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Can DAOs Innovate Governance beyond Hierarchies?

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Abstract
Decentralised autonomous organisations (DAOs) represent a novel organisational form made possible by blockchain technology. This article summarises a research project that sets out to establish an intellectually coherent, consistent, and academically robust theoretical framework that locates DAOs within a theory of organisation. I examine the unique characteristics of DAOs, focusing on their ability to facilitate coordination and cooperation without traditional hierarchical structures. By leveraging market-like mechanisms and token-based governance, DAOs aim to reduce agency costs and promote inclusive decision-making. The efficacy of these mechanisms, however, in achieving effective governance remains an empirical question. This research provides a theoretical framework to understand DAOs within the context of organisational theory, offering insights for researchers, practitioners, and policymakers on the potential and challenges of this emerging form of organisation.
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JEL Classifications: *D23, D71, D86, L22, L86*

1. Introduction

In May, I was honoured to be inducted as a Fellow of the British Blockchain Association at a ceremony held in Singapore. This article is a longer form exposition of the presentation I gave in Singapore and summarises a research programme that I have pursued over the past three years that examines the economic function and purpose of decentralised autonomous organisations (DAOs) [1–3]. This research programme has been partly financed by a research grant generously provided by the Ethereum Foundation.

There is a large emerging literature that examines DAOs as novel institutional forms and the governance of those forms. See, for example, [4–10] and [11] for recent literature and the governance of DAOs. I commend this literature to the reader. In this article, I focus on the contribution I am making to our understanding of DAOs.

DAOs are organisational forms that have become possible following the advent of blockchain technology. They appear to be the native digital analogue to real-world organisational forms. This immediately raises the question as to whether they are a new and unique organisational form, or whether they are simply 'organisations on the internet'? This is not a matter of mere semantics. If DAOs are novel organisational forms, then we know much less about them than we think we do. If, however, they are a variation on a theme – now 'just' organisations on the internet – then we might know much about them.

The extent to which DAOs are indeed novel is important – we are beginning to see empirical research into DAOs (for example [12]), but if we do not have a clear theoretical understanding of DAOs, it may be the case that the empirical questions that we ask are not as informative as we might otherwise expect.

In my research, I have been attempting to isolate those features of DAOs that make them novel and the organisational challenges that they must resolve that make them viable.

In summary, to be novel organisational forms, DAOs must facilitate coordination (as markets do) and facilitate cooperation (as organisations do) while suppressing agency costs. If DAOs are able to do so, then they can provide 'public goods' even though they are private organisations. All of this must be possible in the absence of centralised and hierarchical management systems.

Whether or not DAOs as currently formulated and structured can meet those criteria is an open, and empirical, question. If my theoretical contributions are correct, then empirical researchers will have some guidance when evaluating the empirical success of DAOs as an organisational form.

2. What Is a DAO?

Berg, Davidson, and Potts [13] define DAOs as being

> A decentralised autonomous organisation (DAO) is a bundle of smart contracts that incorporate a system of governance – the blockchain equivalent of a company. A DAO is a company in which the decision-making rules are hard-coded into self-executing algorithms.

DAOs, however, appear to be much more than simply being 'a company' on the internet. Davidson, De Filippi, and Potts [14], for example, define DAOs as follows:

> A [DAO] is a self-governing organisation with the coordination properties of a market, the governance properties of a commons and the constitutional, legal and monetary properties of a nation state. It is an organisation, but it is not hierarchical. It has the coordination properties of a market through the token systems that coordinate distributed action, but it is not a market because the predominant activity is production, not exchange.

In this view, DAOs represent a novel and pioneering framework in organisational design, blending characteristics of markets, commons, and nation states. Surprisingly, what is missing are characteristics of organisational forms such as firms.

At its core, a DAO is an organisational entity that operates autonomously, free from traditional hierarchical structures. This autonomy is facilitated by blockchain technology, which enables a DAO to function based on pre-set rules encoded as smart contracts. These smart contracts are executed automatically, ensuring adherence to the rules without the need for centralised oversight. The self-governing aspect of DAOs heralds a shift from top-down control to a more horizontal structure of management, where decision-making is distributed among its members.

DAOs embody market-like characteristics through their use of token systems. These tokens, often taking the form of cryptocurrencies or utility tokens, serve as a means to incentivise and coordinate the actions of distributed individuals. Much like a market, these token systems facilitate the allocation of resources and labour through mechanisms akin to supply and demand dynamics. Unlike traditional markets where the primary activity is exchange, however, DAOs utilise these market mechanisms primarily to coordinate production and collective action.

DAOs also share similarities with commons in their governance structure (see [15] for more discussion on this point). In commons, resources are managed collectively by a community, with decisions made through consensus or democratic processes. Similarly, DAOs often rely on collective decision-making processes, where token holders or contributors have a say in key decisions. This participatory governance model ensures that decisions reflect the collective will of the community, aligning with the ethos of decentralisation.

The resemblance of DAOs to nation states lies in their self-contained 'legal and constitutional' frameworks and the ability to issue their own tokens, akin to a national currency. DAOs can establish their own rules and norms, much like a constitution, that govern the interactions within the organisation. The issuance of tokens can be compared to a nation state's monetary policy, as these tokens can often serve as the medium of exchange within the DAO ecosystem, influencing economic activities and value distribution.

Contained within that definition, however, are a number of implicit assumptions that need to be examined. The definition assumes that DAOs can effectively govern themselves without traditional hierarchical structures. In reality, the effectiveness of self-governance in DAOs can vary significantly. The reliance on technology for governance assumes a level of infallibility in smart contracts, which may not always hold true given the potential for bugs or unforeseen scenarios. Moreover, the assumption overlooks the human element in governance – the potential for conflicts, divergent interests, and collective action problems, which can be challenging to manage purely through automated systems (if at all).

The assumption that DAO decision-making reflects the 'collective will' of the DAO membership may overlook the challenges inherent in democratic governance systems. Furthermore, token-based governance could lead to plutocratic tendencies, where those with more tokens (and hence more voting power) can dominate decision-making, potentially leading to decisions that favour a minority of token holders. Tokens are themselves often highly volatile and can be subject to speculation and manipulation, which can distort the intended coordination and incentivisation mechanisms they are intended to facilitate. These issues are further discussed below.

Table 1: Attributes of Governance Structures

	Governance Structure			
Attributes	Market	Hierarchy	Hybrid	DAO
Instruments Incentive Intensity	++	0	+	++
Administrative Control	0	++	+	0
Performance Autonomous Adaptation	++	0	+	++
Cooperative Adaptation	0	++	+	++?
Adaptive Integrity	0	++		++?
Contract Law	++	0	+	+

Key: ++ Strong; + Semi-strong; 0 Weak.
Source: Adapted from [2] and [17].

In Davidson et al.'s view, DAOs are hybrid institutions as envisaged by Oliver Williamson [16, 17]. The question then becomes, 'What sort of hybrid are they?' In [2], I investigate that question by applying Williamson's [16] framework to the question at hand. Table 1 is adapted from Williamson [16] and reproduced from [2] and adds a column where the governance attributes of DAOs are included. In Williamson's [17] theory, markets and hierarchy are mirror images of each other, and hybrids constitute an organisational compromise. Note that 'hybrids' as envisaged by Williamson tend to not be 'autonomous'.

Looking at the first panel, DAOs employ market incentive structures and do not have 'administrative controls'. By definition, there is no hierarchy within DAOs. Community control is manifest via market mechanisms, that is, voting by token holders (this being equivalent to shareholders voting directly to control a firm).

Williamson [17] argues that adaptation to change is an important organisational attribute. He labels adaptation that is driven primarily by market forces as 'Autonomous Adaptation', while adaptation driven by 'conscious, deliberate, purposeful cooperation' is defined as 'Cooperative Adaptation'. If DAOs are to be described as being an organisational form (and not simply a dark pool), then there must be a mechanism to facilitate 'conscious, deliberate, purposeful cooperation'. As a matter of theory, DAO governance (token voting and smart contracts) must result in 'conscious, deliberate, purposeful cooperation' in the absence of administrative control but in the presence of (market) incentive intensity. Whether or not DAOs do achieve that goal is an empirical question. There is much more theory that underpins that insight, however, and that is discussed below.

Davidson et al. [14] also argue that DAOs have features of nation states – they provide 'public goods'. Williamson [16] argues that the provision of public goods requires 'adaptive integrity' by which he means 'probity'. In private sector organisations, Williamson suggests that probity is secured by contract law. In the case of the nation state, however, probity cannot be secured solely by contract law. This is an empirical claim, and Williamson appears to introduce an impossibility theorem at this point in his argument. Nonetheless, the point remains that a 'probity hazard' (defined as being the 'loyalty and rectitude' whereby the transaction is discharged) exists in all organisational forms, including DAOs. Within DAOs, probity would be secured by open-source norms, smart contracts, and 'community values'. The antecedents of community values within DAOs generally are under-researched, and this does represent an opportunity for cultural economists, ethnographers, and sociologists to explore important and interesting questions in this space.

Finally, Williamson [17] discusses the role contract law plays in governance structures. Contract law plays a very important role in the functioning of markets, but less so within hierarchy. Within DAOs, however, smart contracts play an important role, albeit they are not 'contracts' as envisaged by the legal system per se.

3. DAO Governance

Following Shleifer and Vishny's [18] exposition of corporate governance, Davidson [2] defines DAO governance as follows:

> DAO governance involves the mechanisms whereby token-holders ensure they receive a return on their community involvement, either in the form of additional tokens, or utility (somehow defined), or influence. How do token-holders ensure that blockchain miners and validators, or smart contracts, perform as expected and as intended? How do they protect against the misappropriation of the treasury or the misallocation of funds into underperforming initiatives?

In plain language, how are 'agency problems' [19] resolved?

The challenge facing DAOs is this: DAOs are a hybrid of several organisational forms (markets, organisations, commons, and nation states), yet they deploy political governance as their governance mechanism. It is the case that political governance does promote consensus and inclusion. Yet it does so at the cost of decisive decision-making. By contrast, corporate governance mechanisms impose discipline on hierarchies but do not necessarily promote consensus and inclusion. Corporate governance usually involves aligning the interests of insiders (management) with outsiders (providers of capital – usually shareholders). By analogy, governance problems arise when contracts do not execute as expected. Generally, there are three reasons why a contract may not execute as expected (beyond the immediately obvious explanation of there being a bug in the contract). Opportunism (self-interest seeking with guile) is the first reason, maladaptation occurs when the contract's terms and conditions do not adequately reflect the original agreement as business and economic conditions change, and finally, hold-up can occur when contracts are being renegotiated.

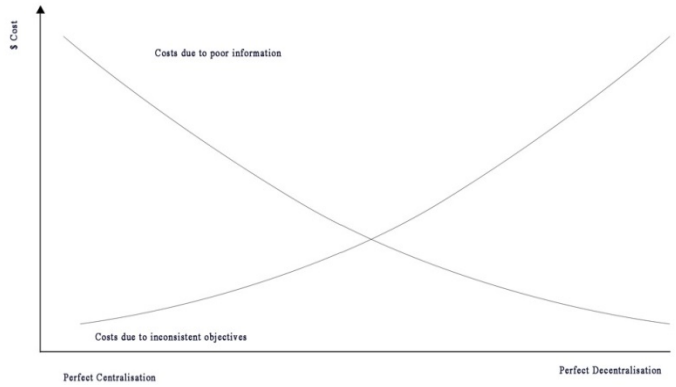
Jensen [20] has argued that four corporate governance control forces exist to align the interests of insiders (managers) and outsiders (capital providers). These are capital markets, legal, political, and regulatory systems, product and factor markets, and internal control systems. Within DAOs, the analogous mechanisms include capital markets and internal control systems. The token allocation and valuation process operates similarly to capital markets. To be clear, however, there is no hostile takeover market for DAOs. Nonetheless, outsiders are able to exert some control over DAOs through the prices they are prepared to pay for tokens. That leaves the notion of 'internal control systems' to govern DAOs.

The challenge that DAOs face in their governance then is answering the question as to how decisions are made, why they are made, and how they are enforced. It is all very well suggesting that smart contracts enforce 'good governance', but who writes those smart contracts? Who commissions the writing of those smart contracts? At present, DAOs make extensive use of political governance to engage in decision-making. In particular, there appears to be an assumption that 'direct democracy' is a viable mechanism to govern organisations.

The problems of direct democracy are well-known in the literature [21]. Voters may be rationally ignorant, excessively ideological, or disinterested. The voter paradox means that there are few incentives for voters to seek out or acquire information that could result in better decision-making. Davidson and Potts [3] argue that corporate governance mechanisms are a far superior tool to deploy in the governance of DAOs than is political governance. Their argument is that political governance creates legitimacy for coercion, whereas corporate governance is about solving agency problems via voluntary cooperation.

Jensen and Meckling [22] make the argument that economies have the problem of dispersed information (or knowledge) and the problem of decentralised decision-making rights. Jensen and Meckling then set out the optimal level of decentralisation within the organisation as the trade-off between 'costs due to poor information' which decline as the organisation becomes more decentralised and 'costs due to inconsistent objectives' (or agency costs – 'the sum of the costs of designing, implementing, and maintaining appropriate incentive and control systems and the residual loss resulting from the difficulty of solving these problems completely') [22], which rise as the level of decentralisation increases. See Figure 1.

Figure 1: The Optimal Level of Decentralisation.
Jensen and Meckling 1992 [22]



Within DAOs, the argument would be something as follows: Those individuals with the best knowledge to undertake specific tasks within a DAO can bid for the work. The wisdom of crowds (in this case the token holders) allocates tasks. In theory, this results in two effects: Costs due to poor information should fall very rapidly, resulting in faster decentralisation than otherwise would be the case. The second argument is that agency costs within DAOs are suppressed because token holders are making the decisions and not delegating to management.

There is an important distinction between how DAOs define decentralisation and how Jensen and Meckling define decentralisation. Jensen and Meckling discuss the colocation of decision-making power and knowledge. Within DAOs, the notion of decentralisation implies a lack of hierarchy and direct democratic decision-making by the community. There is no notion of collocating decision-making with local knowledge.

4. Conclusion

This article summarises some of the recent works I have undertaken on DAOs and their governance. It begins by accepting Davidson et al.'s [14] definition of DAOs as being complex hybrid organisations. The very first challenge that arises, however, is that DAOs rely on a very simple governance mechanism – direct democracy. As a system of governance, direct democracy does promote consensus and inclusion. It can also result in majoritarianism and plutocracy. Direct democracy, however, is not well disposed to decisive or effective decision-making.

Other insight that has become apparent from this research is that in order for DAOs to survive as a unique organisational form, they have to suppress agency costs as defined by Jensen and Meckling. In order to do so, they must reduce costs associated with poor information and reduce the costs associated with inconsistent objectives. These latter costs are probably reduced by the strong community values that DAOs generate. It is not clear how DAOs resolve poor information problems (or what Hayek would define as being a knowledge problem). Hierarchies solve this problem through colocation (see also [23]). How DAOs solve this problem – without resorting to hierarchical solutions is a matter of on-going research.

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None declared.

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SD designed and coordinated this research and prepared the manuscript in entirety.

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