Louis Daysh

HINDERED ON ALL SIDES: WHY THE USEFULNESS OF DECENTRALISED AUTONOMOUS ORGANISATIONS REMAINS LIMITED

Final Paper

LAWS521 Organisational Law: Corporations, Trusts and Fiduciary Relationships

2022

Abstract:

Decentralised autonomous organisations (DAOs) were presented as a revolutionary organisational structure capable of connecting global communities despite their location, creed or statehood. However, the structure remains used almost exclusively in blockchain-based applications. This article explains why DAOs remain confined to that niche by exploring the obstacles facing the structure. It breaks these obstacles into two categories; those posed by unsatisfactory legal environments and those posed by DAOs use of Lex Cryptographia. It argues that regulatory uncertainty and a lack of novel legal recognition make using a DAO within existing legal environments untenable. Furthermore, those DAOs that seek to avoid these legal obstacles by operating via the private regulatory frameworks of Lex Cryptographia alone face additional challenges. The imposition of pseudonymity, no access to existing capital markets and vulnerabilities in token holder governance all hinder DAOs further. This article analyses these various obstacles and asserts that they explain DAO's limited use.

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I.   *Introduction*

The old idiom goes that nothing in this world is certain except death and taxes. It is increasingly clear that technological advancements can be added to that list, too. Virtual reality, artificial intelligence and even space colonisation – all are moving from the pages of fiction into reality. Blockchains play a minute part within this wider movement, Decentralised Autonomous Organisations ('DAOs') a smaller one still. Both were introduced as radial new technologies with potentially efficiency-enhancing characteristics.[1] While blockchains have largely realised their potential, DAOs have not yet met that milestone. Many excellent papers included throughout this article explain DAOs conceptually, explore their theoretical advantages and detail some of the obstacles they face. However, none exclusively analyse why DAOs remain a niche structure with limited use.

This article aims to fill that gap by asserting that the usefulness of DAOs as an organisational structure is hindered by a variety of obstacles originating from two sources. The first is unsatisfactory legal environments which make operating as a DAO within them untenable. This means current DAOs must substitute regulation via those laws with regulation via *Lex Cryptographia* alone*,* a blockchain-based system that enables the creation of private regulatory frameworks.[2] However, that substitution imposes a second set of obstacles via *Lex Cryptographia's* structural features and current governance dynamics. The obstacles arising from both sources must be overcome before DAOs can provide a viable organisational structure for mainstream users.

This article unfolds in five parts to justify that conclusion. Part II contextualises the piece by providing a concise description of *Lex Cryptographia* and DAOs. Part III analyses the legal obstacles imposed by regulatory uncertainty and a lack of novel recognition. Regulatory uncertainty directly relates to DAOs as blockchain-native organisations that principally engage in blockchain-based activities utilising virtual assets to govern themselves.[3] The limited options available for DAOs to become legally recognised by incorporating as a limited liability company, a foundation company or a New Zealand company or partnership will then be analysed. It will be shown why each structure is inadequate to facilitate a DAO. The result of these two legal obstacles means that DAOs cannot operate within current legal environments. That forces users to not use a DAO at

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[1] Aaron Wright "The Rise of Decentralized Autonomous Organizations: Opportunities and Challenges" (paper presented as part of the Blockchain & Procedural Law: Law and Justice in the Age of disintermediation seminars, Luxemburg, June) 152 at 156.

[2] At 153.

[3] For the purpose of this essay, virtual assets encompass all classes of blockchain-based tokens.

all or choose to operate the DAO 'alegally'. For the purpose of this article, alegality refers to operating outside of traditional legal environments by utilising *Lex Cryptographia* instead.

Part IV provides a novel analysis of the obstacles posed by utilising *Lex Cryptographia* in that manner. The imposition of pseudonymity, limited access to capital markets as well as actual or perceived governance vulnerabilities will each be explored in this part. These will affect DAOs to varying degrees depending on the activities they engage in. While certain disadvantages can be mitigated with advances in protocol design, others are ever-present and may prove irreconcilable with mainstream uses.

Part V draws these elements together and concludes that any one of these constitutes a substantial hindrance to using a DAO. This makes the structure suited only to those that choose to operate alegally and who can mitigate the obstacles posed by *Lex Cryptographia*. For all others though, DAOs will remain an unsuitable organisational structure.

II.   *Context*

One challenge of the internet age is how to efficiently organise globally dispersed communities. DAOs were designed as an organisational structure to solve that challenge.[4] Rather than being bound to a single jurisdiction, DAOs can operate wherever an internet connection exists, connecting users despite their location.[5] DAOs overcome differences in jurisdictional rules by substituting them with *Lex Cryptographia,* a system created by the combination of blockchain technologies, smart contracts and virtual assets.[6] Explaining how *Lex Cryptographia* combines those technologies to facilitate the creation of private regulatory frameworks is an essential prerequisite to understanding how DAOs operate.

A.   *Lex Cryptographia*

1.   *Blockchains*

At their most basic level, blockchains are decentralized databases.[7] They are analogous to an electronic ledger where each entry is time-stamped, electronically signed and connected in

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[4] Vitalik Buterin "A Next Generation Smart Contract & Decentralized Application Platform" (13 January 2014) Ethereum.org <Ethereum.org/en/whitepaper/> at 23.

[5] Wright, above n 1, at 152.

[6] At 153.

[7] Primavera De Filippi and Aaron Wright "Blockchain, Bitcoin and Decentralised Computing Platforms" in Marcelo Corrales, Mark Fenwick and Helena Haapio *Blockchain and the Law: The Rule of Code* (Harvard University Press, Cambridge (Mass), 2018) at 16.

sequence with the next.[8] Global networks of computing nodes maintain the blockchain through distributed ledger validation.[9] Nodes collate transactions into blocks and validate them using various cryptographic proofs.[10] Honest nodes are incentivised to maintain the network through the distribution of block rewards.[11] The network is made trustless by ensuring it is more profitable to maintain the network than attack it.[12] Block validation is final, making data recorded on blockchains immutable except in rare circumstances.[13]

2.   *Smart Contracts*

Blockchain technology has been extensively upgraded since it was first used by the Bitcoin network. Recent developments have enabled the deployment of blockchain-native software called smart contracts ('SCs').[14] SCs are self-executing programs deployed onto blockchains that operate once pre-defined conditions are met.[15]

Explaining how basic SCs function is commonly achieved by drawing analogies to vending machines.[16] Vending machines exchange money for goods through the fulfilment of standard contractual terms of payment, lien and even enforcement.[17] Transactions are reliably performed without the need for external trustworthy intermediaries.[18] If the terms are unfulfilled, such as a user providing inadequate funds or the machine lacking stock, the transaction fails. SCs fulfil a similar role to vending machines by automatically executing whatever task their creator has programmed in a reliable, immutable and deterministic manner.[19] Somewhat counterintuitively, SCs are not intelligent with 'smart' referring only to their ability to connect and exchange data with external users and applications.[20] Furthermore, they are not typically intended to create legally

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[8] Timothy Nielsen "Cryptocorporations: A proposal for Legitimising Decentralised Autonomous Organisations" (2020) 5 Utah Law Rev 1105 at 1107.

[9] De Filippi and Wright, above n 7, at 13.

[10] Gerald Dwyer "The economics of Bitcoin and similar private digital currencies" (2015) 81 J Financial Stab 81 at 86.

[11] Nielson, above n 8, at 1108.

[12] Dwyer, above n 10, at 84.

[13] Nielson, above n 8, at 1107; and see generally Pete Rizzo "Ethereum Hard Fork Creates Competing Currencies" *CoinDesk* (online ed, New York, 25 July 2016).

[14] See generally Buterin, above n 4, at 13.

[15] Nielson, above n 8, at 1107.

[16] Benedikt Schuppli and Golnaz Jafari "Piercing the Digital Veil: A Case Study for a DAO Legal Framework under Swiss Law" (2021) 12(4) J Intell Prop Info Tech & Elec Com L 331 at 332.

[17] At 332.

[18] At 332.

[19] At 332.

[20] At 332.

enforceable contracts.[21] The contracts they refer to contain the code required to execute their intended purposes.[22]

Like all software, SC utility is limited only to the creativity of developers. Just as software can be used to control a vending machine or simulate advanced medical protein folding, SCs can be used in a variety of ways of differing complexity. Expanding beyond their ability to regulate basic interactions between users, SCs can be layered to create comprehensive private regulatory frameworks.[23] Existing legal systems regulate behaviour with an interconnected set of laws based on statute, precedent and judicial decisions.[24] Sufficiently comprehensive layers of SCs can achieve a similar outcome.[25] An important element of SCs is that they operate in a manner that cannot be violated or distorted.[26] Returning to the vending machine example, if a SC's terms are not met, the transaction fails.

3. *Virtual Assets*

Virtual assets provide the final element of *Lex Cryptographia*. Two categories of virtual assets currently exist, protocol and application tokens. Protocol tokens form the core assets of the blockchain's consensus layer.[27] These are created by function of the blockchain directly, typically through reward issuance.[28] Blockchain transactions incur network fees called 'gas' which must be paid with these protocol tokens.[29] Some blockchains allow a further application layer to exist atop the native protocol layer.[30] Application layers permit the deployment of SCs and the issuance of novel tokens that do not form part of the underlying network's incentive scheme.[31] These are widely customisable with some examples being stablecoins, NFTs and tokens that attribute rights to their holders.[32]

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[21] At 332.
[22] At 333.
[23] Wright, above n 1, at 155; and Wei Rong Chua "The Legal Status of Daos in Singapore: Company, Partnership, or Business Trust?" (2021) 38 Sing L Rev 213 at 216.
[24] Chua, above n 23, at 219.
[25] At 219.
[26] Katarzyna Ziolkowska "Distributing Authority – State Sovereignty in the Age of Blockchain" (2021) 35(2) Int Rev Law Comput Technol 118 at 121.
[27] Kyle Bersani "Separating Governance Tokens from Securities: How the Utility Token May Fall Short of the Investment Contract" (2022) 43 Cardoz L Rev 1306 at 1316.
[28] Nielsen, above n 8, at 1108.
[29] Buterin, above n 4, at 13.
[30] Nielsen, above n 8, at 1109.
[31] At 1109.
[32] At 1109.

Private Regulatory Environments

Lex Cryptographia functions by combining these technologies to create novel regulatory environments. Analogising to motor vehicles provides one way of conceptualising these technical descriptions. Blockchain protocol layers create the infrastructure like roads, intersections and bridges. Protocol layers also establish the rules of the road which dictate user behaviour. Application layers allow users to design customised motor vehicles capable of using that infrastructure to complete various tasks. These vehicles require fuel to run, being the gas referred to previously, that is paid to nodes who validate the transactions which implement instructions and effect activities.[33] No third parties or metaphorical police are required to enforce protocol or SC rules. Much like trying to sail a boat on a road, actions that violate protocol layer rules fail.[34] Additionally, if SC transaction requirements are unsatisfied, then that transaction fails as previously described.

The combination of these elements enables the creation of quasi-legal structures capable of independently regulating trustless relationships.[35] *Lex Cryptographia* eliminates the need for contracts, statutes and judicial enforcement by relying exclusively on the rule of code set out in protocol layers and relevant SCs.[36] That feature allows applications to operate external to traditional state-enacted laws and remain beyond the reach of their coercion. Therefore, applications have the ability to operate 'alegally' by substituting regulation via laws with regulation via *Lex Cryptographia* alone.

A.   *DAOs*

DAOs are one metaphorical vehicle made possible by *Lex Cryptographia*. Wright notes that what qualifies as a DAO is still evolving, but currently, all rely on blockchains, smart contracts and digital assets to support organisations natively on the internet with the capability of scaling globally from birth.[37] DAOs lack legal organisational structures or contracts and are instead governed by regulatory frameworks created by layers of SCs deployed on a blockchain.[38] SCs alone establish a cohesive nexus of behavioural rules that regulate how users participate and interact with the DAO.[39]

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[33] Buterin, above n 4, at 14.
[34] At 13.
[35] Katrin Becker, "Blockchain Matters – Lex Cryptographia and the Displacement of Legal Symbolics and Imaginaries" (2022) 33 Law Critique 113 at 118.
[36] At 119.
[37] Wright, above n 1, at 155.
[38] Nielsen, above n 8, at 1110.
[39] De Filippi and Wright, above n 7, at 218.

DAO membership is achieved by obtaining a type of application token called a governance token.[40] Token holders obtain specific rights against the DAO.[41] These may include rights to the DAO's profits or the ability to access, manage or transfer its resources or services.[42] Most also include governance rights via the ability to submit and vote upon proposals that control the DAO.[43] Governance tokens may be purchased or allocated as a reward in exchange for capital, contributing to the DAO or using its services.[44]

DAOs were first introduced without a predefined rulebook or novel legal recognition dictating their features.[45] Rather, developers alone are responsible for creating frameworks that facilitate DAOs. This makes identifying particular features difficult as most frameworks are highly modified alterations of off-the-shelf options with vast differences in structure and purpose.[46] Therefore, sticking to Wright's definition allows this article to detail the basic attributes of DAOs without risking a detailed analysis of their features that may be invalidated by subsequent developments.

B. *Differentiating Attributes*

Regardless of their bespoke frameworks, all DAOs exhibit several notable differences from existing organisational structures. First, DAOs lack formal managers or directors. Members are treated equally regarding their ability to join, interact and access information pertinent to the DAOs operation.[47] Equality of membership means that no fiduciary duties exist.[48] Second, DAO membership can be transient. Users may acquire governance tokens, vote on a proposal, dispose of those same tokens and exit the DAO within hours. Governance tokens are also traded exclusively for financial gain without holders ever exercising their rights. Third, DAOs replace governance via directorial management with token holder governance achieved with distributed consensus.[49] A DAO operates by allowing token holders to submit proposals that will be voted upon by other members in proportion to their governance token holdings.[50] These proposals are typically unlimited in scope and provide the sole means of controlling DAOs. Malicious proposals are prevented only by the rules set out in the DAOs SCs that facilitate voting and provide

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[40] Wright, above n 1, at 156.
[41] At 142.
[42] At 146.
[43] Nielsen, above n 8, at 1110.
[44] De Phillipa and Wright, above n 7, at 134.
[45] Buterin, above n 4, at 23.
[46] Youssef Faqir-Rhazoui, Javier Arroyo and Samer Hassan "A Comparative Analysis of the Platforms for Decentralised Autonomous Organisation in the Ethereum Blockchain" (2021) 12(9) JISA 1 at 5.
[47] Wright, above n 1, at 156.
[48] At 156.
[49] At 156.
[50] Nielson, above n 8, at 1110.

additional security features. Finally, DAOs may operate pseudonymously which will be explored in detail during part IV. In short, this allows users to transact without revealing their identity while still leaving proof of their actions.[51] Whether a DAO is pseudonymous depends on how its governance tokens proliferate. DAOs can allow their tokens to proliferate freely on the open market and potentially create an organisation with millions of pseudonymous members acting together according to *Lex Cryptographia* without the need to identify or trust one other possible.[52]. Others require applicant identification before members may join, forfeiting this feature.[53]

C.   Contemporary Uses

Any organisation may become a DAO. Yet, as a blockchain innovation, most contemporary DAOs engage exclusively in blockchain-related activities. Analysing why they only occupy this niche is the overall focus of this article making an explanation of DAOs' contemporary uses relevant. Contemporary DAOs widely fall into three categories; those that accumulate and deploy capital, those managing token-gated communities and, most prevalent, those that administer smart contracting platforms. The nature of these activities remains subject to change so these categories are by no means conclusive.

1.   Capital Pools

Capital Pool DAOs afford members direct control over investments, the ability to converse with like-minded investors and the apparent ability to bypass existing financial regulations around ETFs, SPACs, and security issuances by utilising *Lex Cryptographia*.[54] The ironically auspiciously named 'TheDao' presented the first major example of a pseudo venture capital fund designed to aggregate Ethereum-based assets and deploy them according to community decisions.[55] Unfortunately, but perhaps unsurprisingly given their experimental nature, TheDao was exploited and failed.[56] Hundreds of millions of dollars were risked and Ethereum was forked.[57] Public capital pool DAOs have since waned in popularity with private applications becoming more common.

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[51] Primavera De Filippi "The Interplay between Decentralisation and Privacy: The Case of Blockchain Technologies" (2016) 7 J Peer Prod 1 at 11.

[52] Chua, above n 23, at 214.

[53] See, for example, FlamingoDAO "Membership" (6 October 2022). <https://docs.flamingodao.xyz/Membership.html#how-can-i-contribute-to-flamingo-and-become-a-member>.

[54] Interview with Aaron Wright, Co-Founder of Tribute Labs (Jack Deeb, Blockchain Australia, 14 April 2022).

[55] Francisco Santos "The Dao: A Million Dollar Lesson in Blockchain Governance" (MA Thesis, Tallinn University of Technology, 2018).

[56] Quinn DuPont "Experiments in Algorithmic Governance: A History and Ethnography of "The DAO," A Failed Decentralized Autonomous Organization" in Malcolm Campbell-Verduyn (ed) *Bitcoin and Beyond: Cryptocurrencies, Blockchains and Global Governance* (Routledge, London, 2018) at 157.

[57] Santos, above n 55, at 42.

2.   Community DAOs

The second category uses DAOs to organise its members to determine a project's future. Participation requires a particular asset, commonly an NFT. This demonstrates flexibility of purpose as community DAOs prioritise the project's future rather than extracting profit. These DAOs are scarce in number but include ApeDAO, managers of the Bored Ape Yacht Club community.[58]

3.   Protocol Daos

By far the largest category by number and financial throughput are DAOs which administer smart contracting protocols. These run Decentralised Finance ('DeFi') Exchanges, lending platforms, network bridges, and most other current DeFi infrastructure. The total trading volume on DeXs, at the time of writing, is over $5b USD daily.[59] Lending platforms Compound and Aave currently hold $5.5b and $18b USD respectively.[60] All are governed by DAOs showing how large endeavours can successfully utilise the structure.

III.   Legal Obstacles to DAO use

Moving from those explanations to the first substantive part of this article, the fact that contemporary DAOs have not expanded beyond blockchain-based activities is primarily attributable to the legal consequences of using the structure. DAOs' ability to operate alegally pursuant to the private regulatory frameworks of *Lex Cryptographia* does not make traditional laws irrelevant. The unsatisfactory state of virtual asset regulation presents a large obstacle to DAOs that warrants overcoming in limited circumstances. Furthermore, given the novel nature and relative immaturity of DAOs, users may desire the familiarity of traditional legal structures. However, no existing structure adequately facilitates a DAO providing another obstacle to their proliferation. These legal obstacles constitute the main hindrance to DAO use.

A.   Virtual Asset Regulation

DAOs are captured by virtual asset regulation both directly via their blockchain-based activities and indirectly through their use of governance tokens. This section begins by describing how blockchains are typically difficult to regulate, leaving states largely unable to apply direct coercion.

[58] ApeCoin "Apecoin Dao Governance" (16 May 2022) < https://apecoin.com/governance>.
[59] CoinMarketCap "Top Cryptocurrency Decentralised Exchanges" (15 May 2022).
<https://coinmarketcap.com/rankings/exchanges/dex/>.
[60] CoinMarketCap "Compound" (6 October 2022) <https://coinmarketcap.com/currencies/compound/>; and CoinMarketCap "Aave" (6 October 2022) <https://coinmarketcap.com/currencies/aave/>.

In response to this, states have chosen to regulate blockchain-based activities instead. The unsatisfactory way this has been achieved will be shown by examining the United States of America's ('US') and New Zealand's ('NZ') regulatory environments.

1. *Blockchain Regulation*

Blockchains disperse control points through global networks of nodes. Coercing a blockchain directly requires coercing the majority of nodes, an inherently difficult task blockchains have relied on to avoid direct state interference.[61] However, networks that support SCs generally utilise the Proof of Stake ('PoS') rather than Proof of Work ('PoW') validation which introduces vulnerabilities.[62] Ethereum's recent transition from PoW to PoS and its status as the blockchain most DAOs use makes it the perfect example to demonstrate this.

PoS validation substitutes PoW's competitive solution-searching process with an algorithm that preselects nodes to validate blocks.[63] Previously becoming an Ethereum PoW validator only required a consumer-grade graphics card, resulting in control being dispersed throughout millions of validators worldwide.[64] Now, PoS validators must lock 32 Ethereum representing their 'stake' as a prerequisite to creating a validator node, currently costing tens of thousands of dollars.[65] Furthermore, nodes that go offline have their stake penalised and destroyed, ensuring nodes are online when called upon to mint blocks.[66] Therefore, PoS requires users to have 32 Eth they are willing to stake and risk if their node goes offline. This massively raises barriers to entry and has resulted in fewer nodes validating the network.[67]

Staking services partially solve this problem by allowing users to deposit less than 32 ETH. Services then combine those amounted into full nodes whose uptime is assured. Lido and Coinbase's services currently control 30.2 and 14.6 per cent of Ethereum nodes respectively, centralising control amongst a few entities.[68] Centralisation of network power is not uncommon under PoW whereby validators combine their validating power into 'pools'.[69] However, validators can easily

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[61] Marcella Atzori "Blockchain Technology and Decentralized Governance: Is the State Still Necessary?" (PhD Thesis, University of Nicosia, 2016) at 13.

[62] Cong Nguyen and others "Proof-of-Stake Consensus Mechanisms for Future Blockchain Networks: Fundamentals, Applications and Opportunities" (2019) 7 IEEE Access 85727 at 85728.

[63] At 85729-85731.

[64] Atzori, above n 61, at 2; and Buterin, above n 4, at 32.

[65] CoinMarketCap "Ethereum" (6 October 2022) <https://coinmarketcap.com/currencies/ethereum/>.

[66] Ethereum Foundation "Crypto-Economic security (27 September 2022) <https://ethereum.org/en/developers/docs/consensus-mechanisms/pos/>.

[67] Dune Analytics "Beacon Chain Depositors Over Time" (6 October 2022) <https://dune.com/queries/991628/1717071>.

[68] Dune Analytics, above n 67.

[69] Buterin, above n 4, at 32.

switch between pools if one was coerced or exhibited improper behaviour. Staked Ethereum cannot currently be withdrawn, leaving users unable to leave their chosen service.[70] Additionally, current PoS services are dominated by centralised exchanges that are incorporated within existing legal jurisdictions.[71] That increased centralisation makes the blockchain network vulnerable to coercion. These concerns have materialised with fears that the US government will direct Coinbase, a US-based publicly traded company, to not validate certain transactions less they be made complicit in their unlawful activities.[72]

Ethereum's recent shift to PoS has resulted in a material increase in centralisation. For the first time, this affords states the ability to coerce blockchains directly. Whether states use this capability remains to be seen. However, if they do, the foundational assumption that coercing a blockchain is too difficult for states to achieve could be disproven.

2.   *Financial Regulation*

Given the ability to directly coerce blockchains has only recently become possible, most states have instead focused on applying traditional financial regulations to those using virtual assets within their jurisdictions.[73] Financial regulation reduces asymmetries of information, prevents harmful activities and protects unsophisticated investors.[74] These can create economically inefficient outcomes leading to market failures.[75] Market failures provide a prima facie case for corrective regulation.[76] Efficient, well-regulated markets benefit businesses and users alike whereas uncertainty does the opposite.

According to Hoffman, Trautmann and Hemprecht, regulatory uncertainty occurs when a decision-maker operates under a perceived inability to predict their action's future consequences.[77] Regulatory environments create legal environments governing certain activities.[78] Being unable to predict the legality of actions taken within those environments has negative consequences. Uncertainty affects an organisation's strategies and decision processes, primarily leading to them avoiding areas of uncertainty by withdrawing from affected markets or postponing investment

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[70] Ethereum Foundation "Staking with Ethereum" (6 October 2022) <https://ethereum.org/en/staking/>.

[71] Duny Analytics, above n 67.

[72] Aleksander Gilbert "Coinbase CEO: Would Exit Staking Business if Forced to Censor Transactions" *The Defiant* (online ed, New York, 18 August 2022).

[73] Thomson Reuters *Cryptocurrency Regulations by Country* (April 2022) at 24, 27.

[74] John Armour and others "The Goals and Strategies of Financial Regulation" in Luca Enrique's (ed) *Principles of Financial Regulation* (Oxford University Press, Oxford, 2016) at 51.

[75] At 52.

[76] At 54.

[77] Volker H. Hoffman, Thomas Trautmann and Jens Hamprecht "Regulatory Uncertainty: A Reason to Postpone Investments? Not Necessarily" (2009) 46(7) J Manag Stud 1227 at 1229.

[78] At 1229.

decisions.[79] Regulatory uncertainty is prevalent in many fledgling segments but few operate with the same level of uncertainty as the virtual asset industry. The US and NZ illustrate this point.

3.   *The United States*

The Securities and Exchange Commission (SEC) has emerged as the US' de facto industry regulator via its role in regulating securities.[80] Securities are subject to disclosure and registration requirements.[81] Those that issue or sell unregistered securities operate unlawfully under Federal Law.[82]

Included within the US definition of securities are somewhat anomalous "Investment contracts".[83] The US Supreme Court judgment of *Securities and Exchange Commission v W J Howey Co* contains the test for such assets.[84] The 'Howey Test' requires 1. an investment of money, 2. in a common enterprise, 3. with a reasonable expectation of profit, 4. derived from the efforts of others.[85] Form is disregarded in favour of examining the substantive economic reality.[86] This makes it highly fact specific and inherently flexible.[87] Such an approach was intended to meet the "variable schemes devised by those seeking to use other's money on the promise of profits".[88]

The test's third and fourth limbs are most relevant to virtual asset regulation. The SEC's interpretation identifies two questions under these limbs; does the purchaser reasonably expect to rely on the efforts of others and, under *Turner,* are those efforts "the undeniably significant ones, those essential managerial efforts which affect the failure or success of the enterprise".[89] They consider the asset's ability to be sold, whether it may appreciate, whether excessive funds were issued to establish a functional network and how it is marketed as relevant factors that increase virtual assets' likelihood of meeting this test.[90] The SEC's advice ends by stating that the factors

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[79] At 1230; and Christian Engau and Volker Hoffman "Effects of Regulatory Uncertainty on Corporate Strategy – an Analysis of Firms' responses to uncertainty about Post-Kyoto Policy" (2009) 12 Environ Sci Policy 766 at 769.

[80] Simon Moore "Towards a Functioning Legal Framework for Emerging DAO Technologies in Australia" (2021) 2(2) Anu Jolt 109 at 113.

[81] Securities Act of 1933 15 USC § 77g.

[82] At § 77f(f).

[83] At § 77b(a).

[84] *Securities and Exchange Commission v W J Howey Co* 328 U.S. 293 (1946).

[85] At 298, 301.

[86] At 298.

[87] Nielsen, above n 8, at 1112.

[88] *Securities and Exchange Commission v W. J. Howey Co,* above n 84, at 299.

[89] The United States Securities and Exchange Commission *Framework for "Investment Contract" Analysis of Digital Assets* (April 2019); and *SEC v. Glenn W. Turner Enter., Inc.,* 474 F.2d 476, 482 (9th Cir.), cert denied, 414 US 821, 94 S Ct 117, 38 L Ed 2d 53 (1973) ("Turner").

[90] United States Securities and Exchange Commission, above n 89.

identified are neither determinative nor exhaustive and market participants should obtain legal advice and/or engage with SEC staff.[91]

The SEC seems to have only confirmed its stance on one virtual asset: bitcoin, which it considers a commodity.[92] The SEC otherwise regulates by enforcement, litigating those it considers to have acted unlawfully. The fact specificity of the Howey Test necessitates the SEC analysing considerable quantities of detailed information about the virtual asset's properties as well as its underlying code.[93]Acquiring that information requires investigation or litigation.[94] Considerable SEC resources are consumed by this rendering regulation costly and slow. Enforcement requires either the targeted party to settle with the SEC or through successful litigation.

Existing literature argues that the SEC incorrectly analysed virtual assets fuelled speculation that any litigation would be hotly contested.[95] This prediction proved true in 2020 when the SEC sued Ripple labs for selling unregistered securities.[96] Litigation remains ongoing with the courts becoming frustrated by the SEC's arguments that are being adopted "to further its desired goal, and not out of a faithful allegiance to the law".[97] Further complicating matters is the introduction of the Digital Commodities Consumer Protection Bill which sees the Senate Agricultural Committee positioning itself to regulate virtual assets it deems commodities.[98]

4. *New Zealand*

NZ's Financial Markets Conduct Act controls regulated products that are recognised financial products.[99] Financial products are categorised as debt securities, equity securities, managed investment products or derivatives.[100] Virtual assets are unlikely to meet these definitions. Debt security means a right to be repaid money or interest on money that is lent to another person.[101] Stablecoins alone may fit this definition but rarely offer a legal right to redeem tokens. Virtual assets are not shares meaning they fall outside of equity securities.[102] The managed investment

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[91] United States Securities and Exchange Commission, above n 89.

[92] Interview with Garry Gensler, United States Securities and Exchange Commission Chair (Jim Cramer, CNBC Market Alert, CNBC, 28 June 2022).

[93] Nielson, above n 8, at 1112.

[94] At 1112.

[95] Ori Oren "ICO's DAO's and the SEC: A Partnership Solution" (2018) Colum Bus L Rev 617 at 639.

[96] *Securities and Exchange Commission v Ripple Labs, Inc, Bradley Garlinghouse and Christian A. Larsen* 1:20-cv-10832-AT-SN.

[97] *Securities and Exchange Commission v Ripple Labs, Inc, Bradley Garlinghouse and Christian A. Larsen* 1:20-cv-10832-AT-SN Document 531 at 6.

[98] Digital Commodities Consumer Protection Act of 2022.

[99] Financial Markets Conduct Act 2013, s 41(2).

[100] At s 7.

[101] At s 8(1).

[102] At s 8(2)

products ('MIP') definition is avoided as most virtual assets do not afford rights to participate in a scheme or receive financial benefits.[103] Even governance tokens fail the third MIP requirement because token holders retain day-to-day control without any one member meeting the Act's definition of manager.[104] Finally, virtual assets are not derivatives as no obligation to provide future consideration exists and they are not analogous to swaps, futures, options or CFDs.[105] Unless the Financial Markets Authority ('FMA') exercised its designation powers to bring cryptocurrencies within the Act, it appears they are exempt.[106]

The FMA characterises cryptocurrencies as unregulated, volatile scams at high risk of cybercrime.[107] Their solution to these systemic risks is not to designate virtual assets but to encourage purchasers to use NZ trading platforms that "offer a minimum level of protection".[108] NZ platforms are deemed to operate a money or value transfer service.[109] Consequently, they must register as a Financial Services Provider and become members of a dispute resolution service.[110] The Department of Internal affairs, as the supervisory agency, has classified these platforms as "Virtual Asset Service Providers" bringing them within the ALM-CTF Act as money changers.[111] This apathetic approach appears to show that the FMA has little appetite to enact comprehensive financial regulation.

Beyond legislation, NZ's prudential regulator, the Reserve Bank, could issue industry guidance. The Bank also appears unwilling to do so. Stablecoins alone were discussed in their recent Future of Money series.[112] The paper states stablecoins "should be captured by the FMI Act" if the FMA exercised their designation powers.[113] Any requirements this designation may introduce only focus on ensuring the capital adequacy of stablecoin issuers.[114]

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[103] At s 9(1)(b).
[104] At ss 9(1)(c), 142.
[105] At s 8(4)(a)(i).
[106] At s 562(1).
[107] Financial Markets Authority (19 August 2022) "Cryptocurrencies"
<https://www.fma.govt.nz/consumer/investing/types-of-investments/cryptocurrencies/>.
[108] Financial Markets Authority "Spotlight on Cryptocurrencies" (10 August 2022).
<https://www.fma.govt.nz/library/articles/spotlight-on-cryptocurrency/>.
[109] Financial Service Providers (Registration and Dispute Resolution) Act 2008, s 5(1)(f).
[110] At s 11(1).
[111] Anti-Money Laundering and Countering Financing of Terrorism Act 2009, s 130 (1)(d); and AML Online "DIA's AML/CFT Reporting Entities" (26 June 2021) at <https://aml.dia.govt.nz/AMLReportingEntities/>.
[112] Reserve Bank of New Zealand *Future of Money Stewardship* (September 2021) at 31.
[113] At 34; and Financial Markets Infrastructure Act 2021, s 31-34.
[114] Reserve Bank of New Zealand, above n 112, at 33.

5.   Analysis

The growing potential for states to directly coerce blockchains as well as the unsatisfactory financial regulation of virtual assets is a major obstacle to DAO adoption. *Lex Cryptographia's* private frameworks rely on blockchains remaining isolated from external influence. Ethereum's PoS transition risks eroding this by centralising nodes into larger services controlled by companies that are vulnerable to coercion while providing no ability to withdraw. This introduces the possibility that the DAOs private regulatory framework will no longer be the exclusive source of behavioural rules, potentially undermining the DAO itself. Whether that risk will eventuate remains uncertain but it would be remiss to ignore it.

Current financial regulations provide more immediate challenges for all blockchain-based businesses, including DAOs. Beginning in the US, absent legislative action, different federal regulators will continue vying for control. Virtual asset businesses must then comply with multiple regulators to avoid enforcement action, even if their requirements are overlapping or contradictory. Furthermore, businesses risk operating illegally under the Howey Test either by issuing or interacting with assets deemed securities. The SEC's test case against Ripple was intended to alleviate some uncertainty by issuing much-needed precedent. Yet it is increasingly unlikely this case will provide timely guidance. Moreover, what success, if any, the SEC has against Ripple may prove unhelpful. Other virtual assets may differentiate themselves from Ripple labs, a centralised blockchain provider with known directors incorporated in the US. Consequently, the US provides an inhospitable legal environment suitable only for those willing to risk enforcement action or those with sufficient coffers to endure years of litigation.

NZ's environment is similarly inhospitable, albeit for different reasons. Virtual assets are not adequately covered by financial regulation. NZ businesses are subject only to minimal registration, dispute resolution and AML requirements. This apparent apathy is nonetheless dangerous. A knee-jerk response could be evoked if consumers suffered from a market failure due to a lack of oversight. This could lead to the DAO or its activities being deemed unlawful.

The uncertainty of current financial regulation presents a considerable obstacle to using a DAO. New users will likely forgo creating or interacting with a DAO if their host state does not conclusively characterise those actions as lawful. Those engaging in blockchain-based activities already operate under this uncertainty, perhaps explaining why DAOs are so frequently used in that industry. However, outside of this niche, the obstacle posed by uncertain virtual asset regulation will hinder DAOs from expanding into the mainstream.

Placing the challenges of uncertain virtual asset regulation to one side, the second major legal obstacle facing DAOs is a lack of novel recognition. Users may be unwilling to rely exclusively on *Lex Cryptographia* to regulate their affairs and instead seek the comforts of traditional structures. DAOs can facilitate this by "wrapping" themselves in recognised structures. All others remain "unwrapped", relying exclusively on *Lex Cryptographia* to govern their processes and the willingness of third parties to contract within those laws.[115] However, the creation of a DAO has legal consequences, intended or otherwise. Most jurisdictions will impose a legal structure on unwrapped DAOs, usually as a general partnership.[116]

The US Limited Liability Company ('LLC') and the Cayman Foundation Company will be examined as the two most promising DAOs wrappers. Yet it will be shown that even these have disadvantages which make them potentially incompatible with DAOs. NZ will then be briefly examined as an example of a jurisdiction that remains devoid of viable wrappers. The compromises involved in using these wrappers and the fact that jurisdictions may lack wrappers at all constitutes the second legal obstacle to DAOs.

1.	*The Limited Liability Company*

Vermont's blockchain-based limited liability company (BBLLC) became available in 2018.[117] The BBLLC wrapper affords DAOs with legal personality and limited liability without disturbing their ability to be governed by blockchain and SC technology.[118] Articles of incorporation must include the DAO's purpose, outline voting procedures, the role of managers/members and the rights and obligations of each group of participants within the BBLLC.[119] Wyoming provides another recent option for DAOs to access the LLC structure through a DAO LLC.[120] Similar requirements include articles of organisation stating the organisation is a DAO and the name including "DAO", "LAO" or "DAO LLC".[121] Existing organisations may be converted into a DAO by amending their articles of organisation.[122] Wyoming DAO LLCs can be member or algorithmically

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[115] Wright, above n 1, at 167.

[116] Biyan Mienert "How can a Decentralised Autonomous Organisation (DAO) be Legally Structures?" (2021) L Rev J LRZ 1 at 3.

[117] Chin Yang Joseph Lau "Legal and Regulatory Intervention in the Cryptocurrency Space: An Impossible Task? (2021) 33 Sac Lj 50 at 55.

[118] 11 VSA § 4173.

[119] At § 4173.

[120] Wy Stat § 17-31-104(a).

[121] At § 17-31-104(d).

[122] At § 17-31-104(a).

managed.[123] Delaware's 'gold standard' LLC can also be extensively modified to meet the needs of a DAO.[124]

LLCs are enticing wrappers because of their exceptional flexibility in structure and governance. These include the ability to contract out of fiduciary duties, mandate compulsory arbitration and utilise US courts to enforce DAO decisions.[125] They naturally afford members limited liability.[126] Therefore, DAO LLCs offer members formal legal protection from the organisation's creditors.[127] US LLCs represent a remarkably enabling approach, affording parties significant discretion to organise their affairs.[128]

LLCs nonetheless have several disadvantages. Wyoming requires a 50% member consensus for decisions and for the DAOs articles of association to be amended if its underlying SCs are updated.[129] Such requirements are impractical for larger DAOs with fluid members and SC parameters. Delaware LLCs must maintain the identity of all members.[130] All members have the right to this information practically making it public knowledge.[131] The only barrier to becoming entitled to that information would be purchasing a governance token denominated to 1×10^{-18}, potentially costing fractions of a cent. A subsequent network-wide loss of pseudonymity could follow; a trade-off unlikely to warrant joining the DAO. Furthermore, maintaining records would be impossible for larger DAOs whose governance token proliferates widely. More generally, LLC customisation may also lead unwitting members to forfeit or obtain duties they otherwise would not have.[132] These compromises may dissuade a DAO from wrapping itself in a LLC.

2. *The Foundation Company*

Offered since 2017, Cayman Islands Foundation Companies ('FC') provide a second promising wrapper. FCs are governed by the Cayman Island Company Law, except where inconsistent with the Foundation Companies Act, benefitting from existing case law and jurisdictional recognition.[133] Becoming a FC requires proving the company is limited by shares along with having a memorandum which states it is a company, describes its objects, provides for the disposal

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[123] At § 17-31-104(e).
[124] Nielsen, above n 8, at 1116.
[125] Wy Stat § 17-31-110; and Del Code Ann tit 6 § 18-1011(e).
[126] 11 VSA. § 4021; and WY Stat § 17-29-304(a)-(d); and Del Code Ann tit 6 § 18-305(a)(3).
[127] Wright, above n 1, at 166.
[128] At 167.
[129] Wy Stat § 17-31-102(a), § 17-31-105(d).
[130] Del Code Ann Tit 6.
[131] At § 18-305(a)(3).
[132] Nielson, above n 8, at 1118.
[133] The Foundation Companies Law 2017 at s 3(2).

of surplus assets on winding up and prohibits dividends or distributions to its members.[134] The company must also have adopted articles and a secretary, a person licenced to provide company management services in the Cayman Islands.[135] Any company may apply to become a foundation company once these conditions are met.[136]

FCs may prove popular for DAOs. They obtain legal status, limited liability and protection from foreign judgments under the firewall provisions of the Trusts Act.[137] A FC's constitution may provide for member management and afford members any rights, power and duties.[138] Directors and a foundation secretary are required but may occupy a nominal role with their powers capable of substantial limitation.[139] Constitutional powers may be exercised for any purpose and subject to any conditions.[140] FCs can be structured without shareholders making them ownerless like the DAO they represent.[141] The Cayman's absence of corporation, capital gains and income taxes may provide an additional incentive for DAOs.[142]

Nonetheless, FCs entail several compromises. They require creation by a known founder, the presence of directors and ongoing monitoring by a secretary. Documents detailing those individuals' identities must be filed with the registrar.[143] That information technically remains private but could be leaked in a Panama papers-style incident. A founder not located in the Caymans could present an easy point of liability in that event. Furthermore, those person's existence itself presents problems beyond their unmasking or potential litigation. Blockchain purists live by the mantra of "don't trust, verify". Any requirement to trust others, even nominally, runs contrary to this base tenet.

3.   *New Zealand*

NZ provides an example of a jurisdiction that is currently incongruent with the core thesis of DAOs. Decentralised governance, pseudonymity and fluid membership are not facilitated by any current structure.

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[134] At s 4(1).

[135] At s 4(1)(a)-(d).

[136] At s 5(1).

[137] Trusts Law 2020 s 91-93; and Foundation Companies Law 2017, s 4.

[138] At s 7(1).

[139] At s 7(2).

[140] At s 7(3).

[141] Bernadette Carey and Chris Duncan "Cayman Islands Foundation Companies for DAOs, Defi and NFTs" (6 April 2022) Carey Olsen < https://www.careyolsen.com/briefings/cayman-islands-foundation-companies-daos-defi-and-nfts>.

[142] Cayman Islands Government "Our Finance & Economy" (11 August 2022) <https://www.gov.ky/about-us/our-islands/finance-economy>.

[143] Foundation Companies Law 2017, s 5.

4.   *Company*

A NZ company must have at least one director and issue one or more shares.[144] This means NZ law does not allow for member-managed companies like a US LLC or Cayman FC. Shares have specific meanings that do not readily translate to governance tokens.[145] This, along with the requirement to appoint a director, would present an insurmountable difficulty to using a NZ company as a DAO wrapper.[146]

5.   *Partnership*

Unwrapped DAOs would automatically become partnerships under NZ law. Most DAOs are businesses that intend to profit, meeting the legislative bar that characterises relationships as partnerships in the absence of contrary evidence.[147] DAO members may also share profits, further evidencing a partnership relationship.[148] Consequently, each member of the DAO would become a partner by possessing governance tokens.

As partners, members would be jointly liable for all debts and obligations incurred by the DAO during their time as a partner.[149] A single member's actions could bind the wider DAO with further liability imposed if they acted wrongly within the ordinary course of business which resulted in loss, injury or penalty.[150] The possibility of that will be explored when discussing governance attacks in part IV. Outside of being completely at odds with the DAO's consensus requirements, the imposition of unlimited liability could bankrupt unwitting investors held responsible for the wider DAO's actions. Any unfortunately doxed member could bear full liability with other partners escaping through geographic location or pseudonymity. Worse still, malicious actors could become a partner by obtaining governance tokens, commit an illegal act on the DAO's behalf, then dispose of those tokens and vanish. The remaining partners would be jointly liable, an unacceptable outcome.

DAO decisions also typically pass with a fraction of members engaging in binding on-chain votes. Therefore, the DOA would rampantly violate the unanimous statutory consent required to amend the rights and duties of partners or add a new partner.[151] DAOs with unlimited token proliferation

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144 Companies Act 1993, s 10.
145 At ss 35-40.
146 At ss 127, 128.
147 Partnership Law Act 2019, ss 8(1), 9.
148 At s 14(1).
149 At s 22(1).
150 At ss 20, 23.
151 At ss 35, 50.

have limited abilities to control membership at all. Some DAOs may also be considered 'large partnerships' due to their asset holdings making them subject to additional financial reporting requirements.[152] These would likely go ignored.

These rules form the basis of partnerships in other jurisdictions meaning NZ largely provides an example of the rule, not an exception.[153] Characterising an unwitting DAO as a partnership can only be described as catastrophic.

C. *Conclusion on the Current Legal Environment:*

Investors seeking to wrap DAOs in familiar corporate forms will find current options lacking or non-existent. Obtaining limited liability and separate legal personality is possible but only at the cost of altering the DAOs basic structure or compromising its foundational features. Not incorporating at all risks the DAOs being characterised as a partnership, an undesirable outcome. Until a structure becomes available that solves these issues, DAOs that desire legal recognition will be forced to choose between these equally unsatisfactory options. This further bolsters the conclusion arrived at following the earlier discussion of virtual asset regulation. The current legal environment creates too much uncertainty and offers too few protections. Combining the legal obstacles posed by virtual asset regulation and legal recognition provides a strong argument for why DAOs use remains highly limited.

Does this spell the death warrant for DAOs? Not necessarily. DAOs have the ability to overcome these legal obstacles by operating exclusively pursuant to their private regulatory frameworks. Adopting this alegal course of action relegates the structure's use to situations where such drastic action warrants consideration. That situation arises because of the very regulatory uncertainty and lack of recognised organisational structures just discussed. In those circumstances, the best way to mitigate those obstacles may be to avoid them entirely.

IV. *Lex Cryptographia's Obstacles*

Lex Cryptographia allows DAOs to regulate behaviour with private regulatory frameworks instead of those offered by existing laws. DAOs can successfully operate this way, contemporary examples presented earlier prove as much. However, doing so may substitute one set of problems with another. The consequences of using *Lex Cryptographia* include the imposition of pseudonymity, limited access to capital markets and the dynamics of token holder governance.

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[152] Financial Reporting Act 2013, ss 58(2), 59-65.
[153] Henry Hansmann and Reiner Kraakman "The Role of Organizational Law" (2000) 110 Yale L J 387 at 395.

A novel analysis of the obstacles faced by DAOs using *Lex Cryptographia* is relevant both now and in the immediate future. Even if the legal obstacles discussed are adequately mitigated by developments in the law, those posed by *Lex Cryptographia* will likely remain. Any one of these may tip the scales against using a DAO, further hindering the structure's usefulness.

A. *Privacy*

Blockchains can create pseudonymous environments allowing users to transact without disclosing their identity.[154] Users interact with blockchains by submitting transactions, whose details including their time, contents and parties involved are usually publicly viewable on the blockchain's records.[155] Transaction details are linked to public address made up of random letters and numbers.[156] Actions are pseudonymous because individual acts can be linked to a specific address.[157] However, user identities' cannot be linked to that address affording a level of privacy.[158] DAOs inherit pseudonymity as a consequence of using blockchains.

The ability for organisations to operate privately has several benefits as detailed by Moon.[159] DAOs can obtain and protect those benefits more effectively than traditional structures. However, blockchain pseudonymity only breaks the link between the user and their identity while leaving transaction details public. This imposes a level of transparency that makes DAOs unsuitable for certain organisations. The interplay between blockchain pseudonymity and transparency provides the first potential obstacle to DAOs imposed by *Lex Cryptographia*.

1. *Identity Shielding*

Moon coins the ability of individuals to invest in and operate businesses without forced public disclosure as identity shielding.[160] Identity shielding can encourage investment by preserving the privacy of capital contributors.[161] Privacy may be essential to businesses depending on their activities and how society views them. Yet privacy creates a moral hazard by allowing anonymous firms to engage in a variety of undesirable activities including the evading of involuntary creditors, financial crime and money laundering.[162] That potential has led to an overzealous campaign to strip privacy-preserving features from organisational law.[163] Privacy that results in anonymity can

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[154] De Filippi, above n 51, at 11.
[155] At 11.
[156] At 11.
[157] At 11.
[158] At 11.
[159] William Moon "Anonymous Companies" (2022) 71(7) Duke L Rev 1425.
[160] At 1431.
[161] At 1432.
[162] At 1434.
[163] At 1434.

certainly facilitate illicit or immoral activities. However, there are legitimate reasons to operate privately making it necessary to resist the urge to depict opaque structures as unquestionably nefarious.[164]

Public disclosure can negatively impact owners by revealing immutable traits. Issues of bias pursuant to race, religion, sexuality or even age remain present in all facets of society, especially business.[165] Privacy allows for capital to flow and businesses to thrive unfettered by these biases. Moon further argues that identity shielding can be likened to limited liabilities' importance as a tool for encouraging socially productive risk-taking.[166] Investors obtain a form of reputational limited liability by keeping investments private.[167] Therefore, identity shielding could encourage the flow of capital to business ventures that otherwise remain unfunded.

2.   *Vulnerabilities*

Existing structures' privacy-preserving features' are vulnerable to legal changes.[168] Many states are reforming structures and forcing disclosure through mandated public registries following the revelations arising from leaks like Panama Papers. The premise of these changes is that displaying the beneficial ownership interests in companies enables greater scrutiny by investigative journalists and civil society that will help prevent the abuse of anonymous companies by the criminal and corrupt.[169] The EU leads reforms by requiring member states to keep publicly accessible central registers of beneficial owners.[170] Minimum information requirements include the beneficial owners' name, month and year of birth, country of residence, nationality and the nature and extent of the beneficial interest held.[171] This will supposedly prevent illicit activity by helping to detect and deter illicit activities.[172] Yet mandatory disclosure requirements appear to ignore the glaring issue that those utilising structures for illicit purposes must self-report incriminating information.[173] UK laws also appear inadequate as the UK registry simply accepts information without inspecting it for accuracy.[174] The fact that providing false information is a crime is unlikely to dissuade those already using structures for illicit purposes from doing so. Of course, loopholes

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[164] At 1444.
[165] At 1449.
[166] At 1453.
[167] At 1455.
[168] At 1453.
[169] At 1471.
[170] At 1472.
[171] At 1472.
[172] At 1475.
[173] At 1480.
[174] At 1481.

like those present in the EU and UK can be closed, but the costs of disclosure will likely be disproportionately borne by law-abiding citizens.

3. *Privacy and DAOs*

DAOs offer a structure capable of implementing and improving upon privacy-enhancing features. Users obtain the option of identity shielding when participating in the DAO via pseudonymity. The core team of larger DAOs will likely waive this option in favour of capitalising on their reputations.[175] Other participants can interact with the DAO and only reveal their public address which remains unlinked to their actual identity. Users may do so for those reasons outlined by Moon above. The unsatisfactory nature of virtual asset regulation already explained provides another strong justification for remaining private. Users may prefer DAO-administered services to those offered by a competing traditional firm for those reasons. Naturally, this allows DAOs to engage in unambiguously undesirable activities as well. However, no examples are readily available, likely due to the imposition of transparency detailed below. In any case, DAOs afford users the ability to retain their privacy if they so desire. How users value this option is likely to change alongside a wider societal trend toward privacy-enhancing technologies.[176]

As Moon has detailed, implementing privacy-preserving features is one thing, ensuring they remain is another. Here DAOs solve the primary weakness with Moon's privacy-enhancing features, permanence. States remove privacy by requiring centralised businesses to disclose that information.[177] DAOs operating pursuant to *Lex Cryptographia* alone lack both a coordinating body and a centralised place of incorporation. That nullifies states' primary attack vector as DAOs have no centralised entity to directly coerce. Furthermore, provided blockchains themselves remain uncoerced, states cannot indirectly control a DAO via their blockchain foundations. This makes it improbable that states could directly or indirectly force DAOs to relinquish their privacy-enhancing features, ensuring their permanence. That immunity from state coercion is a unique feature other structures are increasingly unable to offer.

4. *Transparency*

The quid pro quo of pseudonymity is *Lex Cryptographia's* imposition of transparency. Information linked to the DAO's addresses is publicly available on the blockchain. The exact details of the DAOs assets, any transactions it makes, the salaries it pays, and its underlying code are all visible

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[175] The identities of core teams of large DAOs are know, see for example, Uniswap, Sushiswap, Convex, Compound.
[176] Privacy Commissioner "Survey: Two thirds of New Zealanders want more privacy regulation" (press release, 30 June 2020).
[177] Thomson Reuters, above n 73, at 23, 24, 27 and 28.

on a live basis. Total transparency is arguably the prerequisite that enables DAOs to function in a trustless manner between diverse pseudonymous users. Users will demand visibility into all aspects of the DAO to ensure it functions as described given a total lack of legal protection. Blockchains' imposition of transparency allows anyone to audit the DAO's code to ensure its legitimacy.[178] Transparency also provides a constraining effect on the DAO's activities. DAOs cannot covertly contravene the wishes of their community, renege on governance decisions or divert funds to unauthorised activities.[179] This affords stakeholders the confidence that DAOs can be held accountable for their actions. Further advantages of transparency apply to token holder governance discussed in part IV.

The unavoidable nature of blockchain transparency comes with potential disadvantages. DAOs cannot protect the intellectual property of applications it develops. If the DAO develops a particularly efficient SC that outperforms its competitors, those same competitors can freely copy it. The DAO's assets are also public, potentially putting them at a competitive disadvantage. ConstitutionDAO, a quasi-investment DAO whose goal was to purchase a copy of the US constitution at auction, experienced this first-hand.[180] When it came to the auction, other bidders could search the DAO's addresses, examine its treasury and ascertain its maximum bid. ConstitutionDAO lacked the same information on rival bidders putting them at a fatal disadvantage that led to them losing the auction.[181]

5.   *Conclusions*

Those considering a DAO must ensure that the benefits of pseudonymity and transparency outweigh their costs. Whether they do depends on the DAO's proposed activity and its users. For some uses, the costs will be minimal or non-existent. Current DAOs again provide the best example of this. For others, the inability to keep information confidential will provide a major obstacle to using a DAO.

B.   *DAO Financing*

DAOs substitute shares with governance tokens. This imposes legal and economic consequences including them being cut off from traditional capital markets. While *Lex Cryptographia* provides ways to obtain initial funding from willing investors, it currently offers options to obtain funding

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[178] Wright, above n 1, at 160.
[179] At 161.
[180] Interview with Will Papper, Syndicate Co-Founder (Dan Boneh, Stanford Dao Symposium, 11 March 2022) transcript provided by Rev.com (San Francisco).
[181] Will Papper, above n 180.

on an ongoing basis. This constitutes the second potential obstacle facing DAOs using *Lex Cryptographia* this piece will analyse.

1. Shares

Farwell J describes shares in *Borland's* as:[182]

> … the interest of a shareholder in the company measured by a sum of money, for the purpose of liability in the first place, and of interest in the second, but also consisting of a series of mutual covenants entered into by all shareholders.

Lord Hoffman affirmed *Borland's* in *Cambridge Gas,* adding that shares are a chose in action.[183] Drawing from these definitions, shares can be described as a species of intangible property which comprise a collection of rights and obligations relating to a company that do not constitute a debt.

Company ownership is achieved by possessing shares. Various company documents and applicable corporate law statutes proscribe the extent of share rights.[184] These typically include control over the company through the ability to elect or remove directors, rights to receive capital as residual claimants at dissolution and rights to income via dividends.[185] Importantly, shareholders cannot exercise control over the companies' assets directly.[186] This would confuse ownership of the company with ownership of its assets, disregarding the foundational notion of separate legal personality.[187]

The law caters for the various needs of investors by facilitating the creation of different share "classes" that afford holders different rights.[188] The prevailing classes are "common" or "ordinary" shares and "preferred" or "preference" shares. Common shares afford voting rights and an equal *pro rata* claim to distributions from dividends and upon liquidation.[189] Preference shares generally trade voting rights for rights to receive distributions before common shareholders.[190]

Shares occupy an important role in raising capital in one-off instances with their various classes balancing the interests of entrepreneurs and investors.[191] They also serve an important ongoing

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[182] *Borland's Trustee v Steel Brothers & Co Ltd* [1901] 1 Ch 279 at 288 per Farwell J.
[183] *Cambridge Gas Transportation Corporation v Official Committee of Unsecured Creditors of Navigator Holdings plc* [2006] UKPC 26, [2007] 1 AC 508 at 519.
[184] Andreas Cahn and David Donald "The Nature and Classes of Shares" in *Comparative Company Law* (Cambridge University Press, Cambridge, 2018) at 308.
[185] At 310.
[186] At 307.
[187] At 307.
[188] At 312.
[189] At 313.
[190] At 312.
[191] At 313.

role in external debt financing by forming collateral for the company to borrow against.[192] Debt financing provides essential funding that otherwise would necessitate the company liquidating equity and incurring the associated consequences.[193]

2. *Governance tokens*

Governance tokens serve an analogous function to shares. Various economic, voting, participation, consumptive or utilisation rights can be assigned to them via SCs.[194] They nonetheless have several legal and practical differences though. Governance tokens are virtual assets that are typically not issued pursuant to traditional security laws. The legal status of these tokens remains unclear as detailed in part III. The scope of attributed rights is unfettered by legal rules and limited only by SC and blockchain rules.[195] Furthermore, *Lex Cryptographia* facilitates their function. Returning to the earlier vending machine and vehicle examples, layers of SCs ensure those rights function automatically, autonomously and without fail. This removes the need for governance tokens to operate within traditional legal environments and their conceptual barriers.

Practical differences arise by nature of token issuance being governed by SCs rather than statutes or company constitutions.[196] Current DAOs usually issue a finite supply of tokens that cannot increase.[197] This prevents them from raising equity funding by issuing additional tokens. Protocols also typically issue a single governance token rather than splitting them into multiple classes like shares.[198]Additionally, governance tokens afford users the practical ability to control the DAOs assets directly via token holder governance, a major departure from how shares function.

These differences remain subject to changes in legal treatment and behavioural norms but at present, they are largely ubiquitous. Those considering a DAO structure must consider the potential consequences of substituting shares with governance tokens. These include attracting willing investors as well as obtaining initial and ongoing funding.

3. *Investor Willingness*

Arguments that governance token's legal indeterminacy will result in a lack of willing investors have proven popular but erroneous.[199] Capital inflows have pushed the cumulative value of the

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192 Cahn and Donald, above n 184, at 221.
193 At 220.
194 Wright, above n 1, at 152.
195 Aaron Wright "Blockchain-Based Token Sales, Initial Coin Offerings and the Democratisation of Public Capital Markets" (2019) 70(2) Hastings L Rev 463 at 474.
196 Wright, above n 1, at 152; and see generally, Companies Act 1993, ss 41-51.
197 Wright, above n 195, at 466.
198 At 475.
199 Nielson, above n 8, at 1114.

ten largest governance tokens to over \$22b USD.[200] Therefore, characterising legal indeterminacy as an obstacle rather than a barrier to investment is more accurate.

4. *Initial Fundraising*

With willing investors available, the challenge of raising funds from them presents itself. DAOs are precluded from traditional capital markets by nature of not being companies with traditional assets like shares. DAOs overcome part of that deficiency by replacing IPOs with creatively named Initial Coin Offerings (ICO).[201] These initial token sales lack the traditional legal scrutiny, disclosures and battery of professionals that tightly control access to public capital markets.[202] Instead, parties seeking to launch a DAO through an ICO draft a 'white paper' that outlines the technical features of the protocol and its objective.[203] The protocol's code is made available for audit and founders engage in marketing to generate interest prior to the sale going live.[204] Once live, anyone can conceivably purchase tokens, usually in exchange for virtual assets.[205] Tokens are typically non-redeemable and may be subject to transfer restrictions, depending on the DAOs private regulatory framework.[206] All proceeds go to the organisation deploying the DAO or are received directly into the DAO's treasury.[207] ICOs have proven an effective method of raising billions of dollars in initial capital since 2017.[208] The process is much simpler than pursuing a traditional IPO as it sidesteps any associated legal, regulatory and disclosure costs and requirements. That simplicity may provide a compelling reason to utilise a DAO and offers a way of obtaining initial funding.

5. *Ongoing Fundraising*

Of equal importance for businesses is obtaining ongoing funding. Traditional companies utilise liquid capital markets to access debt financing when this happens.[209] Lenders bind companies with legal contracts, obtain director guarantees as well as take security in the company's assets or equity to ensure repayment.[210] DAOs operating alegally cannot offer these protections by lacking a legally

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[200] Coinmarketcap "Total Cryptocurrency Prices by Market Cap" (10 September 2022) <https://coinmarketcap.com/writing>.
[201] Wright, above n 195, at 465.
[202] At 465.
[203] At 477.
[204] At 478.
[205] At 478.
[206] At 479.
[207] At 480.
[208] At 481.
[209] Philippe Aghion and Patrick Bolton "An Incomplete Contracts Approach to Financial Contracting" (1992) 59(3) Rev Econ Stud 473 at 491.
[210] At 475.

recognised entity, directors or legally certain assets like shares to offer as security. What options then remain?

Most DAO treasuries are exclusively denominated in their governance token.[211] Ongoing financing necessitates unlocking the illiquid value of these tokens, usually through obtaining stablecoins.[212] These could be obtained by the DAO liquidating tokens. That requires the market to have sufficient liquidity to absorb the sale's shock. If not, the token's price will fall and the DAO's remaining treasury suffer. The DAO could instead directly locate a financier. This necessitates relying on the financier to not liquidate the tokens themselves; possible but unlikely. Debt financing avoids the need for businesses to liquidate assets and drive their price down. Therefore, the ideal solution for DAOs would be a blockchain-native version of it.

Blockchain-based applications offer a partial solution, albeit only for the largest DAOs. Certain DeFi lending platforms offer debt financing by accepting governance tokens as collateral for loans.[213] Uniswap, Yearn.finance, Curve and Maker tokens are examples of accepted tokens. However, these DAOs all have a market cap above $250m, justifying DeFi platforms listing their tokens via their adequate market interest and the improbability of the token failing that would bring the lending platform into disrepute. Smaller DAOs lacking similar market caps are unlikely to warrant the effort and risk assumed by DeFi lending protocols in accepting their tokens as collateral.

With DeFi's rapid growth, a solution that allows the collateralisation of any virtual asset will likely soon appear. In the meantime, DAOs of all sizes remain isolated from traditional capital markets. Larger DAOs overcome this deficiency by utilising DeFi lending protocols. Adequate treasury diversification away from exclusively holding the DAO's governance tokens can mitigate these challenges for those protocols too small to warrant listing. This involves the DAO retaining adequate liquid assets acquired in the DAOs ICO for use as collateral in DeFi loans. Those that eschew ICOs in favour of natural growth will naturally forgo this ability potentially leaving them with no choice but to liquidate tokens directly.

6.   Conclusions

DAOs utilising *Lex Cryptographia* alone can raise initial funding from willing investors. However, the ability to obtain ongoing funding remains unavailable to all but the largest DAOs. Much like

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[211] See, for example, Uniswap Treasury (8 October 2022)
<https://etherscan.io/address/0x4b4e140d1f131fdad6fb59c13af796fd194e4135>.
[212] A token pegged to an external asset, typically the United States Dollar.
[213] See, for example, Compound.finance "Assets" (6 October 2022) < https://app.compound.finance/>.

the conclusion on privacy, the relative impact of this varies. Those that acquire adequate initial funding, manage their treasuries in a sustainable manner and can fund expansion without liquidating assets or obtaining debt will be unimpacted by these limitations. For others, the way *Lex Cryptographia* isolates DAOs from traditional capital markets and provides inadequate methods for accessing debt financing will constitute an insurmountable obstacle to using the structure.

C.   *Token Holder Governance Dynamics*

The final two obstacles this piece will analyse relate to DAO governance. Governance can be described as the method of applying and implementing policies that control an organisation's actions, generally through or by an organisation's governing body. DAOs operating pursuant to *Lex Cryptographia* alone must regulate the exercise of this power without the benefit of traditional legal duties. Examining these duties and how token holder governance functions contextualises the analysis of the final two obstacles.

1.   *Legal Duties*

Users wielding control over traditional organisations are constrained by legal duties requiring them to act in good faith, for the benefit of beneficiaries, in the best interests of "the company" or some variation of the three.[214] Profit-making enterprises typically utilise companies making them a logical comparison for DAOs. The board of directors is the primary decision-making body within companies.[215] Directors wield overarching powers to manage the company pursuant to its constitution and the general law.[216] Duties ensure these powers are used for proper purposes. These duties largely fall into two categories; a duty of loyalty and a duty of care.[217] Loyalty requires directors to avoid actual or potential conflicts of interest, not acquire voting power for the purpose of maintaining control and not declare dividends or diverting corporate opportunities to themselves or their affiliates.[218] The duty of care requires directors to exercise reasonable care and diligence when acting for the company.[219] These duties are designed to fill gaps in contracts that otherwise would prevent the efficient running of an organisation.[220]

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[214] Trusts Act 2019, s 26; and Companies Act s 131; and Jennifer Hill "Chapter 1: Evolving Director Duties in the Common Law World" in Adolfo Paolini *Research Handbook on Directors' Duties* (Edward Elgar Publishing Ltd, Northampton, 2014).

[215] Kenneth Nielsen "Directors' Duties under Anglo-American Corporation Law" (1966) 43(5) Univ Detroit L Rev 605 at 622.

[216] At 622.

[217] Cleaveland Miller "The Fiduciary Duties of a Corporate Director" (1975) 4(2) Univ Baltimore L Rev 259 at 261.

[218] At 262 and 264-266.

[219] *Re D'Jan of London Ltd* [1994] 1 BCLC 561 (EWHC) at 563.

[220] Wright, above n 1, at 170.

The effectiveness of these duties is debatable. Evidence suggests that the core purpose of business enterprises has radically shifted from the creation of wealth for all stakeholders to the extraction of value for a select group of financial institutions, shareholders and executives.[221] Leaving that debate to one side, at the very least, duties provide a check on the exercise of directorial power and prevent some amount of negative behaviour.

2.   Token Holder Governance

DAOs utilise token holder governance where users vote on governance proposals that direct the organisation.[222] Governance proposals are created and voted upon with on-chain transactions.[223] The extent of a user's voting power is determined by the governance tokens they possess.[224] Proposals control the DAO totally and are implemented without fail provided the procedural rules of the DAOs private regulatory framework are met.[225] Unlike existing structures that constrain behaviours with duties, *Lex Cryptographia* provides no checks beyond what is provided for by the DAO's SCs.[226] Without these duties, users can potentially pass proposals that manipulate the DAO for their own benefit.

Token holder governance creates two situations where users can manipulate DAOs. The first occurs when the DAO's founders retain actual control post-launch.[227] The second is where the DAO is the victim of governance capture. Founder control can be adequately mitigated within the context of *Lex Cryptographia*. However, the challenges of governance capture are not so easily overcome.

D.   Founders

DAOs are coded into existence according to the ideas and expectations of their founders. Founders determine the DAO's purpose, design its SCs and typically obtain significant quantities of governance tokens in return for their investments. Therefore, founders hold considerable power in the DAO's creation and operation via their token holdings. An intuitive argument is that founders will protect that power and manipulate the DAO in their favour. The argument goes that

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[221] Thomas Clarke, Walter Jarvis and Soheyla Gholamshahi "The Impact of Corporate Governance on Compounding Inequality: Maximising Shareholder Value and Inflating Executive Pay" (2019) 63 Crit Perspect Account 102049 at 102055.
[222] Wright, above n 1, at 160.
[223] At 160.
[224] At 160.
[225] At 160.
[226] At 170.
[227] This refers to the initial Dev team and any investors funding the DAOs development.

founders have a vested interest in retaining control over the DAO they have created even if governance tokens are distributed and a voting mechanism deployed post-launch.

Token holder governance splits proposals into two components to account for potential voter apathy, a minimum quorum requirement to ensure voter participation and a substantive voting threshold.[228] Quorum requirements can be as low as 4 per cent with voting thresholds typically requiring a voting majority of those that participate.[229] With few proposals exceeding 20 per cent on-chain community participation, founders arguably only need 10-15 per cent of all governance tokens to retain effective control of the DAO. The remainder can be distributed to the community who obtain the illusion of control.

Examining the community itself, empirical psychological research has shown that individuals exhibit strong status quo biases when presented with change.[230] This makes the community unlikely to alter features implemented by founders, however detrimental to their interests. Moreover, game theoretical models suggest the existence of an incumbency advantage where voters are unlikely to vote against decisions favoured by incumbents.[231] If incumbent founders vote against a proposal, users are likely to follow. Combining these premises invites the conclusion that DAOs are vulnerable to being controlled by founders alone.

1.   *Lex Cryptographia response*

Lex Cryptographia provides no duties to prevent this behaviour. Yet it does provide mechanisms to avoid this. Some founders adhere to the DAO's ethos of community control and cede tokens accordingly. For those that do not, voting transparency has a passive constraining effect on founders. Additionally, the threat of the community forking the DAO in the event of impropriety provides an active incentive for founders to avoid impropriety.

2.   *Ceding Control*

Yearn.finance, MakerDAO and Curve provide different examples of founders ceding control. Yearn.finance pioneered the 'fair launch' model where the lead developer obtained no tokens on launch, instead electing to distribute all tokens equitably as rewards for interacting with the

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[228] At 165.

[229] See, for example, Uniswap Labs "Governance" (6 October 2022) <https://docs.uniswap.org/protocol/concepts/governance/process>; and Aave "Governance" (6 October 2022) < https://docs.aave.com/governance/>.

[230] William Samuelson and Richard Zeckhauser "Status Quo Bias in Decision Making" (1988) 1 J Risk Uncertain 7 at 47.

[231] Scott Feld and Bernard Grofman "Incumbency Advantage, Voter Loyalty and the Benefit of the Doubt" (1991) 3 J Theor Politics 115 at 130.

protocol.[232] Founders that accumulated large token holdings did so on an equal playing field with all other users. The Maker Foundation, responsible for the DAI stablecoin, provides another albeit delayed example. The foundation launched in 2017 and pledged to eventually fully cede control to the community.[233] The central team made good on that pledge by transferring their remaining tokens worth $480m to MakerDAO after three years of development.[234] These provide practical examples that rebut the presumption that all DAO founders will retain control.

Curve utilised a more typical launch with 30 per cent of tokens allocated to the Curve team and investors.[235] The remainder was allocated with 5 per cent to the treasury and 65 per cent to those that interacted with the DAO as part of a rewards scheme to be discussed later in this article. While they lack a majority, at first glance this launch appears to leave the founders with adequate tokens to control the DAO when accounting for voter apathy. However, voter apathy is largely an illusion created by token holder governance dynamics.

3.   *Voter Apathy, Transparency and Community Constraints*

Existing papers assert that voter apathy allows founders to control the DAO even without an absolute majority of governance tokens.[236] These arguments focus on on-chain voting statistics.[237] However, this creates misconceptions about token holder governance and ignores how *Lex Cryptographia's* transparency provides the community with the ability to constrain this behaviour.

Returning to technicalities, governance proposals are created and voted upon using on-chain transactions.[238] Submitting transactions for validation requires users to pay gas as discussed in part II. DAOs built on Ethereum sometimes require tens or hundreds of dollars of gas to submit these transactions.[239] Higher costs can lead to less community participation.[240] Alleviating this is achieved using signalling votes to gauge community attitudes before final on-chain voting

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[232] Cryptopedia "What is Yearn Finance" (8 December 2021) <https://www.gemini.com/cryptopedia/what-is-yearn-finance-yfi-coin-yearnfinance#section-yf-is-fair-token-launch>.

[233] The MakerDAO "The Maker Protocol: MakerDAO's Multi-Collateral Dai (MCD) System" (February 2020) <https://makerdao.com/en/whitepaper/#abstract>; and Brady Dale "MakerDAO Moves to Full Decentralisation; Maker Foundation to Close in "Months" *CoinDesk* (online ed, New York, 15 September 2021).

[234] Jeff Benson "Maker Foundation Sends $480m to MakerDAO Before it Dissolves" *Decrypt* (online ed, New York, 4 May 2021).

[235] Messari.io "Curve Launch and Initial Token Distribution" (6 October 2022) <https://messari.io/asset/curve/profile/launch-and-initial-token-distribution>.

[236] Nathan Tse "Decentralised Autonomous Organisations and the Corporate Form" (2020) 51 VUWLR 313 at 331; and Youssef and others "Effect of the Gas Price Surges on User Activity in the DAOs of the Ethereum Blockchain" (paper presented as part of the CHI Conference on Human Factors in Computing Systems Extended Abstracts, New York, 8-13 May 2021) at 2.

[237] Yousseff and others, above n 236, at 3.

[238] Wright, above n 1, at 160.

[239] Youssef and others, above n 236, at 2.

[240] At 4.

commences. Signalling involves the proposal's idea being listed and discussed on open forums to gauge the community's perspective. Next, the proposal can be tested on a service like Snapshot which enables users to vote by signing a transaction.[241] Functionally, this verifies that the user possesses the governance tokens they claim to have by reading their wallet balance. Signing does not involve submitting a transaction to the blockchain, making it gasless and therefore free.[242] Following these initial stages, on-chain voting commences.[243]

Low on-chain voter turnout and proposals frequently passing unanimously may lead to the appearance of voter apathy.[244] Yet that conclusion considers on-chain voting in isolation without examining the role of signal votes. Most proposals garner considerable community unanimity by the time on-chain voting occurs because of signalling votes.[245] This leaves no economic reason for most users to vote on-chain and pay gas fees once the proposal's result is a foregone conclusion. Therefore, basic users logically leave on-chain voting to larger actors willing to pay for gas. Until network scalability drastically lowers gas costs, on-chain participation by the majority of users will remain low.

This governance dynamic nonetheless means that if a founder attempted to vote against the results of the communities' signalling votes, *Lex Cryptographia's* transparency would make this betrayal public and elicit a profoundly negative reaction from the community. Votes are submitted with transactions making their details public and therefore transparent. That transparency means the community could see the founder acting improperly, pay the gas fees to vote them down and ensure the proposal passed according to the communities' wishes. The threat of this provides a strong passive constraint on founders acting selfishly and against the communities' wishes despite their apparent ability to do so.

The active threat of forking adds to that passive constraint. Forking involves the community copying and transplanting the DAO's SCs in an attempt to hive off its acceptable parts.[246] If a founder successfully exercised their powers in an unacceptable manner which the community was unable to prevent, the community could fork the code, remove any problematic elements and migrate to the new DAO. Blockchains, protocols and DAOs have all been forked due to

[241] Snapshot "Voting Systems" (13 September 2022) <https://docs.snapshot.org/>.
[242] Snapshot "Case Study: Snapshot" (5 October 2022) <https://docs.ipfs.tech/concepts/case-study-snapshot/#overview>.
[243] Snapshot, above n 242.
[244] See, for example, Aave "Aave Governance" (6 October 2022) <https://app.aave.com/governance/>.
[245] Aave, above n 245.
[246] Sebastian Overhage and Thomas Widjaja "A Taxonomy of Forks in the context of Decentralised Autonomous Organisations" (2022) 77 ECIS Research Papers 1410 at 1412.

community discontent making this a real threat.[247] Of course, forking code is easy; ensuring the communities and their assets migrate to the new DAO is less so. Yet it is possible as evidenced by past successful forks.

4. *Conclusion*

The argument that founders retain the ability to manipulate their DAOs is erroneous. Examples of successful DAOs show that some founders cede control to the community. *Lex Cryptographia* imposes strong passive and active constraints on those that do not. Despite the appearance of voter apathy, communities retain the ability to prevent founders from acting in their interests alone. Therefore, any argument that DAOs face an obstacle due to their founders being able to manipulate them is purely academic.

E. *Governance Capture*

Building upon the previous examples of founders ceding control, many DAOs can become vulnerable to exploitation by external users if their tokens are widely dispersed. This is because by ceding control to the community, founders are effectively ceding control to the market. For those DAOs whose tokens are freely available, anyone can purchase sufficient governance tokens. That leads to a vulnerability where actors with sufficient economic power subvert the DAO by acquiring adequate governance rights to create and force through proposals at will. Any intersubjective expectation of the DAO's purpose can be overridden with sufficient capital. This article describes this subversion as governance capture. The vulnerabilities arising from governance capture present the final obstacle to DAOs that will be analysed.

1. *Governance Capture*

Governance capture occurs when users obtain either a procedural majority based on the number of votes expected or an actual majority of 51%. Covertly acquiring adequate tokens to influence DAOs often requires little effort. Blockchain pseudonymity makes it trivial to create and disperse tokens throughout a network of addresses, leaving a DAO unaware of the accumulation of power. The controller of those addresses can then manipulate proposals with those addresses while maintaining the appearance of community consensus. Alternatively, the controller needn't obtain direct control of tokens. Bribing existing token holders to obtain their votes provides another avenue to governance capture that achieves the same result.

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[247] At 1412.

Governance capture complicates DAO governance by allowing users to obtain a transitory controlling interest during which they exercise unchecked control. The line between legitimate free market actions and malicious governance attacks remains blurred. If a user obtained a large stake in the DAO to help develop and drive it to new successes then any changes they make would likely be characterised as legitimate. Conversely, if a user obtained a temporary controlling interest and wielded that power to empty the DAO's treasury into their wallet, that would certainly be deemed a governance attack. Token holder governance permits both of these activities, with both again being unconstrained by traditional legal duties. The challenge of discerning whether a DAO is being legitimately controlled or is subject to a governance attack is best illustrated by the current implementation of DAO reward schemes.

2.   *Reward Schemes*

DAOs administering DeFi smart contracting platforms commonly implement reward schemes. DAO participants, users or sometimes both are rewarded with governance tokens as a direct financial incentive for using the DAO's services. One rationale behind these schemes is to distribute tokens to the community, thereby onboarding users and growing the DAO.[248] A DAO's number of active users directly corresponds to its profitability like any business. Another rationale is to provide a cheap method of augmenting the competitiveness of the DAOs services. Oftentimes these rationales are intertwined with the DAO wanting to onboard users by augmenting its service's competitiveness. How these systems are vulnerable to governance capture is evidenced by examining Curve.finance.

3.   *Curve.finance*

Curve.finance is a decentralised exchange platform controlled by the Curve ('CRV') governance token.[249] Curve facilitates the creation of decentralised liquidity pools that replace traditional market makers.[250] Liquidity pools facilitate the on-chain swapping of virtual assets.[251] Anyone can launch a pool on Curve comprising between two and four virtual assets.[252] Curve utilises a rewards scheme whereby certain pools obtain additional CRV as part of an incentive program.[253] Users can lock CRV in return for voting escrow Curve ('veCRV'), which affords holders a revenue share

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[248] See, for example, Curve Foundation "Boosting your CRV Rewards" (6 October 2022) <https://resources.curve.fi/reward-gauges/boosting-your-crv-rewards>.

[249] Curve Foundation *Curve Documentation Release 1.0.0* (Curve Foundation, June 2022) at 5.

[250] At 7.

[251] At 7.

[252] At 11.

[253] At 44.

and DAO governance rights.[254] Curve's DAO determines which pools receive CRV rewards on a bi-weekly basis.[255] That governance right makes the CRV token valuable as users holding sufficient veCRV control reward allocations.

This system is vulnerable to abuse. Users can create a token, launch a Curve pool and obtain sufficient veCRV rights to allocate it excessive CRV rewards. These rewards directly benefit token holders that supply liquidity to the pool. It also inflates the token's price by stoking demand from Curve users seeking maximum yields. Returns from CRV rewards can exceed hundreds of percent making Curve pools highly lucrative.[256] The market for CRV exploded once users realised the profitability of controlling the reward scheme. The aptly named "curve wars" constituted a period where protocols attempted to obtain maximum amounts of CRV not to further the DAO or contribute to the project, but to profit from controlling rewards.[257] Presently, Convex.finance controls over one-third of all veCRV making it the de facto winner.[258] Users who purchase and lock Convex's governance token vote on how the protocol utilises their Curve governance rights. Projects deploying Curve pools pay bribes to Convex to obtain favourable CRV rewards.

By way of comparison, say a firm issued a tender to factories to produce a product. Rather than competing against other factories, one bribed enough shareholders/directors to obtain the contract. At best that seems unethical. At worst it can only be described as institutionalised bribery. Governance capture facilitates this behaviour by allowing users that obtain enough votes to direct the DAO regardless of their intentions. Again, *Lex Cryptographia* provides no inherent mechanisms to avoid this outside the DAO's own SCs.

4.   Multi-Signatory Wallets

The current best protection against governance capture is for the DAO to create a crisis team to protect against governance attacks.[259] This involves the DAO choosing a small group of trusted individuals to hold keys to a multi-signatory wallet ('multi-sig') with pre-defined emergency powers.[260] Multi-sigs can override proposals they deem attacks and have become a necessary, if controversial, feature of DAOs. Curve's multi-sig, the Curve Emergency DAO, contains nine members elected by the wider DAO that require a 51% quorum and 59.9% support to implement

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[254] At 35.
[255] At 40.
[256] Edward Oosterbaan "How Yield Farming on Curve is quietly conquering DeFi" *Coindesk* (online ed, New York, 4 November 2021).
[257] Omkar Godbole "CRV Extends Rally as 'Curve Wars' Intensify" *Coindesk* (online ed, New York, 5 January 2022).
[258] See, for example, Convex holding 211 of the available 531 million CRV, (9 September 2022)
<https://etherscan.io/address/0x3fe65692bfcd0e6cf84cb1e7d24108e434a7587e>.
[259] Henrik Axelsen, Johannes Jensen and Omri Ross "When is a DAO Decentralised?" (2022) 31 CSIMQ 51 at 68.
[260] At 68.

emergency proposals involving cutting pools off from CRV rewards.[261] Multi-sigs deliberately ensure they are unable to be influenced by any one founder, faction or individual within the community with no Curve team members being on their multi-sig. Crucially, the multi-sig can only veto proposals and cannot make the DAO take positive action. Emergency proposals can be overridden by the main DAO who can also remove multi-sig members at will.[262]

5.   *Mochi Attack*

Curve's multi-sig was stress-tested when the Mochi protocol attempted to rely on governance capture to obtain excessive CRV rewards. Mochi launched a token and created a Curve pool to facilitate its trading which attracted $170m of liquidity.[263] A Mochi team member then purchased massive quantities of Convex's governance token.[264] This would have enabled them to direct Convex's veCRV governance rights to allocate excessive rewards to Mochi's pool. In a governance first for large-scale DAOs, Curve's multi-sig implemented an emergency proposal cutting off Mochi's rewards, citing security flaws in their protocol and the action's unprecedented scale.[265]

This event is relevant for two reasons. First, the multi-sig functioned as intended, promptly defending the DAO from attack. The community was at risk of purchasing Mochi's token to obtain excessive CRV rewards only to have those funds stolen due to the protocol's security flaws. Any lingering doubts concerning a DAOs inability to protect itself from governance attacks ought to be dispelled by this event.

Second, and more interesting, is how the community reacted. Mochi utilised economic power to obtain the ability to manipulate Curve without violating *Lex Cryptographia*. This lack of *procedural* impropriety meant the community did not unanimously support the multi-sig's actions.[266] Mochi's actions adhered to the DAO's rules and were devoid of fraud or coercion. Nothing in Curve's rules prevented taking advantage of the rewards scheme in this manner. Indeed, many other protocols take advantage of governance capture to bribe veCRV holders to achieve a similar end.[267] Arguably, the multi-sig had violated *Lex Cryptographia* by imposing their own rules. The

[261] Curve Foundation "Curve DAO: Protocol Ownership" (13 September 2022) <https://curve.readthedocs.io/dao-ownership.html>.

[262] Curve Finance, above n 249, at 65.

[263] Andrew Thurman "Curve Wars' Heat Up: Emergency DAO invoked after 'Clear Governance Attack'" *Coindesk* (online ed, New York, 18 November 2021).

[264] Etherscan "Address" (11 November 2021) <https://etherscan.io/tx/0xa6624c4ae19df808d7b7581197cd37737b7f127aa4097f95e9695fadd073d389>.

[265] Charlie_Eth "The Curve Emergency DAO has killed the USDM gauge" (3 November 2021) <https://gov.curve.fi/t/the-curve-emergency-dao-has-killed-the-usdm-gauge/>.

[266] Curve Finance (@CurveFinance) "Good Question" <https://twitter.com/curvefinance/status/1458789685384421380>.

[267] Llama Airforce "Votium Bribe Rounds" (13 September 2022) <https://llama.airforce/#/bribes/rounds/votium/cvx-crv/26>.

multi-sig justified exercising their action on the basis that they were protecting the community from a governance attack that Mochi was conducting as was their function.[268] It must be noted that Mochi initially accepted this decision and the wider DAO chose not to override the multi-sig or replace its members.[269]

F.   Conclusions

The lack of legal duties to constrain improper behaviour and the potential for governance capture leaves DAOs vulnerable to users subverting the DAO for personal gain. This constitutes a major obstacle to their use; if a DAO can be subverted by improper or purely malicious proposals then they are ill-suited for any purpose. The current solution relies on the intersubjective discretion of multi-sig holders to differentiate legitimate governance proposals from malicious attacks. The need to create such a small, centralised team that wields immense power cuts across core tenets of how DAOs operate using token holder governance. Yet no better solution exists. When confronted with a choice to protect users' financial interests or risk it all for principles' sake, DAOs overwhelmingly chose the former. Therefore, this final obstacle can be overcome, albeit at the expense of the primacy of token holder governance. A flawed solution is better than none at all.

V.   Conclusion

Perhaps then that sentiment explains why DAOs remain of such limited use. The structure currently only offers flawed solutions to a multitude of obstacles. The purpose of this article was to show that the limited uptake in DAOs is attributable to those obstacles. Beginning legally, the current uncertain state of virtual asset regulation and a lack of novel legal recognition means that DAOs will struggle to operate within the bounds of traditional legal frameworks. States currently provide an unsatisfactory financial regulatory regime that imposes uncertainty on those interacting with virtual assets. This is particularly impactful on DAOs as blockchain-based organisations governed by those very assets. DAOs also lack novel legal recognition with available wrappers varying between jurisdictions. Some offer structures that provide access to the traditional comforts of limited liability and separate legal personality albeit at the cost of compromising elements of the DAO. Other jurisdictions offer no options at all. The combined effect of these legal obstacles makes operating a DAO within the bounds of traditional legal environments untenable.

Some users may elect to create a DAO in spite, or perhaps because, of current legal obstacles. DAOs can operate alegally pursuant to *Lex Cryptographia* via the creation of private regulatory

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[268] Charlie_Eth, above n 265.
[269] Thurman, above n 263.

frameworks. This offers them the ability to avoid legal rules entirely by substituting them with those created by SCs. However, *Lex Cryptographia's* inherent properties and dynamics may just substitute one set of obstacles for another. Only those that embrace pseudonymity and its associated transparency, can raise funding outside of traditional capital markets and are sufficiently savvy to replace traditional legal constraints on malicious behaviour with those provided by *Lex Cryptographia* will find DAOs to be a viable structure. Even if developments occur to the point that legal obstacles fall away, many of the obstacles imposed by *Lex Cryptographia* will remain.

The current usefulness of DAOs is limited to those engaged in blockchain-based applications where users choose to operate alegally and are unimpacted by the obstacles of *Lex Cryptographia*. In all other cases, any one of the obstacles discussed provides a compelling reason against using a DAO. The conclusion this article must then arrive at is that while these obstacles remain, they will serve as a major hindrance to DAO's usefulness as a mainstream organisational structure.

Wordcount:

The text of this paper (excluding abstract, cover page, table of contents, footnotes and bibliography) comprises exactly 12000 words.

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