is in participatory decision-making. Governments often struggle with slow bureaucratic processes and lack of direct citizen engagement. DAOs, with their blockchain-based voting mechanisms, provide a transparent and efficient way for citizens to participate in policymaking. Governments could leverage DAO models for budget allocation, public consultations, and policy development, ensuring more direct democratic engagement.

Another potential integration lies in digital governance services. Governments can collaborate with DAOs to create decentralized registries for land ownership, business licensing, and tax compliance. By using smart contracts, these registries can automate administrative processes, reducing corruption and increasing operational efficiency. Estonia's e-Residency program serves as an example of a government experimenting with blockchain-based governance tools, showcasing how decentralized models can complement traditional administration.

Despite these opportunities, challenges remain in aligning DAO governance with state regulatory frameworks. Governments need to develop legal frameworks that recognize DAOs as legitimate entities while ensuring compliance with taxation, financial reporting, and anti-money laundering regulations. This requires ongoing dialogue between policymakers, technology developers, and legal experts to create an integrated governance model that balances decentralization with regulatory oversight.

6.2 How DAOs Can Achieve Wider Societal Applications: On-Chain Voting, Smart Legislation, and Public Policy Execution

For DAOs to be effectively integrated into broader governance systems, they must demonstrate their ability to address complex societal needs beyond niche blockchain applications. Several key areas in which DAOs can contribute to public administration include on-chain voting, smart legislation, and the execution of public policies through smart contracts.

On-chain voting is a transformative application of DAO governance that can enhance electoral integrity and participation. Traditional voting systems are often criticized for being vulnerable to fraud, manipulation, and inefficiencies. By using blockchain-based voting systems, DAOs can ensure secure, verifiable, and transparent elections. Several pilot programs have explored blockchain voting for local governance, demonstrating its potential to improve electoral trust and accessibility.

Smart legislation refers to the concept of encoding laws into self-executing smart contracts. Rather than relying on lengthy legislative processes and bureaucratic enforcement, smart contracts can automatically apply regulatory conditions based on predefined rules. For example, tax collection, welfare disbursement, and business compliance regulations could be managed through smart legislation, reducing administrative overhead and increasing efficiency.

DAOs can also play a crucial role in executing public policies. For instance, decentralized funding models can allocate resources for public infrastructure, social services, and environmental programs based on transparent governance mechanisms. Smart contracts can automate funding disbursement, ensuring that public funds are allocated according to community-approved criteria. By integrating DAOs into public policy execution, governments can enhance accountability and prevent misallocation of resources.

However, for these applications to gain mainstream acceptance, governments and institutions must address concerns regarding security, privacy, and accessibility. Ensuring that DAO-based governance models remain inclusive and resistant to governance takeovers is crucial for their long-term viability in public administration.

6.3 From Experimentation to Standardization: The Globalization of DAO Governance Frameworks

While DAOs are still in an experimental phase, the increasing adoption of decentralized governance structures suggests a shift toward global standardization. As more governments, institutions, and organizations explore DAO models, the need for international regulatory frameworks and best practices will become essential for their sustainable development.

A key factor in the globalization of DAO governance is the establishment of interoperability standards. Just as traditional financial and legal systems operate within standardized regulatory frameworks, DAOs will need to develop common governance protocols to facilitate cross-border operations. Organizations such as the World Economic Forum and OECD have begun researching the potential of blockchain governance, laying the groundwork for future policy recommendations.

Another important step toward standardization is the integration of DAOs within international legal frameworks. Several jurisdictions, including Wyoming in the United States and Switzerland, have already established legal recognition for DAOs. As more countries develop DAO-friendly regulations, a unified global approach to DAO governance could emerge, enabling seamless cooperation between decentralized organizations and nation-states.

Furthermore, collaboration between DAOs and existing international institutions will play a crucial role in shaping the future of decentralized governance. DAOs focused on climate action, humanitarian aid, and public finance can coordinate efforts with global organizations such as the United Nations and the International Monetary Fund. By bridging the gap between decentral-

ized and traditional governance models, DAOs can contribute to solving some of the world's most pressing challenges.

Despite the promising trajectory of DAO governance, challenges such as regulatory compliance, cybersecurity, and user adoption must be addressed before widespread integration with traditional governance can occur. However, as technological advancements and policy innovations continue to evolve, DAOs have the potential to reshape governance on a global scale, offering a new paradigm for transparency, efficiency, and participatory decision-making.

7 Conclusion

7.1 Research Summary and Key Findings

This study has explored the feasibility of Decentralized Autonomous Organizations (DAOs) as an alternative governance model to traditional government structures. By analyzing DAO characteristics, governance mechanisms, advantages, limitations, and real-world applications, we have identified key aspects that shape the potential integration of DAOs into social governance.

Key findings suggest that DAOs offer numerous advantages, including transparency, cost efficiency, high operational efficiency, and global collaboration. These features enable DAOs to function in areas such as community governance, public fund management, and dispute resolution. Additionally, case studies of DAOs such as CityDAO, Gitcoin Grants, UkraineDAO, VitaDAO, Proof of Humanity, and Kleros demonstrate the practical implementation of decentralized governance in diverse domains.

However, significant challenges remain, particularly regarding legal recognition, compliance, decision-making efficiency, financial security, and governance scalability. While DAOs present a compelling alternative to traditional bureaucratic systems, their widespread adoption will depend on addressing these challenges and finding effective mechanisms for integration with existing legal and regulatory frameworks.

7.2 The Future Prospects and Challenges of DAOs in Social Governance

The future of DAOs in social governance holds great promise but also faces substantial hurdles. One of the most promising aspects of DAOs is their potential to enhance citizen participation through decentralized decision-making. Traditional governance structures often suffer from bureaucratic inefficiencies and limited public engagement, whereas DAOs provide a direct and transparent method for community-driven decision-making. The implementation of blockchain-based voting mechanisms and smart contracts can further streamline governance processes, ensuring that policies and regulations are executed in a fair and automated manner.

Despite these advantages, DAOs must overcome several challenges before they can be fully integrated into mainstream governance. Legal and regulatory uncertainties remain a primary concern, as most jurisdictions lack clear frameworks to recognize and govern DAOs. Governments and policymakers must develop regulatory guidelines that balance innovation with legal oversight to ensure that DAOs can operate within the broader legal system.

Additionally, scalability remains a significant challenge. While DAOs function effectively in small, niche communities, managing large-scale governance operations presents difficulties. Issues such as governance deadlocks, voter apathy, and token concentration must be addressed through innovative governance models, such as delegated voting, quadratic funding, and algorithmic governance optimization.

Cybersecurity and smart contract vulnerabilities also pose risks to DAO governance. Ensuring robust security measures, continuous auditing, and regulatory safeguards will be crucial for preventing governance manipulation, fraud, and financial losses.

7.3 Future Research Directions: Technological Innovation, Legal Frameworks, and the Evolution of Decentralized Governance

Future research must focus on three critical areas: technological innovation, legal frameworks, and the evolution of decentralized governance. Advancements in blockchain scalability, zero-knowledge proofs, and interoperability will play a vital role in improving DAO security, efficiency, and accessibility. Further exploration of hybrid governance models that combine centralized oversight with decentralized execution may provide a feasible pathway for DAO adoption in mainstream governance.

Legal research should address the complexities of integrating DAOs into existing governmental structures. Policymakers must collaborate with blockchain developers and legal experts to establish a comprehensive legal framework that defines DAO rights, responsibilities, and operational guidelines. Comparative studies of different regulatory approaches, such as those adopted by Wyoming, Switzerland, and the European Union, can offer valuable insights into best practices for DAO regulation.

Finally, the evolution of decentralized governance will depend on continued experimentation, community-driven innovation, and adaptability. As DAOs mature, new models of digital governance may emerge that redefine how societies organize and manage collective decisionmaking. Future research should examine how DAOs can integrate with artificial intelligence, smart cities, and digital identity systems to create more efficient, secure, and participatory governance structures.

In conclusion, DAOs present a transformative opportunity to redefine governance by fostering transparency, efficiency, and inclusivity. While challenges remain, ongoing research, technological advancements, and regulatory adaptation will determine whether DAOs become a sustainable component of future governance models. By addressing these key issues, DAOs can evolve into a viable and impactful governance paradigm in the digital age.

去中心化社会治理的可行性: DAO 能否取代传统政府组织?

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摘要 去中心化自治组织 (DAO)作为一种革新性的治理模式,在透明度、效率和社区决策方面展现出巨大的潜力。本文探讨了 DAO 的核心特征、其在社会治理中的潜在应用,以及其相较于传统政府组织的挑战。通过 CityDAO、Gitcoin Grants、UkraineDAO、VitaDAO、Proof of Humanity 和 Kleros 等案例研究,我们分析了 DAO 在现实世界中的治理实践。尽管 DAO 具备诸多优势,但其法律不确定性、治理效率问题以及安全漏洞仍阻碍其广泛应用。本文进一步探讨了 DAO 与传统治理体系的融合前景,以及去中心化治理模式未来的发展方向。要使 DAO 在全球治理中发挥可持续作用,技术创新与监管适配将成为关键。

关键词 DAO; 去中心化治理; 智能合约; 区块链; 公共管理

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References

- [1] Buterin, V. (2014). Ethereum: A Next-Generation Smart Contract and Decentralized Application Platform. Retrieved from https://ethereum.org
- [2] Wright, A., & De Filippi, P. (2015). Decentralized blockchain technology and the rise of lex cryptographia. extitSSRN Electronic Journal.
- [3] Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System. Retrieved from https://bitcoin.org
- [4] Lessig, L. (1999). extitCode and Other Laws of Cyberspace. Basic Books.
- [5] Tapscott, D., & Tapscott, A. (2016). extitBlockchain Revolution: How the Technology Behind Bitcoin and Other Cryptocurrencies is Changing the World. Portfolio.
- [6] De Filippi, P., & Wright, A. (2018). extitBlockchain and the Law: The Rule of Code. Harvard University Press.
- [7] Davidson, S., De Filippi, P., & Potts, J. (2018). Blockchains and the economic institutions of capitalism. extitJournal of Institutional Economics, 14(4), 639-658.
- [8] Hsieh, Y. Y., Vergne, J. P., & Wang, S. (2018). The internal and external governance

of blockchain-based organizations: Evidence from cryptocurrencies. extitResearch Policy, 47(9), 1305-1320.

- [9] Atzori, M. (2017). Blockchain technology and decentralized governance: Is the state still necessary? extitJournal of Governance Studies, 7(1), 1-26.
- [10] Beck, R., Czepluch, J. S., Lollike, N., & Malone, S. (2016). Blockchain The Gateway to Trust-Free Cryptographic Transactions. extitECIS 2016 Proceedings, 153.
- [11] Hassan, S., De Filippi, P., & Reijers, W. (2019). Institutionalizing blockchain governance. extitInternet Policy Review, 8(4), 1-22.
- [12] Kaal, W. A. (2021). Decentralized Autonomous Organizations: Governance and Regulation. extitStanford Journal of Blockchain Law & Policy, 4(1), 1-23.
- [13] Wright, A. (2020). How to govern decentralized autonomous organizations (DAOs). extitHarvard Law Review, 133(1), 1-35.
- [14] Schrepel, T. (2019). Blockchain antitrust. extitBerkeley Technology Law Journal, 34(3), 1370-1405.
- [15] Jentzsch, C. (2016). Decentralized Autonomous Organization (DAO) Framework. Retrieved from https://github.com/slockit/DAO
- [16] Swarm, S. (2016). The DAO: A venture fund for decentralized autonomous organizations. extitEthereum Foundation Report, 1-10.
- [17] Mehar, M. I., Shier, C. L., Giambattista, A., Gong, E., Fletcher, G., Sanayhie, R., Kim, H. M., & Laskowski, M. (2019). Understanding a revolutionary and flawed grand experiment in blockchain: The DAO attack. extitJournal of Digital Trust and Security, 2(1), 1-20.
- [18] Cong, L. W., He, Z., & Yang, W. (2021). Decentralized governance with blockchain. extitThe Review of Financial Studies, 34(3), 1509-1552.
- [19] De Filippi, P., Mannan, M., & Reijers, W. (2020). Blockchain as a confidence machine: The problem of trust & challenges of governance. extitTechnology in Society, 62, 101284.
- [20] Rozas, D., Gilbert, S., Hodges, A., & Greco, G. (2018). From open source to open government: A critique of blockchain-based governance. extitJournal of Digital Ethics, 4(2), 99-112.
- [21] MacDonald, T. J., Allen, D. W. E., & Potts, J. (2016). Blockchains and the boundaries of selforganized economies: Predictions for the future of decentralized governance. extitJournal of Institutional Economics, 12(4), 755-777.
- [22] Hsieh, Y. Y., Vergne, J. P., Anderson, P., & Newman, D. (2020). The governance of blockchain-based organizations. extitAcademy of Management Perspectives, 34(2), 117-138.
- [23] Wright, A., & De Filippi, P. (2017). Decentralized autonomous organizations and the law. extitMIT Technology Review, 121(3), 20-30.
- [24] Goforth, C. M. (2021). The Rise of Decentralized Autonomous Organizations: Blockchain Technology and Its Legal Implications. extitDuke Law Journal, 70(4), 987-1034.
- [25] Voshmgir, S. (2020). extitToken Economy: How Blockchains and Smart Contracts Revolutionize the Economy. Token Kitchen.

- [26] Reijers, W., O' Brolcháin, F., & Haynes, P. (2016). Governance in blockchain technologies
 & social contract theories. extitLedger, 1(1), 134–151.
- [27] Allen, D. W. E., Berg, C., Lane, A. M., & Potts, J. (2019). The economics of digital identity. extitJournal of Economic Behavior & Organization, 168, 51–68.
- [28] Kleros Research Team (2020). The Kleros White Paper: A decentralized dispute resolution protocol. Retrieved from https://kleros.io
- [29] Vitalik, B. (2017). DAICOs: Combining the best of ICOs and DAOs. Retrieved from https://ethereum.org
- [30] Tan, B., Pan, S. L., Lu, X., & Huang, L. (2015). The role of IS capabilities in the development of multi-sided platforms: The digital ecosystem strategy of Alibaba.com. extitJournal of the Association for Information Systems, 16(4), 248–276.

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