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Legal Personality for Blockchains, DAOs and Smart Contracts

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- 1 - This paper is a revised and extended writing of the blog post “*Malta Blockchain Regulation Proposal: Legal Personality for DAOs and Smart Contracts*” by Steve Tendon, available at: <https://chainstrategies.com/2018/03/11/malta-blockchain-regulation-proposal-legal-personality-for-daos-and-smart-contracts/> (March 24, 2018).
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 - 3 - Dr. Max Ganado is the Senior partner at Ganado Advocates which is one of the larger law firms in Malta with leading teams on several specialist areas of law including financial services, shipping and aviation and corporate. The firm has taken particular interest in the Fintech and blockchain area over the past three years and has a team dedicated to its impacts in key areas of specialisation. Dr. Ganado leads the core team on the new legislation being proposed for Malta. Dr. Ganado has been responsible for the drafting of several pieces of legislation at the request of the Government of Malta and its agencies. These include some laws relevant to the topic of blockchain such as the provisions on derivatives, in particular on close out netting, the Securitisation Act, regulations on custody of securities, the Proposed Bill on a Central Registry for Malta, the general law on legal persons, including associations and foundations, and on segregated cells in legal structures. He was also involved in the drafting teams for the legislation relation to shipping and aviation, including the relative national registers and on incorporating Trusts into Maltese law, mainly a Civil Law system, and on voluntary organisations, their enrolment and supervision. He also participated in the EU working group on Legal Certainty in relation to the holding of dematerialised securities through book entry systems. He is an external lecturer at the University of Malta and regularly contributes articles and has authored or edited several legal publications, and lectures locally and internationally on legal subjects on which he specialises. He is a Board member of Blockchain Malta Association.

ABSTRACT: *This article expresses strong support for the idea proposed by the Government of Malta in a recently issued DLT Consultation Paper (referred to, in the article, as the “consultation document”) of permitting the grant of legal personality in the form of a newly designed type of legal entity incorporating a blockchain and/or smart contract/DAO/DAC arrangements. It examines why conferring legal personality to new kinds of technology artifacts is a worthy endeavour; specifically those kinds of Technology Arrangements that exhibit autonomous behaviour, and yet interact with humans. The need for this arises not only for the emergence of autonomous entities in the physical world, but even more so for autonomous software artifacts which come in the form or are built on top of public blockchain technologies. Such autonomous entities may even survive the life of their designers, with self-sufficiency, thus undermining the Nearest Person principle; they will exist for an indefinite amount of time; yet they could potentially cause damage and loss to the users to whom they provide services. The article tries to resolve the issue of how liability can be managed in this scenario, all the while protecting the innovation capability of a thriving open source engineering community that promotes these developments. It reflects the position as of the 24th March 2018.*

Technology Arrangements

The consultation document covers a broad range of issues, reading the signs of the times, proposing some regulation of some blockchain technologies and some technology services providers, with a holistic and long term perspective. However, the consultation is not only about regulation but also proposes that the introduction of some significant legislative innovation. One proposal it makes relates to the possibility of granting Legal Personality to Technology Arrangements, provided they fulfill certain criteria⁴.

In the consultation document⁵ there is a short but very significant section; it is section 5.3 *Legal Personality of Technology Arrangements* which reads:

“Whilst some Technology Arrangements are owned by a corporate structure, other Technology Arrangements may not have such an ownership structure. This could result in

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- 4 - These can consist of requirements such as a governance structure which would allow users to raise matters which cause them loss and an ability of a designated person to intervene if the cause of loss can be addressed, a recourse structure which can contain an insurance policy, a guarantee or a fund collected from small percentages on platform transactions; and a compliance functionality to comply with identity of users for AML purposes and other mandatory legal requirements such as preservation of personal data. These are logical approaches which would justify the grant of legal personality with all the benefits which go with it, particularly in relation to managing the liability risks of some of the participants in the blockchain arrangement, those in its initial stages and those involved on a continuing basis after it is launched.
 - 5 - See: “*Malta, A Leader in DLT Regulation*” issued by the Maltese Parliamentary Secretariat for Financial Services, Digital Economy and Innovation of the Office of the Prime Minister. Available at: <http://opm.gov.mt/en/Documents/FSDEI%20-%20DLT%20Regulation%20Document.pdf> (March 24, 2018).

the possibility of transacting on and with the Technology Arrangement without a proper 'legal person' as counterparty. The proposed TAS Bill will try to provide a solution to such a scenario and it is being proposed that certain Technology Arrangements will be able to register with the Registrar for Legal Persons in Malta and acquire legal personality upon satisfaction of a number of requirements."

Out of the many ideas proposed in the consultation document, this one alone is the most controversial; the least understood and also the one that could have the deepest impact on the shaping of the Blockchain industry in Malta, and possibly globally too. It is considered to be the keystone in the construction of a set of legal rules relating to a liability regime relating to this sector and an anchor or reference point which enables the legislator to start to address, even if in small part, the massive legal uncertainty which has emerged as a very evident feature of this innovative technology⁶. Some consider this is a problem to address. Others feel nothing should be done. Malta has chosen the first option⁷ in favour of some trying to create some legal certainty.

The initiatives above described address one area of legal certainty which has long been evident – that of what is regulated and how, and what is not to be regulated at all. This touches areas of public policy and criminal law and could not be left ambiguous any longer. The next stage is to address purely private law issues which affect the relationships between people in the community – admittedly the global community. There is therefore a strong awareness that the cross border nature of this phenomenon challenges the applicability of national laws at the very doorstep of this discussion⁸.

Legal Personality of Technology Arrangements

The invitation to consider these Technology Arrangements as legal persons emerges fairly naturally through mere observation of their features:

- (1) there is a human designer who through his or her free expression of intention has created assets and infused them with a specific lawful purpose. The blockchain platform, and related software for its operation and all smart contracts, are not ordinary things but things which are conceived, designed, programmed or put together to provide defined outcomes conditioned by parameters set off to achieve the specific purposes intended and to exclude others. They also establish the conditions under which the operations can take place.
- (2) there is a governance structure⁹, even if not in the normal format or reach or even functionality of a board of

6 - See "The Distributed Liability of Distributed Ledgers: Legal Risks of Blockchain" by Dirk Zetzsche et al., 2017, EBI Working Paper Series 2017 no. 14.

7 - This article addresses the topic of legal personality in the context. The liability regime and the issues relating to applicable law are two other aspects which are the subject of detailed proposals not contained in the consultation document but which will emerge once the focus of the regulatory aspects shifts to ancillary issues.

8 - See Philipp Paech, "Securities, intermediation and the blockchain: an inevitable choice between liquidity and legal certainty?" Unif.F.Rerv., Vol 21, 2016, 612-639; where the author analyses the issues which arise in the securities context.

9 - See among many other sources, Philipp Hacker: "Corporate Governance for Complex Cryptocurrencies? A framework for Stability and

directors or governors. We see this again in the very technology design which is a wonderful development for those who can no longer keep up with all the compliance and risk for traditional fiduciary duties imposed on administrators of legal entities;

- (3) there is a patrimony which is dedicated to the purpose; and
- (4) there is readable (source) code which states intent, the purpose designated for the assets, a ledger system which maintains accounts for the assets and some rules for the way operations, including some decisions, are taken.

These four elements are the elements which are found in any legal organisation at a basic level. There are many types of legal organisations and then each type has its own legal features which make it what it is. At basic levels there are the *associations of persons* such as companies, clubs, cooperatives and similar and then there are the *universality of things dedicated to a purpose*, such as foundations, institutes, funds, universities, churches and the like. They have different features and qualities; the context of a blockchain platform can be compared to both depending on how the structure is designed by its developers. It is within the Government's design capabilities to choose the form which can be selected for adoption within the legal system, or it can cater for both forms and then leave it to the developer. However, even if one makes absolutely no effort at all, it is possible that these elements feature in a blockchain platform and the arrangement will be treated as a legal organisation for national law public policy reasons although not intended to be so.¹⁰

It is, at least under Maltese law, more difficult to accidentally establish an organisation as you need a written statute with some minimum content¹¹; and even more difficult to establish an organisation with legal personality as legal personality only emerges through formal registration with the Registrar of Legal Persons under the Second Schedule to the Maltese Civil Code¹², apart from exceptional cases of religious organisations. In the past this was not so and could happen through a court recognising personality of its own motion.

The proposal of legal personality for Technology Arrangements in the consultation document will involve legislative intervention which will undoubtedly require formal registration so this will be clearly an intentional act. It will be a decision at the design phase as the design will need to cater

Decision Making in Blockchain-Based Organisations" (November 22, 2017) <https://ssrn.com/abstract=2998830>. Who argues for the adoption of a corporate governance framework to blockchain based organisations as a means of reducing uncertainty.

10 - See Hacker *op. cit.*, page 21, where he states the following when he compares a blockchain with voting and profit participating tokens to traditional companies and other forms of legal organisations: "...it has even been suggested that blockchain-based networks might, in themselves, be partnerships in a legal sense, particularly if users follow a joint purpose and share profits;" and cross refers to Zetzsche et al. "The Distributed Liability of Distributed Ledgers: Legal risks of the Blockchain", U. Illinois L. Review (forthcoming), https://papers.ssrn.com/so13/papers.cfm?abstract_id=3018214, at 36 which is an even more robust articulation on how these arrangements can give rise to classification as a partnership.

11 - Absent minimum content in a written instrument, a legal organisation does not exist and will probably amount to a mandate or an informal discussion club without a centralised patrimony or purpose. Of course it is possible to have agreements in verbal form but for an artificial legal organisation to be recognised a writing is necessary.

12 - Chapter 16, Laws of Malta; see articles 29(4) on foundations and article 49(2) of the Second Schedule of the Civil Code.

for an appropriate reflection of the basic elements outlined above. The important opportunity this proposal give us is the chance to vary the traditional requirements for a legal organisation to ones which are sensitive to the technological innovation taking place and the qualitative elements of a distributed ledger. What is so powerful is that what has traditionally been achieved through paper and defined human structures, which are centralised, can now be restated in a way that better reflects the methods and outcomes intended for blockchain operations, most importantly taking advantage of the powers of technology design in meeting certain expectations on important features, like on governance and compliance or on performance and liability through smart contracts, for example.

Legal Personality and the Liability Maze

What characterizes these Technology Arrangements is that they might all have a degree of autonomy whereby, when interacting with human counterparts, they might produce damages or losses of various kinds. The troublesome question that the proposed bill is trying to address, is: who is responsible for such losses suffered or damages caused by external or internal events?

Just like Isaac Asimov imagined the *Three Laws of Robotics* to limit the kind of actions that autonomous robots could take against human counterparts, the proposed bill suggests a similar approach: namely to recognize legal personality to Technology Arrangements, thereby conferring rights and duties which will be exercised not necessarily by people but autonomously on the basis of the Technology Arrangements themselves.

The Three Laws of Robotics were stated as follows:

1. *A robot may not injure a human being or, through inaction, allow a human being to come to harm.*
2. *A robot must obey orders given it by human beings except where such orders would conflict with the First Law.*
3. *A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.*

For example, under the proposed bill, a DAO (Decentralized Autonomous Organization) could become a “legal entity,” which will then allow the structure itself to exercise rights and to perform duties¹³.

13 - An excellent source of discussion and proposals is Wright & De Filippi, “Decentralised Blockchain Technology and the Rise of Lex Cryptographia” which is a must read by all persons interested in this subject. In particular, note their description of DAOs: “Decentralized autonomous organizations are a specific kind of decentralized organization that are both autonomous (in the sense that, after they have been deployed on the blockchain, they no longer need nor heed their creators) and self-sufficient (in the sense that they can accumulate capital, such as digital currencies or physical assets). Decentralized autonomous organizations can charge users for the services they provide, in order to pay others for the resources they need. As long as they receive sufficient funds to operate on their own, they can thus subsist independently of any third party. If a decentralized organization is truly autonomous, no one (including its original creator) can control it after it has been deployed on the blockchain. An ill-intentioned decentralized autonomous organization thus could be akin to a biological virus or an uncontrollable force of nature.” The attributes of autonomy and self-sufficiencies of DAOs are the key notions which suggest the need to consider legal personality for DAOs and other similar Technology Arrangements.

Fear of the Artificial “Person”

When presenting the idea of recognizing legal personality for a Technology Arrangement, it is easy to fall victim of the fear of extending a qualification that is typical of humans to other “things” that do not appear human at all. If it can help, this is not about creating an artificial legal “persona”, but reasoning about the technology that has come about and becoming aware that it is beneficial to society as a whole to recognize that a Technology Arrangement can indeed operate better and more safely vis a vis the rights and remedies in case of loss, of those all around it, if it had a legal personality¹⁴. Likewise it can carry out its obligations, statutory duties and mandatory duties of compliance better than we could physically do so. Technology has no emotions, cannot be bribed or threatened and does not forget. There is hope that it will carry out compliance functions more effectively than we would, if properly programmed to do so. Of course, technology as such is not a “person”. For the avoidance of misunderstandings, let us explain that when reference is made to legal personality for Technology Arrangements, it is not intended to imply that the software itself becomes a legal person but that the software arrangements (there could be many elements combined together with some new code added on), being the main asset or endowment of property, will be the principal and determining asset of a legal organisation of a special type (reflective of the context)¹⁵, where other important constitutive elements can be achieved through some powers of technology, such as in governance and compliance, combined with digital statements to substitute a formal statute, combined with human interface on key points where human intervention, at least for now, is necessary.

The kind of technology we are examining (Blockchains, Smart Contracts, and DAOs) are unquestionably of such nature that they autonomously control a set of assets. Now, how is that different from a corporation? Every known legal entity is an artificial artifact that is defined by the assets over which it can unilaterally and autonomously exercise command and power.

If assets that are controlled and organized in arbitrarily complex ways by an artificial legal entity, which was created

14 - See “*The Distributed Liability of Distributed Ledgers: Legal Risk of Blockchain*” by Dirk Zetzsche *et al.*, 2017, EBI Working Paper Series 2017 no. 14., in particular the conclusion: “*Part of the thrill of blockchain to date has been its disregard of the law. With law in the picture, data are less attractively housed in distributed ledgers. This does not mean liability will exist in all cases. However liability matters, and distributed ledgers may, in time, most often be legally structured (particularly in permissioned systems) as a joint venture where all servers are owned and operated – ironically – by one entity, or a small number of specified entities, rather than as a cooperation among multiple entities.*” Naturally the challenge becomes even more compelling when considering autonomous artifacts on public, permissionless blockchains.

15 - In our legal systems we see this sometimes. We have shipping organisations which are designed to own only ships and the bankruptcy rules are designed assuming single ship contexts bringing about efficiencies which do not exist in other cases. We see something similar with securitisation vehicles where the securitisation assets are collectively treated in a special way so that securitisation creditors as a whole have a special status with preference in a bankruptcy. There are features in existing legal organisations which are not needed in the blockchain context, some are not needed in their current form or for the reasons they currently exist. Given the expectation that Technology Arrangements will soon explode onto the world in multiple use areas, it would be wrong to vest the assets in a legal organisation in current forms which have sophistication for the wrong and unneeded reasons, with features too clumsy for the capacities of the blockchain and with formalities which are irrelevant to the context.

for the benefit and for the convenience of society to deal with it, what prevents recognizing that the controlling entity can actually be a software artifact that acts autonomously with self-sufficiency, and exercises unilateral power over those assets, keeping in view the purposes and the standards expected for governance and compliance?

If we can accept that the issue is not that about dehumanizing people, but about the convenience and benefit for society to be able to deal with the autonomous nature of these new software artifacts, then recognizing the legal personality of a Technology Arrangement is less intimidating. Extending yet again the artificiality that is created by law is still a good idea; as it has been for thousands of years. After all, law and order are necessary for a civilized society; even when that society necessarily becomes receptive to new “entities” as these autonomous software artifacts.

The “Nearest Person” Principle

During the lively discussion at a recent blockchain event relating to the consultation document, several lawyers expressed the opinion that giving legal personality to a Technology Arrangement would not be a good idea. The example was given of self-driving, autonomous cars. If such an artifact produced any sort of damage, ultimate resort could be claimed by applying the principle of *The Nearest Person*. In other words, the manufacturer of the autonomous car would be held liable.

The Difference between Autonomous Cars and DAOs

What seems to be missing in putting forth the principle of *The Nearest Person*, is that in the context of a DAO, such a person might not exist at all. A self-driving, autonomous vehicle is a physical object, which is created by a well-known manufacturer. A DAO on the other hand, can exist without there being a known creator.

The most prominent example of *The Nearest Person* principle not being applicable, is the Bitcoin network itself, which can be considered as a DAO because it effectively replaces a number of intermediaries (like clearing and settlement houses) that were previously human. What has to be observed, is that the original creator of the Bitcoin network, known as *Satoshi Nakamoto* is unknown. Even willing to apply the principle of *The Nearest Person*, in practice it cannot be done.

But the cases for this are even more intricate than this example.

Why the “Nearest Person” Principle is not always Applicable

If a self-driving, autonomous vehicle goes rogue, in the worst case scenario the vehicle can literally be taken down – physically¹⁶. In the case of a DAO, “taking down” is not

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16 - We have seen this happening very recently where a person was killed by a driverless car which appears to have malfunctioned. The risk of liability by the persons involved in its design and operation is so high that the total withdrawal of the product which could actually be making roads safe and less prone to fatal accidents was the only thing that could be done in the context. This demonstrated that the risk of liability will hinder innovation in the most radical of ways without regard

an option. Once a DAO is released onto a Blockchain – in virtue of Blockchains being uncensorable, and providing irrevocable permanence – that very DAO simply cannot be “taken down.” (The only option, as is often stated, would be to “switch off the Internet” – which clearly would produce even greater damage.)

So far, the Bitcoin network seems to have functioned flawlessly. So the need to chase Satoshi Nakamoto has not come into being. Yet it is possible to imagine scenarios where more sophisticated DAOs, constructed on top of Smart Contracts and which provide much more complex functionality, might actually have defects and flaws.

In fact, in the instance of “The DAO,” a bug in the Smart Contract code created a vulnerability that was exploited by an attacker, who could claim control over \$50M. (How that case eventually unfolded is another story altogether; and while it would be worthy of a Hollywood film, we won’t be concerned with its intricacies here.)

Now, in the case of “The DAO,” the people behind its creation were well-known, unlike the case of Satoshi Nakamoto and the Bitcoin network. The creators of “The DAO” conducted all operations transparently and publicly. In that case, the principle of *The Nearest Person* could possibly be applicable.

Yet it is possible to envision that similarly complex Smart Contract arrangements could be released in the same manner as the Bitcoin network was originally released. In such a case, there would be no people to “go after.” Who is liable in such an instance? The closest “thing” that resembles a person would be the Technology Arrangement itself. So, why not consider it as a Legal Person in its own right?

Why Legal Personality is Necessary

If a Technology Arrangement, like a DAO exhibits behaviour that until before its existence was in the exclusive capacity of existing legal person with rights and duties, it stands to reason that the counterparties of any interactions (communications, services, transactions) provided by a DAO would expect the same kind of provisions and guarantees offered by an equivalent legal person.

Case of Anonymous Designers

To reiterate the earlier example: the Bitcoin network offers the same guarantees of execution that prior to its existence were in the remit of clearing and settlement houses, and the transactions it executes will have irrevocable finality.

The functionality of the Bitcoin network is very simple, when compared to the kind of functionality that can be offered by second or third generation blockchains, which support extensive Smart Contract applications, and in particular, the realization of sophisticated DAOs/DACs. In these instances, the kind of interactions (communications,

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being had to statistics and other scientific data which shows the benefits of such innovation outside the specific case context. What is going to happen in the context where the technology cannot be taken down? The need for a specific liability regime which caters for the outcomes is clearly evident and is no longer a choice but a necessity, if we are to allow for a future of this innovative technology. The alternative is a short life to being litigated out of existence without there necessarily being any wrongdoing, negligence, dishonesty or similar contributions which will, at least, justify its elimination.

services, transactions) provided can be much more complex.

Accordingly, the expectations of counterparties will be much higher – to the point that they might expect to be able to have legal recourse, if those expectations are not fulfilled. And this is where it is evident that, in the absence of a *Nearest Person*, because that person has opted to remain anonymous, legal recourse must be made available, but with respect to some other person. A person that the current laws do not identify or recognize.

Case of Consumer Protection

The first reason why such a new legal personality is necessary, is to better provide for consumer protection. It is a general expectation: relevant consumer rights (and other legal issues) presume the existence of the personality of an actor – a person, or a “thing” as it will become evident – who/which is obliged to comply to certain rules.

One way to provide for consumer protection is to *require that the Technology Arrangement exhibits certain expected qualities, attributes, features or even behaviour* – like offering securities, guarantees or insurance that could cover possible damage claims.

Thus the designers of any Technology Arrangement who would find it agreeable for their creation to acquire a legal personality, would have to *code and implement the required qualities, attributes, features and behaviours*. Since this would imply creating or extending Smart Contracts that are part of the Technology Arrangement as such, the required qualities, attributes, features and behaviours would become as permanent as the Technology Arrangement itself, once it is deployed on a blockchain. In other words, *the required qualities, attributes, features and behaviour would become permanent elements of the Technology Arrangement itself, even if the designer remains anonymous or disappears*.

Case of Designer Protection

Given the general reliance of Blockchain technologies on open source software, it is to be expected that a number of Technology Arrangements on Blockchains might themselves be realized as open source projects. Open source projects are often inspired by ideals; or start off as experiments, that then take on a life of their own. Open source projects are “forked” and give rise to a multitude of diverse and generative variants and variations.

Often, the initial behaviour of a piece of software can be reused in other later variations, providing the foundation for completely different functionality and behaviour, that were not in the intent or even in the understanding of the original designer. The principle of *The Nearest Person* would reach such designers, even though they might not have had any active role in the creation of the Technology Arrangement subject to scrutiny, because maybe the later designers have chosen to remain anonymous, or have disappeared. In this instance, providing a legal personality for the Technology Arrangement would effectively shield such remote (and innocent) designers from liability claims on the basis of the principle of *The Nearest Person*. The new legal entity would be the point of recourse for persons, such as innocent third party users, suffering loss and would as a result design the mode of recourse, the extent of access to compensation, the availability of funding or cover for such compensation and related matters. The more this can be automated through smart contracts which are self-

executing based on event driven verification the better. Disputes would disappear given the advance agreement to the “rules of the game” on the particular Technology Arrangement. At the same time, contributors, even very near ones, to the technology, its development and maintenance and its administration would not be liable except in defined situations and that would mean that they would be able to carry on with the innovative work without undue concern on liability. Where they are indeed at fault, they would have to compensate the new legal entity – as opposed to an unknown number of users for an unlimited amount of losses – as in any other breach of contract and they would usually be covered by their own professional indemnity and defense insurance policy.

Note that this is particularly relevant when the original designers are individuals who might have contributed open source projects as a means of expression; and not corporations that would still provide a limitation of liability to their owners and managers. These open source developers are even more remote and in any case would probably not be within the reasonable circle to justify a cause and effect basis for liability. However that does not protect them from being jointly sued with everyone else in a claim for loss.

In this sense, the provision would protect the vibrant community of innovators that operate in the open source world, and in particular when the software or technology being developed has the features of or can be used to build a Technology Arrangement. In other words, this is a matter of protecting innovation capacity, and not discourage software enthusiasts and professionals from continuing developing open source software, in particular in the fields of Blockchain technology, decentralized storage, decentralized computation, cryptography and computational law. At the same time, there is no unreasonable exclusion of recourse for loss, although there may be transparent limits of liability embedded in the compensation fund or insurance cover forming part of the new legal person’s structure. In this regard, an important point needs to be made: it appears reasonable to suggest that the software making up the platform or operating system (the blockchain itself) needs to be protected from attachment and enforcement and should be segregated, so that it cannot be affected by bankruptcy or court orders which have a fatal effect – let’s call them “switching off orders” which can come in different forms, direct and indirect. Such order will by definition cause more risk and harm to the person suffering loss in the first place, and much more as it would affect all the users having assets and other rights on the platform which would instantly disappear or go into massive stress stations unless addressed sensitively. If one uses open source, public domain/commons arguments, which are very possible in this context, then it would make sense to use segregated cell features for this legal person, which are available under Maltese law already. These would allow the critical software to be placed within a segregated cell and not be part of the liability patrimony of the new legal person and the justification would be the massive protection that brings to all users and the fairness would be based on the fact that being of the nature of public domain, that asset has no balance sheet value anyway, it being held for the common benefit of all users under a fiduciary obligation of protection and care for the community as a whole. So even without a segregated cell it would still not be available for enforcement purposes of third party judgements. So the law can exclude such a cell/asset from the recourse rights and simultaneously concentrate the recourse right to the cells established exclusively for recourse, which in turn would hold within it a sinking fund internally generated from a small commission from on-blockchain transactions, a guar-

antee deposited at the commencement or topped up regularly to keep pace with the growth of the risk exposure or an insurance policy to cover such risks – all three cumulatively being transparently disclosed and available to all users so they are aware at any time what limits exist to their aggregated rights of recourse. That will be the basis on which they will then be willing to use the particular blockchain well knowing that, apart from that point of recourse to the disclosed limits, the legal principle for dealing on the blockchain will be based on the *caveat emptor* principle which places the risk of loss on the users.¹⁷

Case of Extinction of Designers

While when a designer is anonymous, it is easy to see that providing legal personality to the Technology Arrangement created by the designer effectively makes some sense, it is harder to realize that it also makes sense when the designer is well known.

Even in this case, the principle of *The Nearest Person* is insufficient. Why? Because a Technology Arrangement on a Blockchain gains the attributes of anything that is stored on a Blockchain. In particular, it acquires the attribute of permanency.

Individuals and corporations come and go. People die. Companies go bankrupt or close down. If those people or companies were the designers, and were *The Nearest Person*, who is *The Nearest Person* once the designers naturally disappear?

The question is relevant, because a *Technology Arrangement on the Blockchain will survive the extinction of its designer* – and, as we have seen, it cannot be stopped or taken down.

Therefore, even if there is a known designer today, it still makes sense to recognize the legal personality of the Technology Arrangement when it has attributes of a recourse fund which is permanent as well; and to have the designer (as mentioned earlier) implement those behaviours that the Technology Arrangement would need to have in order to be recognized as a Legal Person of indefinite term or duration as are most types of legal persons.

Case of Technology Arrangement Protection

It is clear that businesses will be built around Blockchain technologies, and that they will seek to generate profits. Therefore, businesses will somehow be considered the owners of the Technology Arrangements that they create and deploy to a Blockchain. Yet, as we saw above, businesses come and go. If for whatever reason a business has to face bankruptcy, their assets do not become immune from seizure just because they take the form of a Technology Arrangement on a Blockchain.

17 - Of course this does not apply to losses caused by the users own negligence nor to cases of fraud or willful misconduct where direct remedies against the person causing the loss on such basis could not be affected on the basis of long standing public policy rules as they apply in most countries, English law appears to allow for an exception even in such cases if the exclusion of liability is very clear and specific so each legal system will influence the outcome and in this context it is well know that the issue of applicable law is itself the subject of substantial legal uncertainty. A topic for another discussion.

However due to the autonomy of the Technology Arrangement, it might have evolved as to supporting use cases that go beyond the actual scope of accountability/liability of the original designer business. The issue that is raised is: how can one guarantee the continued legal usage of the Technology Arrangement by other third parties in such a case of extended use cases?

It becomes a matter of protecting potentially millions of people who trust the Technology Arrangement (the Bitcoin network, to give a clear example), and to let them continue to exercise that trust, rather than trusting the designer; a designer who might go bankrupt or simply pass away.

The Technology Arrangement needs to be able to stand on its own, from a legal point of view because that clarity of patrimonial segregation from the patrimonies of every other legal or natural persons in the world means that the user assets on the blockchain can never be confused with the software owned by the legal entity and used to secure or enforce an obligation of the legal entity. Without a legal entity clearly marking off its own assets available for recourse, user assets may potentially be seized and use to settle an obligation arising from a loss caused on the blockchain by causes totally unrelated to the user¹⁸. That becomes more possible when the user has a vote or other means of influencing administration as we see with miners or token holders which are structured like shares in a company. Most people would see the irrationality of making users jointly and severally liable with the underlying operating technology but in litigious communities and aggressive litigants who have suffered serious losses there is no rhyme or reason. Segregated patrimonies resulting from legal personality are therefore a very important starting point in drawing lines for liability purposes.

The assets hosted by the Technology Arrangement must not be caught in any bankruptcy process that hits the original designer business for obvious reasons. There might be provisions to pass on the ownership of the entity to someone else; but more easily this can be managed by acknowledging the Technology Arrangement as a separate legal entity, with its own legal personality. The indirect consequence is also that the original designer business can no longer be considered as the owner of the Technology Arrangement and of the assets controlled by the Technology Arrangement; notwithstanding that the business is the creator of the Technology Arrangement.

Case of Evolving Legislation

As everything, legislation evolves and changes. However the dynamics of changing legislation has the potential of clashing with pre-existing Technology Arrangements. We must always keep in mind that a Technology Arrangement of the kind we are concerned about exists on a Blockchain. Therefore, once it has been deployed, it *cannot be changed* and it will *exist forever*.

18 - The archetypical case of this is “The DAO” in 2016: eleven thousands users had funded the autonomous organization with over US\$150 million. A month after its launch, The DAO was attacked by an unknown individual who exploited a number of vulnerabilities in The DAO’s smart contracts. The attacker gained control of over US\$50 million. Paradoxically, in lack of a clearly identifiable legal entity, the same investors that had been robbed of the amounts they themselves funded, could be held liable for the loss caused by the vulnerability in The DAO’s software, as there was no corporate veil to shield them from individual liability.

It might be the case that a new law renders illegal the behaviour of a pre-existing Technology Arrangement, with no possibility of remediation. The (newly) illegal behaviour will always be there, no matter what (and, of course, this is compounded by the earlier considerations that there might not be any known *Nearest Person*). The new law would be materially ineffective. *The frightening conclusion is that the evolution of law suddenly becomes ineffective.*

In order to preserve the possibility of law to evolve, something new must be conceived of. The section of the consultation document cited at the beginning here, “*certain Technology Arrangements will be able to [...] acquire legal personality upon satisfaction of a number of requirements.*”

Such requirements could be, for instance and among others, the effective presence of certain minimum acceptable “good” behaviour in order for the Technology Arrangement to be considered a “good” (virtual) citizen of the jurisdiction. Such behaviours could be defined similarly to Asimov’s Three Laws of Robotics. They would have universal validity and be of such nature that no matter how future laws could evolve, the Technology Arrangement could still be considered a “good” (enough) and (sufficiently) “lawful” (virtual) citizen.

Yet, the legislator will have to take into account the nature of the new medium of Blockchains when promulgating new laws. As an example, consider EU’s “right to be forgotten:” how would it have been shaped, had Blockchain technologies been widely known and used before the drafting of such rules?

Would rules of law deeming a power to vary the code being vested in a designated person or persons, only for the purpose of keeping the operation legal and consistent with the law as it evolves, be a solution?

Case of Levels of Compliance

While one of the position statements of the original cypherpunk movement (which was the breeding ground wherein the Bitcoin and Blockchain technologies were conceived of) is to deplore regulation on cryptography, one needs to come to terms with the fact that an autonomous Technology Arrangement needs to be a “good” citizen if its services intend to benefit society at large.

Irresponsible proposals that are often put forth in regulatory circles, ask for the creation of backdoors and other technical mechanisms for weakening the cryptographic techniques. Regulation of cryptography is a very short-sighted proposition, and fails to understand how it undermines all applications of cryptography.

It becomes imperative to create space for a Technology Arrangement’s good citizenship, without weakening cryptography. Since legal personality is conferred to a Technology Arrangement once it exhibits certain desired qualities, attributes, features and behaviours, it is also conceivable to accept different degrees of such. Since these qualities, attributes, features and behaviours are nothing other than further software, they can be programmed as the designer might see best fit in order to give its Technology Arrangement the appropriate degree of compliance.

At the entry level, a Technology Arrangement would simply cater for consumer protection and basic regulatory compliance. At the highest level of compliance (possibly required for applications that are of critical nature in terms of safety or national interests) the behavior would allow for the forces of law to intervene and actually clamp down the

Technology Arrangement – yet without compromising any cryptographic integrity or the lawful assets of users – based, for instance, on multi-signature schemes, wherein the competent authorities’ signature needs to be conceded in order for the Technology Arrangement to function; as it could be revoked in case of any sort of crisis or emergency.

With the notion of levels of compliance, space is given both for open development, as well as the realization of governance mechanisms for safety critical Technology Arrangements. In practice, the provision would recognize different types of legal personalities of Technology Arrangements, just like there are different types of legal personalities in current law (individuals, corporations, foundations, trusts, NGOs, institutions, etc.).

Note that this provision would also further support the previous case of evolving legislation, as the Technology Arrangements at the highest level of compliance could be rendered ineffectual should new rules render their instances illegal.

Case of Supporting Forking

In the world of open source software development the possibility of a forking a project is extremely valuable. It is one of the cornerstone of the evolution of new ideas in open source projects.

In a very similar way, even Blockchains can fork, but with much more far reaching – and often very controversial – consequences than ordinary software forks. Whether one agrees or disagrees with Blockchain forks, they do happen; and hence need to be considered with respect to the legal environment that is being enabled through our concepts.

Malta has already a number of legal structures based on the idea of segregated cells to create segregation of liability. For example, Malta recognizes protected cell companies (PCC) and securitisation cell companies (SCC) and the same applies at a higher level for associations and foundations in their basic forms.

In the case of a Blockchain fork which might affect a Technology Arrangement, the Technology Arrangement will exist in two distinct instances, each of which might have its own set of qualities, attributes, features and behaviours, which might depend on the core protocol that is subject to the technical forking. In these instances it must be possible to extract a cell from an existing legal entity (on the original branch) and reconstitute a new legal entity (on the spawned branch). The new entity will be self-standing, with its own, distinct legal personality upon registration with the Registrar of Legal Persons.

With such a provision, the evolution of Blockchain technologies is ensured with respect to the open source practice of forking, while avoiding the risk of putting the two entities at a legal stand still, or worse, in conflict of ownership over existing assets.

Case of Jurisdiction of Choice

Since a Technology Arrangement is or exists on a Blockchain, which is global in nature, it is very tricky to determine its jurisdiction: it is not located in any specific country. By implementing the required qualities, attributes, features and behaviors in order to acquire legal personality in Malta, a Technology Arrangement would effectively choose its home jurisdiction, and offer its services to the

international community on the basis of international trade laws.

By having a legal personality of its own, the Technology Arrangement would need to have, in first instance, a technical administrator who is registered with the local regulator so that there could be a point of contact by the regulator if ever this is needed. The technology allows for regulators to become users on the platform and have access to all information which has regulatory relevance and one assumes that the regulatory functions will not develop externally in traditional form but will be exercised through using the very same technology.

Though the proposed bills also provides for designers and administrators to voluntarily register with the Malta Digital Innovation Authority, or the use of the services of a registered auditor and administrator would seem to be the minimum commitment expected for a Technology Arrangement's creators to choosing Malta as their home jurisdiction, thus giving a home jurisdiction even to the Technology Arrangement itself. The only condition is that the Technology Arrangement implements the required qualities, attributes, features and behaviors; and it appears reasonable to expect that the Malta entity uses regulator recognised service provided in the two referred to functionalities – but no other functions – in its assessment and continuing interface.

Case of Extended Decentralized Value/Service Chain

It has been argued that the end users could be held liable for the actions of a Technology Arrangement, especially when the users have been conferred governance power over the actions of the Technology Arrangement, by the (“code is law”) rules of the Technology Arrangement itself. The instance of “The DAO” was of this kind. This way of reasoning can still make sense in as far as the services provided by a Technology Arrangement are self-contained. However, with the perspective that *a thriving ecosystem of Technology Arrangements will develop*, which can – in autonomy – offer, consume, negotiate, enter contracts and pay services offered to, by or for other Technology Arrangements (especially when automated directory and discovery services will come to fruition), it stands to reason that such users might have no insight at all into which services of other “third-party” Technology Arrangements might be invoked by the one over which they have governance power. Such governance power can be limitedly exercised for general direction, and not for specific operations, which the Technology Arrangement could choose on its own account (again, especially if service discovery mechanisms will be incorporated in the overall ecosystems). It does not make sense to hold such users liable for the actions performed by third party Technology Arrangements which are out of scope of their governance power.

Hence, Legal Personality is again a way to resolve the conundrum. The requirement here would be that a “good citizen” Technology Arrangement could very well use discovery services to find third party Technology Arrangement in order to consume their services, provided those third party Technology Arrangements themselves are “good citizens” and fulfill the requirements to have legal personality too. In this way, even if a Technology Arrangement in the middle of a value/service chain produces damage, the end-points (and any other intermediary point as well) are not held liable.

Case of Supporting the Smart Contract Oracles Industry

One of the critical elements for a class of smart contracts is the existence and availability of trustworthy so-called “oracles.” Oracles are data providers or sensors that convey to the smart contracts information about the state of real-world. They build the informational bridges between what happens in the real-world, and the virtual, computational world of smart contracts; and they verify in real-time that certain events or conditions happen in the real-world. Oracles will invariably contain software that runs as part of their providing information services to smart contracts. The smart contract needs to trust the oracle, yet the oracle's software runs *off-chain*, in a situation that is (typically) not subject to the consensus mechanism underlying all (public) blockchains.

So while oracles need to be trusted, and provide essential information for smart contracts to correctly perform their functions, they fall outside of the scope of intrinsic trust created by the consensus algorithm. A Technology Arrangement that employs oracles could be in the situation of holding the oracles liable for damages, arising from bad data. Unless the (smart contracts) between the Technology Arrangement and its oracles is legally binding, such recourse wouldn't work, as would neither any exclusion or limitation of liability clauses.

Oracles, too, could be consulted on an ad-hoc and fully automated basis, once oracle discovery services will be in place (not unlike the discovery of intra-Technology Arrangement services described earlier). As a subject that contracts third parties, the Technology Arrangement needs to be able to enter such contracts through a legal personality of its own. Conversely, the reputation of oracles will only benefit if they assume the responsibility of being liable for the data feeds they might provide.

Requirements for Legal Personality

While the idea of a Technology Arrangement having legal personality is something that we all can conceive of, the notion still begs the question: how can it be done in practice?

We need to reiterate a key passage of the consultation document: “*Technology Arrangements will be able to [...] acquire legal personality upon satisfaction of a number of requirements.*” and keep in mind that we are dealing with software artifacts, with all the flexibility and malleability that software affords us.

It is obvious that legal personality will not be conferred to just any piece of technology. The technology needs to exhibit qualities, attributes, features and behaviours that are required for it to be conferred with legal personality. The right needs to be earned. It will be the designers' responsibility to code and implement such qualities, attributes, features and behaviours.

For example, one inspiration can come from Basel 3 Principles of Sound Management of Operational Risk¹⁹ whereby risk is being covered upfront via capital requirements and/or insurance of the operators and intermediaries. In the

19- The “Basel Committee On Banking Supervision, Principles For The Sound Management Of Operational Risk” (June 2011), available at <http://www.bis.org/publ/bcbs195.pdf>.

case of an autonomous Technology Arrangement, the Technology Arrangement itself acts as all operators and intermediaries. Therefore, one of the required qualities and behaviours that a Technology Arrangement should exhibit is to set aside adequate capital requirements or insurance, which could be collected on an ongoing basis, via the deliberate design and coding of its smart contracts in order to do so. The Technology Arrangement would thus become covered – automatically (by using the very features of the technology itself) – against liability claims from third parties; and such coverage would remain in effect, operational and continuously current even after the extinction of the designer, or the limitation of liability of the designer through other means.

Other requirements could be added as necessary. For instance, we already cited that system/life critical applications could be required to implement a “kill switch” in the section about level of compliance. Even this behaviour is something that the designer of the Technology Arrangement has the discretion to implement.

Likewise, KYC/AML practices for onboarding new users can be devised in similar ways, with the integration of oracles that could interrogate authoritative identity sources, and achieve higher level of regulatory compliance.

Any sort of behaviour that the Regulator would like to see to recognize the “good citizenship” of a Technology Arrangement can be expressed in these terms, and then implemented by the designer of the Technology Arrangement. The certification process would validate that the required quality, attributes, features and behaviours are effectively provided for by the Technology Arrangement; and on that basis recognize its legal personality status.

The adoption of this line of thinking will lead to parametric regulation, smart governance even computational law, where many of the desiderata of good behaviour are codified directly into the Technology Arrangements that by choice of their designers opt to be regulated.

Maybe this will become the ultimate meaning of the expression “*Code is Law*”.

Conclusions

Blockchain technologies provide a new medium which is global and uncensorable, wherein autonomous software entities can come into existence and never be taken out. The autonomy and permanency of such entities are a novelty never seen before; and since they will exhibit behaviour and provide interactions (communications, services, transactions) with humans, there is a challenge in how those behaviour and interactions can happen in an acceptable and lawful way.

The autonomy and permanence demolishes the principle of *The Nearest Person*. The only reasonable way to promote the proliferation of “good” (virtual) entity-citizens is to make provision for their legal personality, and use game theoretic incentives for their creators to want to bestow their creations with “good” and lawful behaviours.

The legal personality can be given to qualities, attributes, features and behaviours that Technology Arrangements would be required to exhibit in order to gain the recognition. Such qualities, attributes, features and behaviours would be the basis for regulatory compliance, liability issues, consumer protection, taxation, continuity, etc.

The intent is to create legal certainty and an environment within which both the businesses or individuals creating the

Technology Arrangements and the Technology Arrangements themselves can thrive. For good or bad, certainty of law is better than no rule at all, even if it is not the best. A weak, innovative and untested rule, is better than no rule; because it can always be improved. ■



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