BACK TO QUO WARRANTO: PRACTICAL DIFFICULTIES IN ACHIEVING JUSTICE WITHIN AND AGAINST DISTRIBUTED AUTONOMOUS ORGANIZATIONS AS AN IMPEDIMENT TO LEGAL PERSONALITY IN THEM BEING PLAUSIBLE

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A. INTRODUCTION

Distributed/decentralized autonomous organizations (DAOs) are an innovative way of running a business to which the law still seems to be searching for the right approach. One of the ideas on how to treat them is to provide them with a legal personality similar to the one of the traditional companies.[1] This, however, brings many unexpected points of view on the questions of traditional law. One of them is a question of justice. How the algorithmic nature of DAOs aligns with the human-centric idea of justice? Can DAOs be expected to behave in a manner which brings just outcomes and to what extent the law can be applied to and enforced against them and can just results be achieved in such an application and enforcement? Seeking answers to those questions, this contribution shall bring some conceptual thoughts about why this question is important when thinking about legal personality for DAOs and an example of what issues could arise if it is not satisfactorily answered.

Notably, DAOs appear to be largely out of reach of at least some of the traditional means of application and enforcing the law. This paper discusses the

[1] While most of the national jurisdictions do not have a specific legal framework covering DAOs in a tailor-made manner, first examples of such a focused approach appear. Some US states (such as Wyoming or Vermont) have adopted laws providing for a DAO-suited corporate form. Malta adopted an extremely elaborate legal framework enabling registration of technological arrangements without providing them with a separate legal personality (on a basis similar to the registration of cars or firearms) which comfortably covers DAOs. A number of other jurisdictions opted for an activity-based approach, providing specific regulation for some of the activities typical for DAOs, rather than for the DAOs as socioeconomic units.

selected problems stemming therefrom in five sections. The first section is to introduce the core questions of legal personality which need to be reiterated and set into the context of the technological nature and practical reality of DAOs. The second section points out the detachment of a DAO's behaviour from its human stakeholders as a key problem of functioning of DAOs within the framework of the human-imposed rules. This is followed by some of the more general and conceptual issues touching on both the results of the algorithmic decision-making within the DAO itself being just and the ability of a DAO to face external justice being discussed in the third section.

In the fourth section, the troublesome nature of making DAOs subject to external justice is demonstrated by an example of the forced dissolution of a legal entity, explaining that while an incorporated DAO could be officially declared dissolved, which would make it cease to exist as a subject of law, its technological nature may still leave it comfortably able to continue its factual activity as there might not be any possibility to reach the practical goal of the dissolution, i.e. to remove the smart contract forming the DAO from the underlying database or otherwise physically force a DAO to stop operating. A parallel is made to a procedure called *quo warranto* and some historical examples of difficulties related thereto, as described by (Philip J Stern 2017), are used to show how the DAOs' key features, such as the DAO being immaterial on its own and running on a technological infrastructure which prevents it from being localized or taken under external control may effectively allow not only for a revival of some of the long-resolved problems of the practical enforceability of the law against corporations but even for their transformation into unexpected and difficult-to-tackle dimensions.

In its fifth section, this contribution suggests that resolving those problems will require a search for a different approach to preventative control in incorporated entities than what national jurisdictions currently apply to traditional entities, so that the particularities of the technological nature of DAOs are reflected, as well as re-thinking the idea of the 'autonomous' element of DAOs in terms of finding an adequate level of viable involvement of humans in a control of a DAO. Imposing a duty for every DAO to be under a meaningful human control of identified natural persons and to have robust procedures for responding to legally binding decisions being made about them included in its code, which would trigger automatically upon the occurrence of a certain predefined event (such as a decision of a court), is presented as one of the viable options.

This contribution aims to be jurisdiction-neutral, working with examples from several national jurisdictions, and discusses questions which can be expected to be relevant in a number of jurisdictions.

B. DAO AS A POTENTIAL ARTIFICIAL LEGAL PERSON: CORE QUESTIONS OF LEGAL ENTITIES IN NEED OF RE-ITERATION

Assigning rights to an artificial subject will always give rise to numerous questions. While the sense and purpose of doing so is obvious when it comes to closely-knit collectivities/groups – legal personality serves here as a certain kind of 'visibility cloak' which helps other parties track obligations and entitlements of such an establishment[2] - there are always other aspects which must be taken into consideration and carefully

[2] Visa A J Kurki, *A Theory of Legal Personhood* (Oxford Legal Philosophy, First Edition, Oxford University Press 2019) 167.

balanced against the benefits of such a visibility cloak. When discussing the possibility and plausibility of granting artificial legal personality to DAOs, it may be noticed that, among many others, similar questions related to accountability, responsivity to legal measures and achieving justice as those which used to emerge at the advent of traditional legal entities may emerge once again. This, however, does not mean that the answers will automatically be the same.

To address this problem, the initial part of this contribution shall present some ideas and notions of accountability and capability of justifiable conduct as well as facing external justice in the conceptual context of legal entities, reiterating some core, but particularly difficult, questions which the concept of artificial legal person traditionally brings. It will also take a closer look into how the existing challenges change if a centralized human-managed business arrangement is replaced by a distributed and automated one.

Apparently, some kind of a visibility cloak for DAOs, as collectivities, could become useful in certain aspects, same as in traditional business entities. To illustrate this idea, it might be helpful to look at the well-known case of the MangoDAO exploit.[3] Notably, there was, among others, a civil lawsuit finally brought by Mango Labs, LLC,[4] the entity in charge of further development of Mango Markets, to which the governance token holders turned, and also a criminal one,[5] which gave rise to an important question: What is the status of the DAO community as a victim? Whom should the relevant authorities address regarding the exploitation? Without the DAO as such having a legal personality, and with it not being easy to reach the individual governance token holders, there was only one option left: to use the DAO's discussion forum to submit legally relevant documentation. It is understandable to common sense that this is not an ideal solution and a DAO being a single entity might seem capable of resolving the underlying problem and therefore to contribute to the justice being achieved much more efficiently. However, it could have equally given rise to other problems at the same time.

Following the paradigm that blockchain arrangements (including DAOs) are not automatically the same as traditional legal entities (firms),[6] although similarities are present, it can be concluded that, instead of automatically treating them the same as the traditional business entities, the relevant questions of collective accountability and possibility to achieve justice both within and against a collectivity should be asked again and answers to them should be sought with regard to the technological and socioeconomic nature of DAOs. The answers should help us to assess thoroughly whether granting DAOs legal personality makes sense at all, and, in particular, what challenges this will bring in terms of the human-centric notion of justice being applied to them. Therefore, in this text, the selected core topics of corporate personality, stemming especially from the collective responsibility and the plausibility and possibility of a collectivity being granted rights and held liable for its actions, will be briefly reconsidered and put in the context of DAOs. An artificial person theory as described

[3] For detailed information about the case see Max Koopsen, 'Mango Labs Sues Avraham Eisenberg Over Mango Markets Exploit' *Decrypt* (26 January 2023) <https://decrypt.co/120054/mango-labs-sues-avraham-eisenberg-mango-markets-exploit> accessed 29 August 2024

[4] Mango Labs, LLC v. Eisenberg, 1:23-cv-00665, (S.D.N.Y.)

[5] U.S. v. Eisenberg, 1:23-cr-00010, (S.D.N.Y.)

[6] Thibault Schrepel, *Blockchain + Antitrust: The Decentralization Formula* (Edward Elgar Publishing 2021) 95-98.

by (Susanna K Ripken 2019) will thereby serve as a basis for understanding the core features of legal personality of entities, although other approaches may be reflected if appropriate.

C. ACTING IN JUST MANNER AND ASSUMING RESPONSIBILITY IN TERMS OF HUMAN-IMPOSED RULES: WHAT DOES IT MEAN FOR DAOS?

It can be assumed that a number of people are involved in developing a DAO and setting it into operation. It appears almost inevitable that there will be numerous token-holders involved in subsequent decision-making and promotion of changes within a running DAO. This means that questions of collective and shared responsibility and just assumption of this responsibility are relevant.

Overall, cooperation and collective decision-making may benefit from synergy effects and help reach more accurate decisions, as well as opening doors for new ideas to be identified and pronounced. However, it has its dark side as well. Sharing responsibility with others may help individuals to relieve negative feelings about potentially undesirable outcomes of their decisions,[7] making them prone to decide in a more ruthless way than they would on their own. This has a serious impact on the effectivity and quality of decisions adopted even within traditional legal entities and things seem to get even more complex when we think that, contrary to a traditional legal entity having a rather limited number of members of the decision-making body, a DAO may have myriads of token-holders entitled and expected (but not necessarily forced) to participate in the decision-making, that a consensus among those token-holders must be reached for each decision which has not been initially incorporated into the DAO's code and that other, specific groups of stakeholders (such as core developers) may play their own role.[8]

Apart from that, it must be noted that cooperation and a synergy effect may easily disappear at the level of the token-holders, although the negative effects of the collective decision-making are likely to persist. The token-holders' decision-making in this point generally resembles a *per rollam* voting in a general assembly of a big traditional PLC, where each participant (shareholder) makes decision on their own, based on the information they have at their sole disposal, possibly without there being the possibility of any discussion prior to the voting.[9]

A consensus of 51% of all tokens must be achieved to adopt a decision, with no possibility of taking the decision-making process under an external control. This consensus mechanism in DAOs helps to reduce the risk of malevolent action by an individual, although it fails to exclude it completely. A majority of 51% of all votes being gathered by one person (or a small handful of co-operating persons) and being used

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[7] Cf Marwa El Zein, Bahador Bahrami and Ralph Hertwig, 'Shared Responsibility in Collective Decisions' (2019) 3(6) Nature Human Behaviour 554.

[8] Cf for example Philipp Hacker, 'Corporate Governance for Complex Cryptocurrencies?' in Philipp Hacker and others (eds), *Regulating Blockchain: Techno-social and Legal Challenges* (First Edition. Oxford University Press 2019).

[9] This is, however, a resolvable problem and there are already examples of DAOs whose founders took care of the maintenance of the stakeholders community and ran a discussion forum on which the proposals having been raised can be further discussed, cf for example the Gnosis DAO (see https://forum.gnosis.io/) or MangoDAO (see https://dao.mango.markets/dao/MNGO). On the other hand, success of such discussions is, again, largely dependent on the activity of the participants.

in a way which harms the minority has already been noted and described in the literature.[10]

The same consensus mechanism further makes decision-making ineffective where a large number of token-holders are expected to vote and reach a consensus. It is already known that individuals tend to assume less responsibility, and to be less prone to take action, in collective settings compared to when on their own.[11] In the context of DAOs' decision-making, this may result in various sorts of unwanted and unjust results. For example, where the number of token-holders is high and the level of understanding of the question on which the voting takes place differs among the individual token-holders, the cooperation or synergy effect is likely to be replaced by some token-holders perhaps not voting, or voting randomly because they don't believe their vote will make a difference in the context of so many others, or by stronger tendencies towards herding behaviour[12] by less-informed token-holders. The consequences thereof may be further aggravated by that, contrary to the traditional companies, no mechanism is in place for protecting minority shareholders, or holders of a dissenting opinion.[13]

Apart from general questions of achieving just results in terms of collective responsibility and collective liability, which would apply to traditional legal entities as well (although now they are often modified or aggravated by the technological nature of DAOs), there are further questions which emerge on top of them which should be discussed taking into consideration the nature of DAOs as autonomous electronic systems. Those generally relate to the ethics of algorithmic agents and would apply to DAOs with a high level of autonomy, i.e. those which are managed solely or highly prevailingly by algorithms, rather than by the decision-making of the membership token (sometimes also 'governance token') holders based on continuous oversight and active participation in raising proposals and voting on them.

Although this may now seem like a matter of the future, the idea that DAOs can be equipped with artificial intelligence and programmed to operate autonomously, i.e., without needing to be actively operated by their founders or token-holders, is still worth considering in terms of whether, or to which extent, the complex legal rules and ethical standards acknowledged by humans can be translated into code and adhered to by an artificially intelligent electronic system in a way which promises just results being achieved.[14] The underlying questions are the same which have been broadly

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[10] Cf Christoph Jentzsch, 'Decentralized Autonomous Organization to Automate Governance Final Draft - Under Review' (23 March 2016) <https://perma.cc/338L-74SJ> accessed 29 August 2024 2

[11] Cf for example Katie K Martin and Adrian C North, 'Diffusion of Responsibility on Social Networking Sites' (2015) 44 Comput Hum Behav 124 or Peter Fischer and others, 'The Bystander-effect: A Meta-analytic Review on Bystander Intervention in Dangerous and Non-dangerous Emergencies' (2011) 137(4) Psychol Bull 517.

[12] Herding behaviour may be described as a situation in which "*investors suppress their own beliefs and try to mimic the actions of others that they consider better-informed*," see Stavros Stavroyiannis and Vassilios Babalos, 'Herding Behavior in Cryptocurrencies Revisited: Novel Evidence from a TVP Model' (2019) 22 Journal of Behavioral and Experimental Finance 57.

[13] Although such protection of the minority token-holders in DAOs is technically possible, cf Jentzsch (n 10) 2-3, there is no statutory requirement for it being in place and its implementation fully depends on the decision of the DAO's originators.

[14] Cf for example Lynn LoPucki, 'Algorithmic Entities' (2018) 95(4) Washington University Law Review 887 <https://openscholarship.wustl.edu/law_lawreview/vol95/iss4/7> or Jurica Dujmovic, 'On-Chain AI May Be the Future of Crypto' *Weiss Ratings* (9 January 2022) <https://weissratings.com/en/weiss-crypto-daily/on-chain-ai-may-be-the-future-of-crypto> accessed 29 August 2024.

discussed in connection with tangible autonomous electronics systems, such as robots or autonomous weapons, and any conclusions reached there basically apply to DAOs analogically – with one difference: a DAO cannot be localised and easily physically fixed or destroyed if it gets out of control.

To provide just a very brief illustration of how artificial intelligence may fall short in compliance with human-set standards of conduct, let us have a look at the example of the Titanic maritime disaster as presented by (Meredith Broussard 2018). Starting with the known properties of survivors and victims, we can, processing the data with a mathematical model, conclude that wealthy people have better chances of surviving similar accidents and therefore could be for example charged lower premiums on life insurance. This makes sense computationally and logically, indeed, wealthy people usually have better means to secure their sustenance and protection in general, not only in the case of a shipwreck, but the broader social impact of such a conclusion appears to be everything but just. The benefit of insurance lies in an even distribution of risk across a large pool of people,[15] which allows the insurers to earn reasonable profit while each of the insured ones can afford to stay protected. Therefore, charging the wealthy ones less based on them having (mathematically) a better chance to live long, including a better chance for rescue if hit by an unfortunate event, practically limits the poorer ones in access to protection via insurance.[16] This, obviously, is not an approach which could be called ethical or socially responsible and is likely to be even unlawful based on the applicable laws, for example in the field of consumer protection or protection against unlawful discrimination.[17] We can surely imagine a fully autonomous, artificially intelligent DAO following similar patterns of conduct. The question is if we can imagine a fully autonomous, artificially intelligent DAO programmed in a way which secures that it will not do so.[18]

A simple understanding of the problem might lead one to answer 'yes', imagining a certain kind of if/then-commands-based code, which, once launched, automatically drives the entity so that it behaves lawfully and justly while performing its business activity, allows for response to decisions of courts and other competent authorities and even executes an automatic wind-up of the entity, if required by the law or by an official decision. A more advanced arrangement may even automatically consult official sources of law in predefined time intervals (if available online or otherwise supplied to the system) and modify its behaviour within the time so that any changes in the law are reflected and adequately responded to.

However, attempts to imagine such an arrangement working in the everyday practice meets some stumbling blocks. As well as noting the burden on business registration authorities, which would have to check the code of each such entity-to-be for the ability to comply with the law for a later discussion, we can dispute whether

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[15] Meredith Broussard, *Artificial Unintelligence: How Computers Misunderstand the World* (MIT Press 2018) 114.

[16] For further reading on algorithmic bias in the field of insurance see for example Arthur Charpentier, *Insurance, Biases, Discrimination and Fairness* (Springer Actuarial, Springer 2024).

[17] In the UK, the Equality Act 2010 will be the starting point in analysing such matters. However, it should be noted that the scope of protection and therefore the extent to which use of such systems can be contested will depend on the particular national laws applicable in a given case.

[18] For further reading on selected examples of the risks of algorithmic bias and algorithm-fuelled discrimination in socioeconomic decision-making see for example Kevin Sevag Kertechian and Hadi El-Farr, 'Dissecting the Paradox of Progress: The Socioeconomic Implications of Artificial Intelligence' in Hadi El-Farr (ed), *The Changing Landscape of Workplace and Workforce* (IntechOpen 2024).

writing a code allowing for such conduct is reasonably practicable. This, however, does not diminish the importance of the underlying questions.

To start a detailed search for the answer to the core question of this problem, we must first ask what is actually right and what is wrong and what can we consider a just result of an automated decision-making process in an artificially intelligent DAO. This is a hard-to-answer question. The notions of right and wrong is established by people and their content largely depends on people's understanding of numerous, very often abstract notions and perceptions of various circumstances. Thus, while we can reasonably assume that programming a DAO in a way that makes it check the official sources of law regularly and directs its actions in order to secure compliance with the applicable law is theoretically possible, securing that such directions are made in a way which leads to the conduct mandated by the legislator is another story. Indeed, "*[l]aw and society are set up to accommodate all of the things that humans think matter. Data-driven decisions rarely fit with these complex sets of rules. The same unreasonable effectiveness of data appears in translation, voice-controlled smart home gadgets, and handwriting recognition. Words and word combinations are not understood by machines the way that humans understand them.*"[19] Thus, the answer does not seem to sound like a persuasive 'yes', at least not at the current state of the art.

To continue, the written law sometimes relies on unwritten norms of conduct and vague notions. Moreover, both legal and ethical norms of conduct regularly change over time and are sometimes understood differently from person to person. Thus, even finding a computationally-functional way how to incorporate lawful and ethical conduct into a DAO's code does not necessarily have to bring the desired results, as it would first have had to be unanimously understood and agreed what lawful and ethical conduct actually is for all situations which the DAO in question can get involved in, and such a DAO would have needed to be supplied with this information.[20] This may, indeed, become another stumbling block as the laws, as well as an overall idea of what is ethical and correct, change over time and there are often several various interpretations of the same norm, leading to different results.[21]

Similarly, a DAO might need to be able to deal with highly non-standard situations in which compliance with the formal law may not be desirable for a particular reason and predict if any defence can be successfully claimed in such cases. Those issues are sometimes not easy to resolve even for human reasoning, never mind a computer program. While there are experiments with legal artificial intelligence already in existence,[22] a fully autonomous artificially intelligent DAO would need to be equipped with a very advanced and well-working legal artificial intelligence to secure its plausible

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[19] Broussard (n 15) 119; for an illustrative example of such discrepancy see also Broussard (n 15) 166.
[20] At this point, it should be pointed out that the *ignorantia iuris non excusat* principle may fall short in fully autonomous DAOs, even if they are equipped with advanced artificial intelligence and can harvest information from the Internet. The reason was described above: it is the difficulty of recognizing relevant pieces of information from less relevant or even misleading ones, which may lead to the impossibility of ensuring that the DAO will autonomously and reliably pick up up-to-date legal texts and writings of renowned experts in the field as a basis for its future conduct. However, a just approach to this problem is still to be found.
[21] Cf Jentzsch (n 10) 1, pointing out that "people do not always agree what the rules actually require."
[22] Cf for example Peter Wahlgren, *A Study on Artificial Intelligence and Law* (Kluwer Law and Taxation; 1992 1992) or Michael Legg and Felicity Bell, *Artificial Intelligence and the Legal Profession* (First edition, Hart Publishing; Bloomsbury Publishing 2020).

functioning as a party to legal and socioeconomic relationships. This does not seem feasible under the current state of the art.

D. BREACHES, REMEDIES AND MEASURES: WAYS DAOS CAN(NOT) FACE JUSTICE

Of course, breaches of the law cannot be avoided completely, regardless of whether we think about a future fully autonomous and artificially intelligent DAO, or about the DAOs of today, which are still rather simple-coded and at least partially controlled by their creators or members. Therefore, it should be also discussed whether and how remedies can be reached if a breach occurs. Traditionally, civil and criminal liability, as well as administrative sanctions, may be imposed on those who breach the law, but it must be asked how DAOs fit into this concept.

In general, remedies for breaches of law committed by a DAO which is under enough of human control may work well and bring just results even without the DAO having a separate legal personality, as long as the people behind such a DAO can be identified and found. In such cases, a DAO may be understood as a certain kind of tool in the hands of its originators, actual operators or members, who are responsible for its operation.[23] Thus, standard liability rules can usually apply in such cases. An example of this may be an arrangement called The DAO,[24] which was created and operated by an existing German corporation. This corporation called Slock.it UG was investigated by the U.S. Securities and Exchange Commission (SEC) with regard to the activities of The DAO relevant to the U.S. markets, and although no enforcement action was taken in the end, it was found that there might have been a breach of the U.S. securities laws on the part of both the corporation and its co-founders, as well as some of the stakeholding intermediaries.[25] The absence of incorporation and formal legal personality of The DAO itself had no substantial impact on this finding. Comparably, currently, existing arrangements such as GnosisDAO or MangoDAO are not separate corporations. For example, GnosisDAO was launched by Gnosis Limited, a company incorporated in Gibraltar, and is, in the words of its founders, "*a collective that uses Gnosis products to transparently guide decisions on development, support, and governance of its token ecosystem.*"[26] In comparable cases, the main result of a DAO's separate legal personality is that it can help its originators and operators could to limit their own liability.[27]

A different situation may occur if we have a fully (or highly) autonomous DAO running on a public blockchain. Being left alone by its originators after being launched,

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[23] Cf Luciano Floridi, 'Artificial Companions and their Philosophical Challenges' (2009) 19(1) Dialogue and Universalism 31.

[24] For a detailed description of the case see for example David Siegel, 'Understanding The DAO Attack' *CoinDesk* (25 June 2016) <https://www.coindesk.com/learn/understanding-the-dao-attack/> accessed 29 August 2024.

[25] See U.S. Securities and Exchange Commission, 'Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO: Securities Exchange Act of 1934' (25 July 2017) <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwi6rab5r7byAhWFoFwKHakqDxIQFnoECAMQAQ&url=https%3A%2F%2Fwww.sec.gov%2Flitigation%2Finvestreport%2F34-81207.pdf&usg=AOvVaw0PEtv82DrcFTrNgmtN8p5l> accessed 29 August 2024.

[26] See https://gnosis.io/gnosisdao/.

[27] Cf Stephen D Palley, 'How to Sue A Decentralized Autonomous Organization' *CoinDesk* (20 March 2016) <https://www.coindesk.com/markets/2016/03/20/how-to-sue-a-decentralized-autonomous-organization/> accessed 29 August 2024.

with the membership token holders, or other benefactors, possibly being anonymous and therefore extremely hard to find, as it could easily become the case, as for example in MangoDAO, a DAO having legal personality appears to be a promising way to have a subject to be held liable for any damages and breaches of law which may occur in the course of its operation. In such cases, the legal personality of such a DAO itself should theoretically provide more protection to the common users and other stakeholders. However, the practical aspects thereof may be much more complex than expected.

Right at the beginning, for example, it may remain unclear who is responsible for maintaining the public blockchain upon which a DAO runs, or the extent of liability for any flaws in the DAO's code. The possible fiduciary duties of the blockchain developers have been discussed for example by (Angela Walch 8 September 2016); however, a practical possibility to apply this theory may be a very different story. Flaws in a DAO's code constitute a separate subtopic of this question and a unanimous and persuasive answer is difficult to reach. While we could treat any misbehaviours of the DAO in the same way as defects of any other product (computer program)[28] and therefore apply the general norms regulating product liability, the practical impact does not necessarily be the desired one. With DAOs likely to be open-source, community-based projects in which numerous people are involved without any formal structure, at least some of them possibly remaining anonymous, it may be nearly impossible to determine who has written the flaw-containing part of the code, or to reach such a person once the problem becomes visible. Another aspect which must be taken into consideration is the defence of the state of the art, which helps the person who brought the flaw into the code free themselves from liability (even if identified) if they proceeded following the available knowledge in the art and could not reasonably foresee that what they program is actually a flaw.[29]

Further, if a flaw is brought into the code by its subsequent changes, it could be asked if only the author of the proposal for the flaw-containing change should be held liable, or if such liability should attach to all token-holders who voted in favour of the change. While this could be handled by applying the rules about the members and/or managers of a traditional entity having to use sound business judgment and act in the justifiable interest of the entity, there may be, again, doubts about the extent to which any token-holder who is entitled to raise proposals and/or vote on them can be practically expected to have sufficient expert knowledge to make a well-grounded decision in such matters. This all closes the vicious circle of the failure of an accountability principle in DAOs, leaving the liability for the damages caused by flaws in the code being imposed on the DAO as such being perhaps the most imaginable

[28] Cf Jentzsch (n 10); Susanne Beck, 'The Problem of Ascribing Legal Responsibility in the Case of Robotics' (2016) 31(4) AI & Soc 473 474.

[29] Indeed, undesirable behaviour of the algorithm sometimes cannot be reasonably foreseen even if the highest standard of care is applied. This has been described yet by Curtis E Karnow, 'Liability for Distributed Artificial Intelligences' (1996) 11(1) Berkeley Technology Law Journal 147 <https://www.jstor.org/stable/24115584> accessed 15 February 2020 161, who calls such incidents "pathological decisions" and warns that they are more of an indivisible part of artificially intelligent programs than of flaws in the true sense. In other words, once artificial intelligence is deployed, pathological decisions will occur. There is no way to prevent, or even effectively foresee, them. This is, however, not to argue that exclusively human-based decision making is free of pathological decisions. Rather, it should be understood as stressing the point that predicting, preventing and even identifying and remedying pathological decisions made by an algorithm follows different principles from dealing with those made by humans, and may be beyond the capabilities of the human mind.

solution - but still, it should be understood that such imaginations may have their downsides and that the results may turn out everything but just to the end.

Thus, among other, DAOs should be able to respond to the decisions of the state authorities (such as courts, administrative bodies or arbitrators) adequately and bear liability imposed on them as a consequence of breaches of law committed by them. This is not necessarily limited to paying fines, complying with a ban to obtain subventions and enter into procurement contracts or, even facing forced dissolution order by a court (which constitutes a particularly thorny point and will serve as an example of the difficulties which need to be expected if DAOs are legal entities), to name just a few examples of punishments which may be imposed on a legal entity. It should be equally able to pay civil-law damages or to refrain from certain activities, if ordered to do so. Moreover, a DAO should be able to do further things to be a valid participant in social and legal relationships; for example, to modify its behaviour in response to reputational risks and well-reasoned social pressures, respond to formal requests to rectify a faulty status, if relevant, or learn from punishment and refrain from faulty behaviour in the future.[30] Again, unless the autonomy of a DAO is limited and substantial changes can be made by the individuals behind it, this apparently needs to be secured by embedding the respective mechanisms in the DAO's code.

In all cases, it should be noted that granting DAOs legal personality is everything but a universal way of achieving just results of their operation or making them face external justice. On the contrary, some of the difficulties in achieving those goals may even speak against DAOs having legal personality at all. Further, granting DAOs legal personality means an even stronger commitment to police them and secure that, at least those which officially exist as legal persons, comply with the law and that breaches are punished by the jurisdiction which does so. Otherwise, the whole concept of legal personality for DAOs would basically stop making sense and, more seriously, could undermine the principle of legal certainty and the general trust in the state and law even in other fields.

E. PERPETUAL EXISTENCE OF DAOS AS AN EXEMPLAR OBSTACLE TO ACHIEVING JUSTICE AGAINST THEM

It has been seen that traditional legal entities (especially corporations) are, or should be, of perpetual existence.[31] This concept deserves some discussion when it comes to its application on DAOs. This section will provide some thoughts on this topic, including an example of how the technological nature of DAOs may cause issues in terms of understanding of the perpetuality of existence of a legal entity and its impact on DAOs being able to face forced dissolution.

Most notably, if the wording of 'perpetual existence' is set in the context of the technological substance od DAOs, it may be rather automatically understood as that a particular legal entity is expected to last forever.[32] Such an interpretation would, however, bring some difficulties. A closer examination will show that the notion of perpetuity is to be understood as being only relative, meaning basically nothing more

[30] Cf LoPucki (n 14) 904.
[31] Cf for example Andrew A Schwartz, 'The Perpetual Corporation' (2012) 80(3) The George Washington Law Review 764.
[32] Cf Shawn Bayern, 'The Implications of Modern Business–Entity Law for the Regulation of Autonomous Systems' (2015) 19(1) Stan Tech L Rev 93 101-102.

than that when membership of existing members stops it does not automatically mean that the entity ceases to exist as well.[33] This can be concluded just from the fact that national jurisdictions usually provide both for procedures regarding voluntary or forced dissolution and winding-up of an entity and for procedures preventing an entity from being dissolved in situations when the general conditions for doing so are met but salvaging the entity and securing its recovery and continuation appears to be more desirable. DAOs, in spite of their technological nature, should not be any exception in those terms.

Indeed, the perpetual existence of an entity (traditional or algorithmic) should be understood practically as a synonym for its separate legal personality and transferability of shares, meaning that an entity's existence is not dependent on the existence and participation of any of its current members. In other words, an entity as a legal person will persist unchanged even if its members change over time. This also appears to be the reason why some jurisdictions deal rather comprehensively with cases in which an entity loses some or even all its members unexpectedly apart from predicting some cases, in which an entity does cease to exist. The latter, which will be given more attention now, may happen for various reasons, such as by virtue of law, upon a decision of a court or by a decision of the members.[34] While the particularities may differ from jurisdiction to jurisdiction, it can be concluded that the law may allow the members to wind up the entity if they agree that they do not want to continue its activity, as well as an entity being wound up involuntarily either because of a reason prescribed by the law[35] or upon a decision of the court.[36]

Therefore, it should be understood as normal that a legal entity is bound to cease to exist at a certain time point and every entity which is incorporated should be prepared for this eventuality happening one day. The concept of traditional legal entities has developed well-working mechanisms regarding how to dissolve and wind up an entity over time, both on a voluntary and forced basis. DAOs may make some of the old and long-resolved problems of a corporation needing to be dissolved revive, especially if this should happen without the founder's consent and before it has reached its goal. But even in such cases, deep roots of the problem may be identified as being already known, which may suggest how to approach it. In particular, even at the very beginning of so-far existing corporate law, situations used to occur when a corporation was under threat of being dissolved without the founder's consent and before it reached its goal. As an illustrative and memorable example, it might be

[33] Cf Schwartz (n 31), especially 773-783, further remarks on the same idea see also Shawn Bayern and others, 'Company Law and Autonomous Systems: A Blueprint for Lawyers, Entrepreneurs, and Regulators' (2017) 9(2) Hastings Science and Technology Law Journal 135 <https://repository.uchastings.edu/hastings_science_technology_law_journal/vol9/iss2/1> 157-159

[34] For comprehensive material regarding dissolution and winding-up of an entity in the UK law see for example Nicholas Grier, *Company Law* (5th edition, Thomson Reuters 2020) Chapter 17.

[35] Taking an example from the Czech law, a legal entity is dissolved when the time for which the entity was established has lapsed or if the entity has reached its goal, cf for example zákon č. 89/2012 Sb., občanský zákoník (Czech Civil Code), S 168.

[36] There may be various reasons for such decision being issued. Apart from the criminal-law sanctions, the law may further provide for subjects entitled to apply for an entity to be wound-up in civil proceedings, or for situations when the court must wind-up an entity even *ex officio*, cf for example Czech Civil Code, S 172 and zákon č. 90/2012 Sb., Zákon o obchodních společnostech a družstvech (Czech Corporations and Cooperatives Act), S 93.

interesting to mention a common-law institution called *quo warranto*,[37] which used to find broad use in England in the times when corporations used to be habitually founded by a royal charter, and which, as described by (Philip J Stern 2017), was "*attacking the validity of corporations by accusing their governors of failing to live up to the terms of their charters or questioning the very validity or origin of the charter itself.*"[38] The procedure, however, hasn't always worked smoothly even in those long-ago times; again, (Philip J Stern 2017) describes a case when "*[f]amously, the Crown tried as early as the 1630s to recall the Massachusetts corporate charter via quo warranto, but was unable successfully to examine the charter, not least because the company, many of its leaders, and even the document itself had been transported across the Atlantic*."[39]

The whole story might have appeared to be nothing but a piece of history for a long time. However, it bears an important message which appears to be reviving and is notably relevant for any jurisdiction when we discuss DAOs as possible legal persons. While today's companies usually get incorporated upon meeting the general conditions prescribed by the applicable law and filing the required documents with the competent authority,[40] rather than on the basis of a sovereign's charter, forced dissolution still remains an option in certain cases. This normally happens as a result of corporate criminal liability, if the corporation stops meeting legal requirements or for other reasons provided for by the applicable law.[41] And again, a certain procedure must be followed and certain steps must be effectuated – which means that they must be feasible first. And, indeed, although the option of deliberately moving the seat of a corporation to a jurisdiction which offers more lenient requirements on how a business is run remains live, physical removal of corporate documents, assets and personnel from the reach of the national authority seeking dissolution of such corporation could hardly be sufficient to reach the goal described above. This is because today's jurisdictions require copies of all substantial corporate documents to be kept by a registrar authority and can use instruments such as extradition and letters rogatory if the case requires an outreach to another country's territory.

Even under the today's state of corporate laws, DAOs, however, appear to be generally rather safe from the risk of forced dissolution and therefore from termination of their legal personality simply due to their nature, which renders certain steps in the dissolution procedure unfeasible. Operating upon a distributed ledger infrastructure makes them intangible, practically unstoppable and impossible to localize, which may quickly return state authorities to the times of *quo warranto* in the sense that the physical object on which the relevant proceedings should be effectuated will not be available. Of course, DAOs could be officially declared dissolved, which would make

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[37] It should be noted that the (troublesome) application of quo warranto in the described case serves here merely as an accessible and memorable example to illustrate that DAOs as a new corporate form are likely to revive (in a slightly modified form) some of the problems the law had to deal with in the past with regard to the corporate forms we now understand as traditional. The actual institute of quo warranto is not a subject of research for the purposes of this article; for further reading on this topic see for example 'Quo Warranto against Private Corporations' (1927) 41(2) Harvard Law Review 244 <http://www.jstor.org/stable/1330889> or Catherine Patterson, 'Quo Warranto and Borough Corporations in Early Stuart England: Royal Prerogative and Local Privileges in the Central Courts' (2005) 120(488) The English Historical Review 879 <http://www.jstor.org/stable/3489222>.

[38] Philip J Stern, 'The Corporation in History' in Grietje Baars and André Spicer (eds), *The Corporation: A Critical, Multi-disciplinary Handbook* (Cambridge University Press 2017) 2.

[39] Ibid.

[40] Cf for example Companies Act 2006 (UK) Ss 9-16.

[41] Cf for example Companies Act 2006 (UK) Ss 1000-1002A and Economic Crime and Corporate Transparency Act 2023 (UK) S 70.

them cease to exist as subjects of law, but, at the same time, they could comfortably continue their factual activity as there might not be any other practical possibility to achieve dissolution in fact, such as removing the smart contract forming the DAO from the underlying database or otherwise physically forcing a DAO to stop operating. On top of that, there is a risk of DAOs equipped with advanced artificial intelligence emerging in the rather near future, and these may even autonomously replicate if they find themselves at risk of destruction.[42] This would open doors to further issues on top of the difficulties of stopping/dissolving the original organization.

On the top of that, the difficulties of dissolution of a DAO offer an interesting, although maybe less apparent follow-up in a risk of a DAO running on a public blockchain reaching a stage in which it cannot be dissolved even voluntarily, for technical reasons. For example, if a sufficient number of the token holders are inactive, this may result in a situation in which the other members, if they decide not to continue with their activity, only have the option of abandoning the DAO and leaving it to run alone. This is clearly not a just case, taking into consideration that common users may remain unaware of this fact and incur damage if they attempt to interact with such an abandoned DAO,[43] as well as the position of the active members who may fear liability for issues of their own DAO they would rather like to see duly would up.

F. POSSIBLE SOLUTIONS

While the idea of legal personality for DAOs definitely deserves consideration and there are signs that it may, at least in some aspects, contribute to an adequate level of legal certainty around those arrangements being achieved, serious issues have been identified on the other hand in terms of both a DAO achieving just results of its own conduct and external justice being achieved against a DAO. The example of impossibility to dissolve a DAO, either forcefully or voluntarily, has illustrated what can, mutatis mutandis, apply to many other cases of justice encountering DAOs. Those and many other related issues are not negligible and need to be addressed before legal personality for DAOs is considered. Some ideas how to approach this question will be suggested below.

(1) Re-Thinking the Balances: Need for Adaptation of the Incorporation and Registration Procedures to the Reality of DAOs

As DAOs differ significantly from traditional legal entities in the way their functioning is secured technically, and therefore also in the way in which it can be influenced from outside, specific solutions may require to be implemented in order to tackle the known issues and to make sure that a DAO will be technically capable of complying with the laws and acting in a just manner, as well as seeking to secure that its general nature

[42] Cf LoPucki (n 14) 904-905.

[43] This could be compared with a situation when a traditional entity is in the process of winding up. In such cases, the law may, depending on jurisdiction, provide for a duty to inform the stakeholders, and even the public about the entity terminating its activity. This usually applies in cases when the entity ceases to exist without a legal successor and a liquidation (settlement of the entity's property) is being performed, cf for example Czech Civil Code S 187-209; words "in liquidation" must be appended to the name of the legal entity under Czech Civil Code S 187 (2) in such cases.

and technological features will not be used as a vehicle for illicit activities. These solutions should be embedded in the source code of the DAO before its launch, to avoid, as far as possible, the complexities of any subsequent changes being made to a DAO. Of course, a DAOs' creators would be responsible for doing so, but the role of the registering authorities in securing that things are done properly is not negligible either. This, however, may require a non-negligible change of paradigm with respect to the particular powers and activities which registering authorities exercise in the course of the registration procedure.

Firstly, it must be noted that the constitutive requirements on traditional legal entities are usually rather easily met. While details differ from jurisdiction to jurisdiction, in general, they tend to focus on verification of the basic conditions being met for an entity to be validly established and allowed to perform the activity it is established to perform.[44] Thus, the registrars are likely to check the basics, such as whether the articles of association were drafted in the form which the law requires for them, whether the members of the entity's bodies meet the general legal requirements on executive managers, whether the initial capital was paid up in the required form, or whether any license required for the entity's activity (if applicable) is present and valid.

This is normally demonstrated by documentary evidence in paper, or electronic form, such as certificates, transcripts or deeds, which are written in a natural language and the registrar's employees are trained to read and assess them. And while any entity is likely to be subject to numerous pieces of regulation throughout its existence, its future compliance with such pieces of regulation is not assessed at the point of the entity's incorporation and registration. Rather, any such regulation has a punitive character, which means that it is presumed that an entity will comply with it through the decisions of its human members, managers and other representatives and action is taken only by the authorities if a breach is already demonstrated.

With DAOs consisting in a source code written in a programming language and effectively replacing both the articles of association and the everyday decision-making of the entity's bodies and agents, including their members, employees and other responsible co-workers, the situation will change substantially. The core steps necessary to ensure that any registered DAO is at least in principle able and prepared to comply with the applicable law, will need to be made before the DAO is registered as an entity. In practice, this means that the registrar would need to verify that a DAO is equipped with technical features which allow it not only to perform the subject matter of its business lawfully (including compliance with any regulatory requirements), but also to respond to any relevant changes in the outer environment, such as being sentenced by a court, being subject to administrative measures or being subject to a law which changes during the existence of the entity. This, however, requires a very different scope of expertise than that required for registration of traditional entities which has to be added on top of legal expertise, although the latter does not cease to be needed.

The example of Malta which will be described more in detail below shows that a separate specialist authority might be a solution for the difficulties which the specific nature of DAOs brings to preventive control, while the elevated requirements on the responsible person (compared to those for traditional companies) may help reduce the risk of straw-persons. On the other hand, it must be taken into account that establishing

[44] Cf for example Companies Act 2006 (UK), Ss 9-16.

such an authority will involve substantial costs for the state, especially as highly qualified experts need to be employed to check the source codes and related documentation of DAO proposed for registration.

(2) Incorporation, Registration and Preventative Control in Current Legal Approaches to DAOs

One of the possible tools which may help address the difficulties of achieving justice in DAOs is enhanced preventative control at registration, which needs to be approached differently than in traditional legal entities. This may require a particular adjustment in the entire process of registration of a DAO, resulting in registering a DAO in a more or less different way from a traditional entity. Some jurisdictions already try to address this problem, and examples of solutions can be found. However, no jurisdiction seems to have achieved a combination of legal personality for DAOs and an effective level of preventative control in them.

In particular, we can either see blockchain-based establishments being registered without their own legal personality, or perhaps simply partial regulation, which provides DAOs with legal personality but does not provide a comprehensive and tailor-made regulation as to matters of incorporation and registration, basically following the pattern of incorporation and registration applicable to an equivalent traditional entity. Still, some of those examples are worth mentioning as they may establish a stepping stone for the approach to preventive control in smart contracts for the future.

Maltese law gives a prominent example, where the mere concept of the regulation makes it obvious that a blockchain establishment is understood as something other than a traditional entity and therefore requiring a different approach. The recognition under Innovative Technology Arrangements and Services Act (ITASA) is issued to a designated person (usually the applicant) rather than to the technological arrangement alone. The Malta Digital Innovation Authority Act (MDIAA) establishes a specialized authority designated to perform the certification, registration and supervision of innovative technology arrangements and innovative technology service providers and to maintain a register of such arrangements and providers, which is separate from the register of traditional companies.[45] This authority executes preventative control of whether the standards of legality, integrity, transparency, compliance and accountability stemming from the applicable law are met and awards certification or other recognition to the arrangements and providers.[46]

ITASA provides a number of material requirements which an arrangement must meet to obtain recognition, including the need to be able to secure compliance with the applicable law, to meet legal obligations or to allow for an intervention of an administrator if a loss to a user or a breach of law occurs[47] as well as to being able to respond to reasonably predictable changes of law.[48] There is also a duty to have a representative regularly resident in Malta[49] and a duty to provide the authority with

[45] See ITASA S 6.
[46] See ibid S 8 (3).
[47] See ibid S 8 (4) (d).
[48] See ibid S 8 (4) (c) (iii).
[49] See ibid S 15.

specific information in specified cases.[50] Obviously, compliance with all those requirements needs to be enforced.

Thus, MDIA is equipped with a wide range of powers relating to registration and authorisation[51] or certification[52] of innovative technology solutions such as DAOs. Granting authorization of an innovative technology solution entails an elaborate procedure in which various factors are considered by the authority, such as whether the applicant (the innovative technology service provider, its technical administrator or any other person involved in the innovative technology arrangement) is a fit and proper person with regard to the arrangement in question,[53] or whether the arrangement itself meets legal and other requirements, especially with regard to Malta's overall reputation and international commitments, protection of the public and legal entities or reputation and overall fitness of the applicant and further stakeholders.[54] Thereby, the type and amount of information, and documentation to be provided to the authority, is not limited. The authority may require any documentation and information it deems necessary to determine whether the innovative technology solution in question is capable of being registered and authorized in terms of the existing legislation.[55] Certification requires a technological audit of the solution proposal being performed as well.

First signs of laws providing for a separate legal entity form for DAOs are present in some U.S. states. Concerningly, however, the preventative control presumed by them does not generally reach the level of elaborateness of the Maltese law. Thus, the Wyoming Decentralized Autonomous Organization Supplement enables DAOs to be established and incorporated as a specific form of LLC, while the Wyoming Limited Liability Company Act still applies with specific modifications to them in such a case.[56] The law includes a reasonably comprehensive list of requirements on what the articles of organization and operational agreement should cover, but the documents are submitted to the secretary of the state for filing and there does not seem to be any specialist preliminary check of the content of them.[57]

Also, while each DAO must have a registered agent as provided for by the relevant provisions of the general corporate law,[58] there is no alignment of the role to the nature of DAOs, nor any specific requirements regarding qualification of such a registered agent in relation to the nature of the DAO and, in addition a registered agent may be not only a natural person but also a legal entity[59] i.e. even another DAO.

A practically analogical approach can be found in the U.S. state of Vermont, which also adopted a set of laws relevant to blockchain, and also there, it remains unclear how preventive control is made at the level of a DAO's source code, as well as at the level of qualification of the responsible people. There is equally not enough clarity about to what extent any steps which were not anticipated by the DAO's algorithm can be enforced. In spite of any possible imperfections of the law, the first blockchain-based

[50] See ibid S 12.
[51] ibid Part III.
[52] MDIAA Part 6.
[53] Ibid, S 27 (1)(a).
[54] Ibid, S 27 (3).
[55] Ibid, S 26(1).
[56] W.S. 17-31-103 a).
[57] W.S. 17-31-106 and W.S. 17-31-107.
[58] W. S. 17-31-105 b) in connection with W.S. 17-28-101 through 17-28-111.
[59] Cf W. S. 17-28-101 a) ii).

LLC thereunder has already been registered,[60] thus, it can be expected that a need with related problems will emerge sooner or later. Here, it appears particularly advisable to address exactly the practicalities of preventive control.

(3) Meaningful Human Control over an Automated Electronic Agent as a Possible Way of Helping Justice in DAOs

It has been explained that the concept of DAOs as predefined, algorithmic, memberless organizations appears to be troublesome with regard to traditional, human- focused, frameworks of liability, accountability and acting in a just manner. While some of the issues can be mitigated by procedures leading to just conduct and ability to respond to external justice taking place being encoded in the DAO, this being enforced by the means of meticulous expert preventative control, the difficulties connected therewith may still constitute a certain level of impediment to DAOs being granted a separate legal personality. However, response to this can be sought in the notion of meaningful human control, a concept which is already broadly known from the discussion about the legal aspects of autonomous weapons systems[61] but which could be transferred to the field of automated socioeconomic arrangements and provide a certain kind of base for the discussion about how to secure human accountability in DAOs and thereby also a better fit into the human-centric idea of justice.

In this context, accepting artificial autonomous systems as self-containing and self-responsible decision-makers may not seem desirable at all and it should be rather thought about active human engagement in functioning of DAOs needing to become a requirement, as long as DAOs should be a non-negligible part of a well-governed society as subjects of the law.

This could help justice being achieved if needed by preventing both human stakeholders from escaping liability, for example through the chaining of companies in them, and the robot-in-boardroom effect from occurring. In terms of DAOs, two groups of persons should be focused on, as those who are actually responsible for the condition of the DAO-governing algorithm and therefore as possible human controllers of a DAO; namely the authors of the original code of a DAO and the token holders with voting rights. General laws can be applied to many of the related situations and the first pieces of regulation dealing specifically with this point are already available.

Thus, the liabilities of non-participating authors of the code can, theoretically, follow traditional norms regulating contractual or product liability on the part of developers and the liability for choice of a contracting party on the part of founding members of the DAO, although the practical application thereof may become difficult, due to the typical nature of the DAO projects. Further, especially in smaller DAOs, it must be taken into account that a single stakeholder falling into both those groups is likely to be very common. Here, the State of Vermont Blockchain Act provides a source of inspiration and possibly a valuable first step towards a model effectively dealing with

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[60] See Openlaw, 'Operating Agreement of dOrg, LLC' <https://lib.openlaw.io/web/default/template/bbllc-dao%20-%20vermont> accessed 29 August 2024.
[61] See for example Filippo Santoni de Sio and Jeroen van den Hoven, 'Meaningful Human Control over Autonomous Systems: A Philosophical Account' (2018) 5 Frontiers in Robotics and AI 15.

the responsibility of members for the condition of the DAO's source code, foreseeing such situations and providing that such a person has to comply with any applicable fiduciary duties.[62]

The fact that the importance of immediate human involvement has been realized even by legislators can be further illustrated by the example of the Wyoming Decentralized Autonomous Organization Supplement, which has undergone fast-paced development in its still rather short existence. The law has always foreseen human actors being involved, but, interestingly, the first version thereof differentiated DAOs based on the level of human engagement with their day-to-day management, allowing for the establishing of two types of DAOs; namely a member-managed DAO and an algorithmically managed DAO.[63] Overall, each DAO established under the Wyoming Decentralized Autonomous Organization Supplement was required to have one or more members,[64] which means that memberless DAOs have never been permitted and certain involvement of persons was presumed, even in the case of algorithm-managed DAOs. Moreover, each DAO must have a registered agent as provided for by relevant provisions of the general corporate law.[65]

However, it was foreseen that the management of the algorithmically-managed sub-type of DAOs would be vested in a smart contract and therefore seemed to presume a very low level of engagement of human members in the functioning of the DAO-governing algorithm. At the same time, the first version of the Wyoming Decentralized Autonomous Organization Supplement paid surprisingly little attention to the legal details of such an arrangement, providing solely that algorithmic-managed DAOs were only permitted if smart contracts, in which the management of such an entity was embedded, could be updated.[66] It did not provide for any specific criteria which such a smart contract should have met, nor did it provide for any specific mechanisms of preventive control (especially at the level of the DAO's source code) or enforcement, beyond that provided by general corporate law.

Eventually, the law was amended in 2022, which resulted in algorithm-managed DAOs being abolished as a separate sub-type of a DAO, with management options being changed, so that a DAO can be managed either by the members, or by the members and a smart contract. More precise requirements were also introduced on what the articles of association must provide for. This development clearly argues in favour of a rather higher level of human control in DAOs being seen as the plausible option. However, there seems to be significant room for development in the field of the overall understanding of what should be understood as meaningful human control in an algorithmic business arrangement.

G. CONCLUSION

The idea of decentralized/distributed autonomous organizations (DAOs) as separate legal persons habitually brings out an image of such an arrangement as a self-contained and self-responsible algorithmic entity being a subject of law. This gives rise

[62] State of Vermont Blockchain Act, S 4174 (a)
[63] W. S. 17-31-104 e) (as applicable until 31st June 2022).
[64] W. S. 17-31-105 a) (as applicable until 31st June 2022). This requirement has persisted even after the law was amended.
[65] W. S. 17-31-105 b) (as applicable until 31st June 2022) in connection with W.S. 17-28-101 through 17-28-111. This requirement has persisted even after the law was amended.
[66] W. S. 17-31-105 c) (as applicable until 31st June 2022).

to the question of how justice can be achieved with regard to such arrangements. Those questions, some of which this contribution had a closer look at, are valid; indeed, the distributed and algorithmic nature of DAOs is an element which is capable to put the idea of them being subject to the general, human-centric, notion of justice at least disputable.

While legal personality for DAOs turns out to be helpful in some aspects of achieving justice with regard to them, it does not seem to be a necessary condition thereof. Further, it equally brings problems in other aspects thereof and there are many questions which need to be resolved first. This contribution firstly had a look at some conceptual problems of how the distributed algorithmic nature of DAOs (mis)aligns with the need for the conduct of the subjects of law bringing just outcomes as well as for those subjects being able to submit to the external justice. An element of possibly advanced artificial intelligence was considered as well, showing that there are substantial risks stemming from a high autonomy and advanced artificial intelligence driving DAOs towards applying economically optimal but unjust patterns of conduct. Secondly, the difficulties relating to the unvoluntary (but possibly even voluntary) dissolution of a DAO were discussed as an instructive and memorable example of how the technological nature of DAOs may impair the regular course of justice being taken against legal entities, as well as of the risk of unjust treatment of active minority of members in particular cases.

The issues described in this contribution do not seem to find a unanimous and effective response so far, which has been shown on the example of several jurisdictions which are known to approach the DAOs in a specific and tailor-made manner. While the overall conclusion is that legal personality for DAOs should not be promoted unless satisfactory solutions for the underlying problems is available, some suggestions were made in terms of how they could be approached as a third substantial element of this contribution.

Maltese law was touched on as an example of a law providing for extensive and elaborate preventative control of registered technological solutions (including DAOs), which is a valuable source of inspiration suggesting that a similar approach could be advisable where granting a separate legal personality to DAOs is considered. However, elevated costs and demands of such approach must be taken into account, plus it does not seem that robust requirements on DAOs codes and their control upon incorporation could be enough, merely because it is not possible to foresee and program all possible alternatives of future events and suitable responses to them. The latter clearly should be seen as an impediment for allowing legal personality for fully or highly autonomous DAOs. On the other hand, maintaining meaningful human control in DAOs is likely to be an effective response to those problems, and therefore should be seen as a reasonable requirement on DAOs to be considered as plausible candidates on legal personality. Thus, a semi-autonomous DAOs, in which identified human token-holders actively participate by overseeing the activity of the arrangement, raising proposals for further development and voting on those proposals, may be plausible to enjoy legal personality.

A combination of both those safeguards, i.e. imposing firstly the requirement on DAOs to be able to act in just way and respond to justice being sought against them by default, this being checked in the course of preventative control as much as possible; secondly the requirement on meaningful human control being exercised over a DAO by identified natural persons, may be a sound way how to allow most of DAOs

benefit from a separate legal personality without allowing them to become a disruptive element to the overall idea of justice – both in terms of achieving just outcomes of the entity's conduct and of facing external justice.