Potentials of decentralized autonomous organizations: A conceptual model to address agency conflicts in traditional corporations

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Abstract

Decentralized Autonomous Organizations (DAOs) offer a novel approach to Corporate Governance that can reduce agency conflicts while improving transparency, accountability, and efficiency. This study explores DAO characteristics like decentralization, transparency, and consensus-based decision-making and their capacity to address agency conflicts. It highlights DAOs' potential to transform Corporate Governance by aligning stakeholder interests, curbing opportunistic behavior, and automating rule enforcement. The authors of this research developed and evaluated a conceptual model for designing DAO governance systems mitigating agency conflicts, structured into four tiers: Key Characteristics, Governance Dimensions, Indicators, and Agency Conflicts. The model additionally includes Advantages, Best Practices, and Design Options for a comprehensive view of DAOs. The model's practicality and usability are enhanced by quantifiable indicators to gauge governance effectiveness. It serves as a valuable guide for organizations adopting new governance approaches and advancing Corporate Governance in the age of decentralization.

Keywords

Decentralized Autonomous Organization (DAO), Agency Conflicts, Corporate Governance

1. Introduction

Blockchain technology empowers Decentralized Autonomous Organizations (DAOs) which drive a new era in Corporate Governance. These innovative organizations potentially solve longstanding agency conflicts by promoting greater transparency, accountability, and efficiency. This research explored the potential of DAOs to enhance Corporate Governance and developed a conceptual model for companies aiming to decentralize their governance structures and mitigate agency conflicts. As a result, a comprehensive model for organizations considering a transition to decentralized governance, outlining principles and strategies for designing a DAO to mitigate agency conflicts was created.

1.1. Relevance

Agency conflicts can reduce the effectiveness of Corporate Governance by leading to suboptimal decisions and decreased shareholder value [22]. Addressing such conflicts requires enhanced reporting standards, performance evaluations, and internal controls [24]. However, opinions on achieving effective Corporate Governance vary, and many reforms overlook the transition from hierarchical to decentralized structures [8]. Blockchain, which gained recognition for its transformative potential across industries [30] presents a potential solution to agency conflicts in Corporate Governance [17].

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1.2. Research gap

Due to the novelty of DAOs, there is no consensus on their inclusion and design for good corporate governance [10, 17, 35]. Research on DAO governance [12, 26] and their potential to enhance governance practices [13, 35] is growing. However, there is limited literature on how DAOs can address for example agency conflicts [17, 29, 31]. Existing guidelines and models [13, 26, 35] lack strategies and principles for mitigating agency conflicts in DAO governance. Studies like [27] and [26] have explored blockchain system governance but have not extended their focus to corporate governance via DAOs. Similarly, Wang in [35] and Jayasuriya and Sims in [13] discuss DAO benefits for corporate governance but do not offer actionable strategies for resolving agency conflicts.

Hence, there is a need for practical guidance on implementing DAOs to address agency conflicts in corporate governance. This gap hinders effective DAO implementation in corporate settings. Multiple authors [20, 21, 27] encourage research on DAO implications and potential. Related areas like power distribution, decision-making processes, and governance principles in DAO communities [19, 20, 28] also highlight the need for studies on DAO applications in a corporate context.

1.3. Research method

This research is methodically aligned with the Design Science Research (DSR) approach [11]. The initial **awareness** phase involved identifying the research gap/problem through a literature review and an expert interview. The literature review focused on governance elements of DAOs and their potential benefits, particularly in addressing agency conflicts. Informed by literature and expert insights, the **suggestion** phase established the requirements for a DAO governance model, structured into three steps: 1) analyzing key DAO characteristics and governance concepts, 2) formulating solution requirements and 3) discussing potential solution designs resulting in a blueprint for the conceptual model. **Development and evaluation** phases were combined, involving the creation and iterative refinement of a four-tier conceptual model. This model underwent three evaluation iterations with experts in DAO governance leading to enhancements, ensuring the model's applicability and effectiveness.

2. Literature results

2.1. Overview of Agency Theory impacting corporate governance

Agency Theory, originating from [6] and later developed by Jensen and Meckling in [14], explores the conflicts between principals (e.g., shareholders) and agents (e.g., board of directors). These conflicts, known as the principal-agent problem, arise due to misaligned interests and informational asymmetries. Key concepts include agency costs, opportunism, knowledge asymmetries, bounded rationality, and risk aversion. These conflicts occur when the interests of the principal and agent are misaligned, and the agent pursues their own interests instead of those of the principal [5, 7, 14].

Corporate Governance, as defined in [3], involves balancing stakeholder interests through rules, procedures, and accountability mechanisms. It aims to align organizational objectives with stakeholder expectations, including transparency and ethical conduct. Agency Theory significantly influences Corporate Governance by providing a framework to understand conflicts and align interests [5]. It is commonly applied to relationships between shareholders and the board of directors [1, 2] but can extend to other delegative relationships within an organization [5].

Despite existing **Corporate Governance practices**, which include e.g., Board Structures, Executive Compensation, Transparency and Disclosure, Shareholder Rights, Audit Procedures and Risk Management [4, 24, 25], debates persist about their efficacy in addressing agency conflicts, especially in dynamic business environments [17, 32]. To enrich the spectre of possibilities to identify and mitigate agency conflicts and to improve governance practices in general, emerging technologies like blockchain-based DAOs or Artificial Intelligence are being explored [9].

2.2. Overview of decentralized autonomous organizations

DAOs are entities that operate without centralized control, governed by smart contracts and consensus among its members. Hassan and Filippi in [10] reviewed a range of literature sources to identify the **core characteristics** of a DAO. They subsequently defined DAO as "a blockchain-based system that enables people to coordinate and govern themselves mediated by a set of self-executing rules deployed on a public blockchain, and whose governance is decentralized (i.e., independent from central control)" [10].

Honkanen et al. in [12] conducted a study on the potential of DAOs to improve Corporate Governance practices, which aligns with the focus of this research. They concluded that specific components are essential to preserve, update and upgrade decentralized ecosystems. The **governance methods** identified are outlined in Table 1.

Table 1

Example
The number of tokens a token holder has determines the share of
voting power.
A predetermined set of rules for handling conflicts concerning rights and responsibilities.
A reputation-based system with incentives and penalties for stakeholders to act in a desirable way.
Users can receive influence in relation to their level of participation as defined by a smart contract.
For some consensus models block miners and transaction validators
have an important governance role, although they do not participate
in other activities. Miners can also advance or prevent development
or changes in the ecosystem through pooling.
Ecosystems can sanction stakeholders based on constitutional rules or ledger-based activity; sanctions can be connected to governance, e.g., that the right to vote can be suspended.
Suffrage is an essential part of governance. Voting is a repertoire of various mechanisms and offers new avenues to achieve consensus while sustaining the blockchain ecosystem.
Ecosystems can define a procedure for handling improvement proposals and stakeholder involvement.
The ability to fork is often seen as a fundamental governance process. Forking can be used for indicating both agreement and dissent.

Methods of decentralized governance

Other literature sources also acknowledge the above outlined decentralized governance methods [15, 17, 26, 28, 35]. Although the characteristics and methods identified in the literature reflect the core idea of DAOs, the implementation can differ. As a more flexible approach to autonomy and decentralization may be required in the corporate context, different types of DAOs with more or less decentralized and autonomous features are likely to emerge [23, 34].

2.3. Advantages of DAOs for corporate governance

Research indicates that DAOs offer several advantages over traditional corporation structures, such as eliminating intermediaries, enhancing transparency, and reducing agency costs [18, 20, 31]. DAOs allow the utilization of automated governance mechanisms and direct stakeholder participation in

decision-making processes. This decentralization addresses the lack of trust and agency problems often found in hierarchical structured organizations [29].

The flexibility of DAOs extends to governance structures. Unlike traditional organizations, which often have long-term commitments and hierarchical decision-making, DAOs emphasize democratic, consensus-based governance [18, 35]. This approach allows for greater agility, less bureaucracy, and broader engagement [35] (Wright 2021). In [17] Kaal even suggests that DAOs can dynamically allocate power to members based on their expertise, making the organization more efficient. Through sharing information and collaborative decision-making DAOs leverage the organization's collective intelligence [18].

Still, the adoption of DAOs can be a challenge. While traditional Corporate Governance models are well established, DAOs require new governance approaches, which will be critical for the organization's long-term viability [18]. In [17] Kaal also stated that it has not yet been seen how effective DAOs will be in solving agency issues, but they offer a viable solution that should be further investigated. Literature review showed that the decentralized and transparent nature of DAOs has following **advantages**:

- Better decisions through inclusion and collective intelligence.
- Increased transparency, trust, and accountability.
- Increased participation and engagement.
- Better alignment of interests.
- More design space to create a customized governance model.
- Increased innovation and flexibility.
- Increased efficiency and reliability through automation.

Building upon the literature, a solution for addressing the issue of agency conflicts in corporations through DAOs is suggested in the upcoming section.

3. Research process

3.1. Conceptual model background and suggestion

To effectively support the creation of successful DAO governance systems, a conceptual model was suggested. The objectives of the model are:

- To provide practical recommendations for organizations wishing to decentralize their governance structures and implement DAO governance practices.
- To consider the distinct characteristics of DAOs that may mitigate agency conflicts and to give practical advice regarding their influence on agency conflicts.
- To provide a flexible and adaptable structure to accommodate future modifications and advancements in DAO governance since the area is still advancing.
- To offer a theoretical and practical foundation for assessing how DAOs might address agency conflicts.
- To create knowledge and insights regarding the influence of DAOs on agency conflicts, enhancing the overall understanding of the subject.

The conceptual model is divided into four tiers, referring to the literature (Section 2):

1. **Key Characteristics of DAOs**: This tier focuses on the unique features of DAOs like decentralization and automation.

- 2. **Governance Dimensions**: This tier delves into the governance aspects, offering a framework for evaluating how DAOs can mitigate agency conflicts.
- 3. **Potential Advantages**: This tier outlines the benefits that DAOs offer, such as reduced information asymmetry and minimized conflicts of interest.
- 4. **Governance Best Practices**: The final tier provides a set of best practices that organizations should consider for effective DAO governance.

Each tier is interconnected, offering a holistic view of how DAOs can be leveraged towards agency conflicts. On Figure 1 each rectangle represents a single tier, and arrows are entitled to show how exactly each tier relates to the other.



Figure 1: Relations of the suggested four tiers

3.2. Conceptual model development and evaluation

The model's first prototype – elaborated in the upcoming paragraphs – was evaluated and refined through three iterations of in-depth expert interviews.

3.2.1. Prototype

3.2.1.1. Tier 1: Key characteristics of DAOs

First, based on the findings from Section 2.2, Key Characteristics that define DAOs and their influence on governance were determined. These characteristics include:

- **Decentralization**: DAOs eliminate centralized control, leading to considerations about organizational structure and stakeholder representation.
- **Token-based incentives**: DAOs use tokens to align stakeholders' interests, impacting incentive systems.
- **Transparency**: DAOs prioritize open access to information, leading to transparency mechanisms.
- Utilization of Blockchain Technology: Blockchain ensures data integrity, giving rise to security and immutability considerations.
- Automation: Smart contracts minimize human intervention, necessitating automation and enforcement mechanisms.
- **Consensus-based decision-making**: DAOs use consensus for decision-making, ensuring stakeholders have a voice and support the results of decisions.

3.2.1.2. Tier 2: Governance dimensions

Second, based on the analysis of key characteristics and according to findings from Section 2.3, Governance Dimensions associated with the identified key characteristics were described:

- **Organizational Structure**: Decentralization can reduce conflicts by distributing decisionmaking authority.
- **Stakeholder Representation**: DAOs ensure inclusive representation, reducing knowledge asymmetries and opportunistic behavior.
- **Incentive Systems**: DAOs can incorporate various mechanisms to incentivize stakeholders and align their interests.

- **Transparency Mechanisms**: Recording transactions on a blockchain enhances transparency, reducing knowledge asymmetries.
- **Security and Immutability**: Blockchain's security and immutability deter opportunistic behavior.
- Automation and Enforcement Mechanisms: Smart contracts enforce agreements, reducing conflicts.
- **Decision-making Systems**: Consensus-based decisions align with organizational objectives and reduce conflicts.

3.2.1.3. Tier 3: Advantages

Third, this tier links the governance dimensions to potential advantages of DAOs identified in the literature review (Section 2.3). These advantages include:

- **Better decisions through inclusion and collective intelligence**: Inclusive decisionmaking results in improved decisions with reduced bias.
- **Increased innovation and flexibility**: Various perspectives and ideas foster innovation and agility.
- **Increased transparency, trust, and accountability**: Transparency mechanisms and blockchain enhance trust and accountability.
- **Increased participation and engagement**: Incentive systems and inclusive decisionmaking encourage active stakeholder engagement.
- **Better alignment of interests**: Decentralization, stakeholder representation, and incentives lead to a more democratic and transparent governance structure.
- More design space to create a customized governance model: Different governance mechanisms allow for customization.
- **Increased efficiency and reliability**: Smart contracts automate governance activities, improving efficiency and reliability.

3.2.1.4. Tier 4: Governance best practices

The final tier outlines governance best practices for organizations to mitigate agency conflicts in DAOs. The theoretical analysis of these best practices is based on the literature review on agency theory and Corporate Governance (Section 2.1) and DAOs (Section 2.2). These practices include:

- Aligning Interests of Stakeholders: Well-designed collaboration and incentive systems align stakeholders with the organization's success.
- **Ensuring Accountability and Oversight**: Promoting transparency and information disclosure holds stakeholders accountable.
- **Promoting Transparency and Knowledge Sharing**: Open sharing of information reduces knowledge asymmetries and opportunistic behavior.
- **Establishing Adaptive Governance Mechanisms and Feedback Loops**: Agile decisionmaking processes respond to environmental changes and enhance resilience.
- **Tailoring Governance Processes to the Needs of the Organization**: Customization improves decision-making and reduces conflicts.

Figure 2 presents the prototype of the conceptual model, capturing relations between key characteristics, governance dimensions, potential advantages, and governance best practices. The justification of relations between parts of each tier can be found in Appendix 1 available at https://drive.switch.ch/index.php/s/Ay4FVNVk7zirXbh



Figure 2: Prototype of the Conceptual Model

3.2.2. First evaluation

The initial prototype of the conceptual model is evaluated and improved based on insights from an expert interview with Eliott Teissonniere, a prominent DAO and blockchain expert (co-founder of Nodle, BitNation and Governance Research Institute, Forbes Technology Council Official Member). Based on the learnings from the interview, following changes were made:

- **Change 1.1**: Tier 3 "Advantages" was replaced with "Design Options" to make the model more measurable and practical.
- **Change 1.2**: Tier 4 "Governance Best Practices" was replaced with "Agency Conflicts" to directly address actual agency conflicts the model aims to solve.
- **Change 1.3**: The "Incentive Systems" governance dimension was removed and combined with key characteristics like transparency and automation.
- **Change 1.4**: "Transparency Mechanisms" was renamed to "Transparent Record-Keeping Systems" to reflect a broader interpretation of transparency.

- **Change 1.5**: "Security and Immutability" was combined with "Transparent Record-Keeping Systems" to better align with real-world DAO operations.
- **Change 1.6**: "Token-based Incentives" was combined with "Transparency" and "Automation" to highlight their unique role.
- **Change 1.7**: "Utilization of Blockchain Technology" was combined with "Transparency" to emphasize the role of blockchain in enabling transparency.

3.2.3. Second evaluation

The conceptual model underwent a second evaluation, with significant refinements made based on insights from a follow-up interview with Teissonniere:

- **Change 2.1:** Shifted from Tier 3 "Design Options" to "Indicators" for a more measurable and practical approach to evaluating governance dimensions.
- **Change 2.2 & 2.3:** Merged "Organizational Structure" and "Stakeholder Representation" into a new dimension, "Decentralization and Stakeholder Inclusiveness" to encapsulate an organization's structure's significant impact on stakeholder engagement.
- **Change 2.4 & 2.5:** Renamed key characteristics "Transparency" to "Transparency through Blockchain Technology" and "Automation" to "Autonomy and Automation through Smart Contracts" to emphasize the role of blockchain technology and smart contracts in enabling transparency and autonomy in DAOs, which are key elements for addressing agency conflicts.

While "Design Options" have been replaced with "Indicators" within the model, the concept of design options remains relevant and may be included in the model's description, offering a comprehensive understanding of the possible variations within each governance dimension.

3.2.4. Third evaluation

Following the second iteration, the model underwent additional modifications proposed by Teissonniere. This updated version was revisited in a subsequent dialogue with Stephan Klaus, participant in various DAOs that range from ones investing in art to larger entities like Uniswap. After the third interview, the model remained intact, and Stephan Klaus endorsed the model's comprehensive nature and practicality, particularly underscoring its usefulness in demonstrating the effects on agency conflicts. At the same time, Stephan Klaus acknowledged challenges in DAO adoption, such as declining participation, voter apathy, technical complexity, legal issues, and accountability deficits. The expert recommended strategies such as incentivization, user-friendly interfaces, clear governance structures, and reputation systems to address these challenges; in addition, there was an advice to start the transition to a DAO with a small, well-defined unit within an organization.

4. Result: Final conceptual model

The final model contains the key findings of the research and represents a comprehensive framework to explore the potential of DAOs in addressing agency conflicts. While specific elements were excluded from the visual representation, they remain pivotal and are described at the end of this section. Figure 3 illustrates the final conceptual model, and following paragraphs provide a comprehensive understanding of its components:



Figure 3: Final conceptual model

4.1. Tier 1: Key characteristics of DAO

The base of the model consists of four fundamental characteristics that form the foundation of DAOs:

- **Decentralization**: Decentralized systems distribute authority and decision-making across the organization.
- **Transparency through Blockchain Technology**: Leveraging blockchain technology, DAOs can create a secure and transparent environment, ensuring open and verifiable transactions.
- **Consensus-based Decision-making**: DAOs use consensus mechanisms to involve all stakeholders in decision-making, thereby promoting fairness and inclusivity.
- Autonomy and Automation through Smart Contracts: DAOs use smart contracts to enable automation and autonomous operation, which can enhance efficiency and reduce the scope for opportunistic behavior.

4.2. Tier 2: Governance Dimensions

The four key characteristics manifest in the Governance Dimensions, which are the primary structural components of DAOs:

- **Decentralization and Stakeholder Inclusiveness**: This dimension reflects the level of decentralization within the DAO and the extent to which diverse stakeholders are included in decision-making.
- **Transparent Record-Keeping Systems**: This dimension concerns how transparent, verifiable, secure, and immutable record-keeping practices are established.
- Automation and Enforcement Mechanisms: This dimension captures the degree of automation in enforcing rules and facilitating transactions supported by smart contracts.
- **Decision-Making Systems**: This dimension focuses on the methods to reach a stakeholder consensus.

4.3. Tier 3: Indicators

Indicators are essential for assessing governance dimensions' effectiveness in mitigating agency conflicts. These quantifiable metrics enhance the model's practicality, with higher values indicating greater conflict mitigation. However, organizations may customize these indicators to suit their unique needs. The key indicators are:

- **Percentage of stakeholders with decision-making authority**: Reflects decentralization in decision-making, potentially reducing conflicts.
- **Percentage of stakeholders that can access records**: Measures transparency, enhancing accountability.
- **Percentage of automated governance processes**: Quantifies automation, improving efficiency and reducing errors.
- **Percentage of stakeholders with equal voting power**: Evaluates equitable power distribution, reducing conflicts and fostering democratic decisions.

4.4. Tier 4: Agency conflicts

The final tier of the model directly addresses three fundamental agency conflicts that DAOs can potentially mitigate: Conflict of Interest, Knowledge Asymmetries, and Opportunism. The integration of this tier ties the model's components back to its primary objective – addressing agency conflicts using DAOs.

4.5. Summary

In summary, the final model provides a comprehensive view of DAOs in addressing agency conflicts and includes necessary context by including advantages, best practices, and design options, fostering a holistic understanding of DAOs.

5. Discussion and conclusions

5.1. Results discussion

The conceptual model was developed with specific objectives outlined in Section 3.1. Evaluating the model against these objectives helps underline its effectiveness and practical relevance. One of the primary objectives was *to provide practical recommendations for organizations wishing to decentralize their governance structures*. The model accomplishes this through measurable indicators that can serve as guidelines for effectively implementing the governance dimensions.

Another goal was to consider the distinct characteristics of DAOs that could mitigate agency conflicts and to give practical advice regarding their influence on agency conflicts. The expert interviews supported the validation of identified characteristics, and their incorporation into the model, reinforcing their influence on agency conflicts.

The conceptual model also provides a flexible and adaptable structure to accommodate future advancements in DAO governance. The introduction of quantifiable indicators, based on the insights of the interviews, enhances the model's flexibility and adaptability, allowing it to evolve with advancements in the field.

In terms of *providing a theoretical and practical foundation for assessing the potential of DAOs to address agency conflicts*, the model successfully bridges the gap between theory and practice. It provides a theoretical understanding of DAOs, their governance dimensions, and related agency conflicts while offering practical, measurable indicators for assessment.

Lastly, the conceptual model meets the objective of *creating knowledge and insights regarding the influence of DAOs on agency conflicts and enhances the overall understanding of the subject.* Drawing upon an in-depth literature review and various expert interviews, the model offers a rich source of insights into how DAOs work, what advantages they provide, and how they can potentially mitigate agency conflicts.

5.2. Limitations and future research directions

Given the innovative and evolving nature of DAOs, the research relied on a theoretical exploration of the impact of DAOs on Corporate Governance and an empirical investigation through expert interviews. While this approach has provided a comprehensive understanding of how the governance mechanisms of DAOs work and how they could mitigate agency conflicts, it lacks empirical validation within corporations. This means that the predictions about the effectiveness of DAOs in mitigating agency conflicts are hypothetical and subject to real-world testing and validation, which can be a topic for future research. In addition, comparative studies examining the degree of agency conflicts within corporations that have implemented DAOs versus traditional corporations could provide empirical evidence of the potential benefits and challenges of DAOs within a corporate setting.

5.3. Implications for practice

The research offers actionable insights for corporations transitioning to decentralized governance structures. The conceptual model provides a practical approach to analyze and implement DAO governance practices for reducing agency conflicts. It is adaptable for various stages of Corporate Governance planning, from considering DAO adoption to conflict mitigation strategies. The model offers a structured framework to understand DAO advantages, assess governance dimensions, and design effective solutions for agency conflicts. These insights contribute to understanding DAOs' applications in the corporate sector amid evolving blockchain technology and decentralized governance. Despite challenges, embracing DAOs can yield substantial benefits for businesses, supported by this valuable model.

5.4. Conclusion and outlook

The research examined agency theory's influence on Corporate Governance and identified common governance elements in DAOs. It revealed the presence of agency conflicts in centralized corporations and highlighted DAOs' decentralization, transparency, and automation as potential solutions of mitigating agency conflicts. DAOs can also help with this task through consensus mechanisms, transparency, and automation, fostering democratic governance. Challenges like voter apathy and accountability deficits were acknowledged, with proposed solutions. The research presented a conceptual model to design DAO governance systems for mitigating agency conflicts and enhance efficiency, stakeholder relations, and overall governance. Understanding and adopting DAOs will benefit corporations as the legal and regulatory landscape evolves.

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