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PART C-   THE NuGENESIS REVOLUTION:

Solving 3rd and 4th Generation Blockchain evolution issues to embrace global mass adoption

C1   Introduction

C1.1   NuGenesis is the evolution of decentralised blockchain technology[1], in which NuCoin is its native decentralised currency and payment system, that eliminates the need for trusting authorities or intermediaries.   The blockchain network and ecosystem, honours Satoshi's grand ambition of supporting direct monetary transactions among a network of peers, by creating a decentralised payment system eliminating the need for central banks and governments who are prone to be corrupted, to censor, permission use or otherwise influence, the economic and social system in a non-neutral manner.

Unifying the vast majority of the globe through code

C1.2   Satoshi's grand ambition is a curious solution for governance without governments. One that is neutral and accessible to all, which appeals to liberal sentiments both from the left and from the right. Moreover, it is equally applicable to the vast majority of the Governments themselves and the many billions in the world that do not enjoy the privileges of the elite which the current legacy financial order extols and produces. Only 1/3rd of the world's Central Banks are part of the Bank of International Settlements; 2/3rds are not. Those excluded are the casualties of the elite decaying financial order.

C1.3   On the one hand, the Bitcoin revolution can be presented as a neoliberal project insofar as it radicalises Friedrich Hayek s and Milton Friedman s ambition to end the monopoly of nation-states (via their central banks) on the production and distribution of money[2], or as a *libertarian dream* which aims at reducing the control of governments on the economy[3]. On the other hand, it has also been framed as a solution for greater social justice, by undermining oligopolistic and anti-democratic arrangements between big capital and governments, which are seen to favour economic crises and inequalities. What we would like to add to this equation is that entire national states, indeed the vast majority of the word's nation status, are just as much the victims, and blockchain technology offers them the same hope it does for most of the worlds' population. The implicit political and social evolutionary solution is the shift of significance of politics to relying on technology.

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[1] currently permissioned, until such time as the NuCoin community considers itself sufficiently confident in the protection of its leading-edge innovations, the security of its systems – particularly after the AI has completed a sufficiently matured machine learning phase to underscore entirely the integrity of the system to go open source.

[2] Hayek, F.A. (1990), *The Denationalization of Money: The Argument Refined,* 3rd edition, London: The Institute of Economic Affairs.

[3] De Filippi, P. (2014), "Bitcoin: a regulatory nightmare to a libertarian dream", *Internet Policy Review 3*(2), http://policyreview.info/articles/analysis/bitcoin-regulatory-nightmare-libertarian-dream

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Crypto means decentralisation of power

C1.4   When we refer to cryptography and the crypto industry, we do not reference to any perseverance of secrecy in transactions. Rather, we refer to crypto in the endeavour to create a *trustless infrastructure* for financial transactions. In this context, cryptography is merely used as a discrete notational system[4] designed to promote the autonomy of the system, which can operate independently of any centralised third party (or more specifically a ruling financial elite). Crypto and the crypto-economy referred to herein is less about cryptography used to protect the privacy of information, and more about a means to promote further decentralisation and disintermediation when combined with a peer-to-peer architecture.

Crypto is social, and therefore political

C1.5   It is not possible to separate the technology from its social and political dimensions[5]. The greatest gift that Satoshi Nakamoto has given us is the gift of decentralisation. It is the first time in human history that we can govern communities without a hierarchy. Hierarchy has historically been the only method by which human organisations have been able to scale. However, we have now reached the point where the opposite is true: nation states, and their laws, and traditional institutions (in the form of national banks, government bureaucracies, Parliamentary democracies) can no longer scale to the imperatives of a global economy. We say that to the global economy, scalability can only be achieved by decentralised non-hierarchical structures: governance by mathematical protocol.

C1.6   The rise of investment in the crypto-economy[6] has been buoyed by extraordinary financial gains[7]. It is universally accepted crypto becoming mainstream, is inevitable. Mass adoption is being recognised in the exponential growth of the crypto market; the race by institutional investors to service the demand by their clients[8], increasing integration into the traditional economy by such service mediums such as Paypal, uber, Amazon and major retailers accepting crypto as payment; and, recently as a harbinger of things to come, the Korean crypto trading market volume exceeding that of the national stock exchange.[9]

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[4] DuPont, Q. (2014), "The politics of cryptography: Bitcoin and the ordering machines", Journal of Peer Production (4), http://peerproduction.net/issues/issue-4-value-and-currency/peer-reviewed-articles/the-politics-of-cryptography-bitcoin-and-the-ordering-machines

[5] Far from being an exclusively economic tool, money is closely associated with social and political systems as a whole which Nigel Dodd refers to as *the social life of money:* Dodd, N. (2014), *The Social Life of Money,* Princeton, NJ: Princeton University Press. See also Simmel, G. (2004), *The Philosophy of Money,* 3rd enlarged edition, London and New York: Routledge.

[6] Crypto economy as an abstract concept is used in this paper to denote an emerging sector of economy that is based on the technological innovations of bitcoin and distributed ledger technologies.

[7] For example, Safemoon did 6000X and investors as low as $100 became millionares within 2 weeks.; HOGE and FEG are the same. Others include: 11,000x for DogeCoin; Neo 378,453% ROI; Ethereum — 279,843% ROI; Spectrecoin — 149,806% ROI; Stratis — 102,338% ROI; Ark — 37,805% ROI; Lisk — 26,367% ROI; DigixDAO — 12,044% ROI; QTUM — 9225% ROI; NXT — 1,265,555% ROI; IOTA — 424,084% ROI; THETA-18,716.71 %; FTM-13,426.68 %; ONE- 7,719.49 %

[8] For example Exchange Trade Funds filed by Goldman Sachs, Fidelity, Van Eck, JP Morgan. Likewise with Microstrategies, Rothchild through Gray Scale, BlackRock just to name a few.

[9] South Korean crypto exchange volumes surpass those of its entire stock market. Shaurya Malwa; March 15, 2021 https://cryptoslate.com/south-korean-crypto-exchange-volumes-surpass-those-of-its-entire-stock-market/

C1.7 Moreover, it is also accepted that crypto markets support an asset class that is uncorrelated with any other investment asset class and is highly liquid, given the crypto markets trade 24 hours a day. The mere recognition of crypto as an asset class is a powerful risk management tool in an investment portfolio. It therefore becomes a commercial imperative for all investment managers to have a portion of their portfolio in Crypto. The economic impact of this alone filtering into the relatively tiny $2.7T plus crypto market will have staggering financial impact to boost capital availability.

C1.8 To say that mass adoption is inevitable is not just a matter of pointing to institutional investors entering the market. Nor is it about the reversal of the recommendations of the largest banks who now find themselves recommending their clients invest, even a small portion of their portfolio, in crypto projects. The inevitability of mass adoption comes from something far deeper. It comes from the asymmetry of power between centralisation and decentralisation. For centralisation to sustain, it must be total: 100%. Every part of the system must be controlled or the money, like water, will flow to the 'loophole'. Decentralisation has no such requirement.

C2.   SOLVING THE 3RD AND 4TH GENERATION PROBLEMS OF MASS ADOPTION

C2.1 The Bitcoin revolution was the first generation of the evolution. The Second generation was the proof of concept that became known as the smart contract platforms lead by Ethereum. The third-generation evolution is now putting these smart contract platforms to some proper commercial application. The 3rd generation problems, and how we have sought to solve them discussed in this paper, are:

(a) **Scalability:** being the ability of the blockchain and the ecosystem within which it operates must be capable of billions of users with instant speeds and inconsequential transaction costs. Our background in providing Central Bank Digital Currency ('CBDC's) for governments mandating global scalability and speeds had us perfectly placed to solve these problems as we explain in paras [B 3.5-3.7].

The TX speeds of a million per second to unlimited parallel processing chains fed data through load balancers applies not only to Coins, but also to Smart Contracts/DNCs.

(b) **Interoperability:** just as we expect our wifi and smartphones to operate in any part of the world regardless of which brand of device we use, blockchain projects should be able to seamlessly talk to each other. Thereby breaking down silos of information and accelerating innovation through collaboration. In para [B6] we explain how we have solved these problems with interoperable cross-chain bridges parallel processing chains from different languages.

(c) **Governance and innovation sustainability:** the lessons of the Bitcoin wars and the inability to evolve into smart contacts, highlights the problem of an inability to upgrade and sustain the ecosystem because of a failure of adequate governance structures.

NuGenesis has built a continued innovation rate of the system in the code. The governance structure preserves the best of decentralisation with the internal funding and sustainability for continual improvement. The imperative to continually upgrade is built into the protocol; the innovation rate is funded to be sustainable. By doing so, NuGenesis:

(i)   caters for future possible applications and threats such as for example Quantum Resistance and 'zero knowledge' ('ZK') proofs; and,

(ii)   ensures the integration of virtual reality interaction and off-line processing with Satellite technology.

C2.2   However, we believe solving the 3rd generation problems is insufficient. True mass adoption involves some greater challenges on the interface between blockchain technology and the expectations of the mainstream public. A broader ecosystem infrastructure is required that better interfaces with the physical and legal systems of the world. These 4th generation problems include:

Broader capture and creation of instruments of value.

Money, or instruments representing and exchanging value, have become increasingly more abstract in the course of human history. The increasing abstraction is facilitated by the legal and commercial infrastructure created to support it. The Crypto markets are the latest evolution.

The next evolution does not need to be limited by expression in the form of tokens. It can be token-less. Take for example the vast value locked in large infrastructure projects that takes decades to realise their economic benefits. Take large R&D and IP in technology, pharmaceuticals etc trapped in the decade before they can go to market; or worse, where they are in countries who cannot properly access global liquidity markets.

Our new generation smart contracts and NFTs, called "Digital Notarised Contracts ('**DNC's**')" and "Serialised Notarised Digital Assets ('**SNDA's**')" discussed further in para [C 3.2] allow for decentralised rails to work what counterparties want without trust to recognise and exchange value. The Virtual Reality Realm, "Parallel Worlds" will allow users new forms of innovative expression.

(a)   Liquidity and capital market efficiency in the crypto economy

The immature state of capital markets in the crypto space, whilst remarkable in how far it has progressed in the circumstances, is far too inefficient to ensure that best technology and innovation is properly funded, or for risk to be properly priced.

The lack of liquidity and its impact in drives the direction of technology. It should not. Efficient capital markets should ensure that money flows to advance the best tech. Inferior tech should not be developed because it has better access to liquidity.

We discuss in para [C 7], our solutions to the problems in terms of providing our own decentralised exchange (Ledger X), launchpad and venture capital sites with some rigours and disciplines that our DNC and SNDA technology allows us to contribute. Indeed, we believe this technology will truly revolutionise the financial markets in crypto converting it from a glorified pawn-shop approach to a truly efficient financial market.

From the perspective of mainstream capital markets, the immature state of the crypto capital markets is not conducive to maximising incoming investment potential. The NuGenesis ecosystem seeks to facilitate mainstream capital investment into the space by providing:

(i)   a peer assessed platform through the Just Social crypto-centric social media for the review, critique and monitoring of new and existing projects. Self-regulatory customs and norms will arise through the commercial competition where more transparent, better reviewed projects attract more capital;

(ii)   the technological tools – e.g. conditions in an ICO release, multi-sig treasuries etc that avoids rug-pulls and releases funds on the projects achieving KPIs and meeting roadmap promises; and,

(iii)   legal regulation at SDEZ's of participating jurisdictions, including standards of disclosure, duties on founders, devs and miners etc for those projects opting to be regulated in return for greater access to traditional capital market inflow.

(b)   <u>Integration and 'hand and glove' relationships with the legal world and nation states.</u>

We believe that the true mass adoption of crypto technologies is a proper, 'hand in glove' supporting relationship with the laws and administrative infrastructures of nation states. Whilst common law countries are familiar with case law developing to recognise legal instruments behind the evolution of merchant practices, that evolution would be inadequate to meet the rate of innovation required in the crypto space.

Accordingly, we believe that legal recognition, starting with Special Digital Economic Zones of crypto instruments is necessary to give the comfort to, and better interphase with the expectations of mainstream investors. In para [B 12] we describe further the development of payment instruments recognition and enforcement, digital wills and estates to allow for succession planning and even arbitration systems to recognise the conditions imposed through DNC and SNDA's.

C2.3   At para [B 11], we discuss valuation methodologies for NuCoin in the NuGenesis blockchain and ecosystem, suggesting it is best reflected by Metcaffs law or as a currency in a developing country.

C3 SCALABILITY FOR SERIOUS GOVERNMENT AND CORPROATE APPLICATIONS

C3.1 NuGenesis blockchains were built for CBDC's and required scalability and securities issues relevant to Government and Serious Global corporate application. This required a number of problems to be solved, which included:

(a) On the question of transaction through put, the transactional speed had to efficient with confirmations occurring seconds and certainly no less than is expected with traditional financial market systems like MasterCard and Visa. Although the Bitcoin is a popular blockchain-based global cryptocurrency, scaling it to handle the large transaction volumes worldwide raises some concerns. Among other things, the transaction processing rate of Bitcoin is affected by (1) the available network bandwidth, and (2) the network delay affects. Miners with high bandwidth and with less network delay can broadcast their blocks among peer nodes with ease and speed, while on the other hand low bandwidth miners with limited computational resources possess less probability of getting their fair share in a successful execution of proof-of-work.[10]

(b) The Proof of Work ('POW'), whilst understandable in its day, is the steam engine equivalent of the industrial revolution. Sure, it was more efficient than human labour, but only as useful as the next evolution inevitably replaced it. The resource intensity involved in POWs systems, as best exemplified by Bitcoin, is simply too irresponsible for Governments to countenance. We designed the Proof of Authority system.

(c) Part of the computational resource intensity involved miners in a lottery style campaign to guess the nonce was an inefficient use of resources for those that did not succeed. Instead, we required all useful computational work to have utility and as such designed our blockchain that all mining effort would, eventually, be rewarded. The Proof of Authority system was modified to be proof of useful work.

(d) Human validators were repugnant to a Government or serious global corporation security requirements. We sought to underscore the system to allow for AI systems to run parallel and increase/decrease the reliance on AI as required for optimal system efficiency or by the community governance for the blockchain. The Proof of Authority system was modified to be proof of useful work/AI.

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[10] Y. Sompolinsky and A. Zohar, "Accelerating bitcoin's transaction processing fast money grows on trees," Not Chains, 2013.

The solution for unlimited scalability

C3.2   As discussed in paras [B 3.5 – B 7], our scalability solutions included:

(a) using system validators overlayed by AI to prevent corruptibility;

(b) removing unnecessary computational resources – for example gas fees;

(c) parallel processing of multiple chains with each chain having its own dedicated function and speed requirements (e.g. an NFT video has a 6 second block speed finalisation; a payment transaction has a 200 milli-second block finalisation);

(d) incorporating 'consensus before packing' protocols to order and maximise data going into the block; and, ultimately,

(e) rolling out blockchain load balancers to read and feed maximum data into the blockchain, with the end result that the greater the use of the system, the faster the transaction speeds.

C3.3   Having set the bedrock for unlimited scalability, we are better able to roll-out the virtual reality realm where millions of events, including videos need to be processed instantly.

Smart Contracts and Oracles replaced by DNCs and SNDA's

C3.4   The great promise of the 3rd generation of blockchain technology given the proof of concept provided by Ethereum, is smart contracts. Smart contracts can simply be viewed as algorithmic enforcement of an agreement among, often, mutually non-trusting entities. More technically, a smart contract is a program that executes on blockchain in a distributed manner and possesses unique identification.

C3.5   Smart contracts help automate the logic of an arbitrary value transfer system in an immutable manner where conditional transactions are recorded, executed, and distributed across the blockchain network. These contracts have the potential to reduce the legal (up to a certain extent) and enforcement costs while largely ruling out the need for central trusted or regulating authority.[11]

C3.6   Companies are increasingly launching smart contracts as prototypes; for example, the insurance giant AXA has rolled out the Fizzy insurance contract[12]. It links the Ethereum blockchain to a flight traffic database and aims to automatically compensate travellers' if their flight is delayed. The essence of smart contracts, hence, is the automatic and fully pre-defined execution of certain (contractual) obligations once pre-defined conditions are met.

C3.7   It should be noted, however, that these smart contracts do not automatically inherit the trustlessness and informational integrity of the blockchain, as they often have to rely on off-

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[11] D. Bargar, "The Economics of the Blockchain: A study of its engineering and transaction services marketplace," Ph.D. dissertation, Clemson University, 2016.
[12] AXA, 'AXA goes blockchain with fizzy' (13 September, 2017), https://www.axa.com/en/newsroom/news/axagoes-blockchain-with-fizzy.

chain information, provided by specialised intermediaries. [13] Despite an impressive growth in Defi projects built on Ethereum and other smart contract platforms, as a general rule, smart contracts are neither smart nor contracts. They are rudimentary and very limited by code. dApps in Defi for example involve composites of multiple smart contracts build on top of each other.[14] Oracles developed as the interface by which AI could assist converting more practical needs to the simplistic code necessary for smart contracts to function.

C3.8   AI can help in understanding, recognizing, assessment decision making in the blockchain. Whereas Machine Learning ('ML') techniques could help to find ways to improve decision making and smart contracts. For instance, AI can help to build an intelligent oracle without the control of the third party. This would learn and train itself to make the smart contract smarter.[15] This lead to developing our new generation smart contracts and NFTs, called "Digital Notarised Contracts ('**DNC's**')" and "Serialised Notarised Digital Assets ('**SNDA's**')" which replace smart contracts.

C3.9   The function of Oracles have been subsumed and inbuilt as a standard feature of the NuGenesis blockchain. The AI evolves a library of template commercial agreements based on increased learning from the greater number of business scenarios. These are modified from comprehensive standard commercial contracts. See para [B 10].

C4   TRUE INTEROPERABILITY AND THE FOSTER OF COLLOBORATION FOR MAXIMIUM INNOATION

C4.1   You do not expect that your Samsung or Apple smartphone communicate only with a Samsung or Apple router; you expect that our wifi connects just as seamlessly in a hotel room in Bangalore or Tehran as it does back at home. It is therefore somewhat surprising that interoperability was relative recent, late push in the evolution of blockchain technology. Standardisation of protocols to allow an efficient collaboration (among different blockchains) still do not exist which implies a lack of interoperability. Whilst the space has enjoyed flexibility for blockchain developers to code with a variety of programming languages and platforms; nevertheless, this approach renders blockchain networks isolated and lack in-between interactions. An example here is the GitHub, which offers more than 7500 active blockchain-enabled projects (i.e., coded with different platforms and programming languages), protocols, and consensus algorithms. Hence a standard protocol is needed to permit collaborations within these developed applications and integration with existing blockchain systems.[16]

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[13] Elisa Mik, 'Smart Contracts: Terminology, Technical Limitations and Real World Complexity' (2017) 9 Law, Innovation and Technology 269, 278.

[14] Hopefully there is composability between different building blocks of multiple smart contracts used in the development of dApps where such building blocks have been tested through iteration and are robust. Otherwise there are multiple layers of bugs in the stacked smart contracts making risks unacceptable.

[15] Z. Zheng, S. Xie, H.-N. Dai, and H. Wang, "Blockchain challenges and opportunities: A survey," Work Paper, 2016.

[16] A. A. Monrat, O. Schelen, and K. Andersson, "A survey of blockchain´ from the perspectives of applications, challenges, and opportunities," IEEE Access, vol. 7, pp. 117134–117151, 2019; H. Jin, X. Dai, and J. Xiao, "Towards a novel architecture for enabling interoperability amongst multiple blockchains," in 2018 IEEE 38th International Conference on Distributed Computing Systems (ICDCS). IEEE, 2018, pp. 1203–1211.

C4.2   Interoperability is critical to the development of the crypto-sphere generally. The current version of the NuGenesis main blockchain is designed follow the broad architecture of Ethereum as opposed to IOTAs tangle or Hashgraph. Almost 90% of all listed tokens are issued on the Ethereum blockchain.[17] Ethereum represents the enterprise market consensus of approach with developers via their 2,800+ dApps built upon it and real-world adoption, exemplified by the Enterprise Ethereum alliance over 450 enterprises business members including Microsoft, JP Morgan Chase, Accenture, ING, Intel Cisco and others. Private permissioned variants of Ethereum are represented by JP Morgan's investment in Quorum and folks thereof such as XinFin, whilst Public versions of the Ethereum have been developed by Big Four Accounting firm, Ernst & Young with Nightfall.

C4.3   The scaling problems of Ethereum are well known and the focus of the crypto-world whilst the hope of Ethereum 2 might ameliorate it. Scaling solutions using side chains such as Plasma and OMG have failed or stalled. 'Roll ups' (of the computational result from off-chain/side chain process), as a solution pending sharding to be perfected, in their various flavours such as Optimism and Arbitrum are plagued with the problem of a single node point of connection between the side chains and Ethereum (known as the Sequencer) that compromises decentralisation. Whilst Polygon offers an interoperable network model for all scaling solutions to Ethereum which its own POS chain being more promising.

C4.4   Interoperability is essential to the space and competition helps as increasingly more complex dApps use composites of other smart contract composites as their building blocks. This composability reduces the layers of risk as the building block components are reiterated and proven robust through use. Boundaries between collaboration and competition blur to a balance in favour of innovation.

C4.5   A number of projects have emphasised interoperability[18] and we have sought to take the issue further by providing for dual/multi-chain bridges to allow for both information and value to exchange between blockchains. As a result, the NuGenesis blockchain system is currently a multi cross chain configuration operating in parallel interoperability:

The main chains are:

(a) the NuGenesis main blockchain that is built on Substrate;
(b) the 2nd, 3rd and 4th Generation innovations beyond the Substrate framework that use the Link language rather than Solidity to support the additional features on the NuGenesis Smart Chain™ and NuGenesis Smart Chain II, which include:
    (i)   Smart Contract Digital Notarised Contracts™ (DNCs)
    (ii) Non-Fungible Tokens (NFTs)
    (iii) the multi-coin creation capability on the Smart Chain;
(c) the LedgerX (Exchange) Trade chain that is based on C++ that is a parallel processing chain made of a tri blockchain configuration;
(d) the Ethereum Chain;
(e) the Bitcoin Chain;
(f) the Ethereum Voting Chain ("EVC");
(g) BitCoin NU; and,

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[17] Fabrian Schär, Decentralised Finance: On blockchain0and smart contract-based financial markets, Federal Reserve Bank of St Louis Review, 2nd Quarter 2021, 103(2) pp 153-174, at 158.

[18] Polkadot, Cosmos, Polygon, Blocknet, Aion, WanChain, Harmony, MantraDAO, Kylin, RampDeFi

(h) BitCoin GREEN (being a Proof of Authority version of bitcoin).

There are 28 other chains centric to particular projects that are ready to be added to this cross-chain parallel processing configuration.

Para-chains and Para-networks

C4.6   Para-chains, relay chains and the ecosystems created within the blockchains have been promoted in the space as a means of achieving interoperability. The cost of doing so must be assumed to be significant if not cost prohibitive to all but the more well-funded projects. At the time of writing the auction of slots on Kusama and Polkadot have not occurred. However, if the cost to Polkadot of running a chain is measure of how much they must charge for a slot on their parachain, there is a significant contrast with NuGenesis. Polkadot's infrastructure requires 10 Nodes per relay chain which compares to an equivalent of only 4 Nodes on NuGenesis to produce the 100 slots to run the parachains. Therefore, it is safe to say that new projects joining as parachains under NuGenesis will be competitively more affordable and efficient.

C4.6   There are cost and time benefits of projects with very specific use cases, to benefit from being a para-chain and/or having para-threads. They save the infrastructure costs associated with consensus and security etc provided by the mother chain. For that reason, NuGenesis provides the option for projects to be para-chains.

C4.7   However, in the main we have not been able to appreciate how a projects' blockchain can satisfactorily be operating as para-chain of another projects' blockchain. In our testing, para-chains operating together drain the efficiency of the entire network. Instead, we preferred to have projects, whether using our NuGenesis blockchain, customised for their purposes or existing blockchains, run as separate networks within their own ecosystem and using their own resources in terms of consensus mechanisms and governance systems. We preferred to develop our 'super-bridges' to aid interoperable communication and exchange between the networks run instead as "para-networks". That way we found speed and efficiency to be maximised and no drain on the resources by one network linked with the others.

C4.8   We tend to view the parachains as having more to do with the unspoken need for providing, a work-around for having a fully-fledged decentralised exchange in their ecosystem. Liquidity is certainly a critical drain on the ability of the crypto-space to flourish. However, pretending that what is being sought to be achieved is an exchange, does help. Bonding curves and other mechanisms to create a sort of internalised technocratic market for determining the value of tokens, we do not believe should be the new standard. The rigours of the external market, with all its harshness should be the default way of providing liquidity. We discuss this further in para [C 7].

Extended operability through Hybrid private and public blockchains

C4.9   Our background with Government capital raising projects has necessitated a susceptivity to the ensure that informationally-sensitive is treated within private blockchains, yet be interoperable with other information that is better utilised with public blockchains for its transparency and verifiability. Accordingly, our interoperability architecture allows us to create hybrid public/private networks and sub-networks operating within a paradigm of a

collective group of blockchains such that there an appropriate mixture of security, scalability, and speed.

C4.10   This hybrid infrastructure will assist in establishing appropriate linking between business and government use and cater for particularly sensitive information to be managed in international commerce.

Smart Chains

C4.11   The NuGenesis Smart Chains are themselves a network of smart chains. Smart Chain I is built on the Substrate framework and is EVM compatible using the Solidity language, whilst Smart Chain II is built with additional net generation features that requires the Link Language to continue to evolve. The Smart Chains are on Layer 1, but there is also a version available on layer 2. The objective of the Smart Chain is to allow new innovative enterprises to have a low-cost and efficient entry into the cryto-economy via the NuGenesis ecosystem.

C4.12   NuGenesis has chosen to have a greater supervisory role and require verification of the projects who propose to issue smart coins and tokens on the NuGenesis smart chains and consequently, will prevent 'rug pulls' or non-authentic projects and require some intrinsic value on the Coins created.

C5.   GOVERNANCE

C5.1   A sorely neglected[19] and limiting area which is pivotal to the mass adoption of blockchain technology and the fulfilment of its promise, is governance. As will be discussed below, the Bitcoin and Ethereum experience demonstrates the problems in maintaining the innovation and evolution rate of blockchain technology. The ideal of governance by mathematical and mechanical protocol in a non-hierarchical decentralised structure to achieve the promise of global scalability nevertheless requires a level of governance that will:

(a) allow for the innovation rate and evolution of the blockchain to seamlessly be implemented by way of technical upgrades, commercial applications and their funding to occur. The NuGenesis Governance structure provides a system for Governance and the funding of technical, marketing, legal and commercial evolution of the blockchain through a series of treasury wallets and rewards.

(b) allow the in-built system of evolutionary sustainability to resource the development of solutions not only for current issues, but issues that will extend into the coming decades. For example, the NuGenesis governance system funds the technical development of:

    (i)   Quantum resistance to meet the challenges that Quantum computing will create;

    (ii)   'zero knowledge proofs' to allow blockchain technology to prove for example that everyone has voted and has been counted without knowing

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[19] The exceptions are Tezos and Cardano which we will discuss in this Part.

what they voted for or proof that a transaction is valid without revealing anything about who sent it, who received it or how much money it contained. This is particularly focused to deal with the community concerns regarding data privacy.

(iii)   Tokenless exchanges of value, particularly with our evolution on the traditional smart contracts and NFTs into Digital Notarised Contracts ('**DNC's**')" and "Serialised Notarised Digital Assets ('**SNDA's**')

(c) allow for decision-making to occur through pre-defined and certain rules with roles and responsibilities for those with 'skin in the game' to undertake. Whilst 'code is law' will still govern, there is appropriate room for the 'prophets' in tech and business to lead the evolution and upgrade of the NuGenesis ecosystem as more users are added.   The ability to upgrade is predictable; without forks.

The problem of the current lack of governance in the crypto space

C5.2   Governance is a key concept in studies on the internet ecosystem,[20] and sociological literature is helpful to deal with the disputes[21] that arise when interactions become problematic in challenging system coordination.[22] What is perhaps most striking about the state of the market is the opacity and informality when it comes to the updating of the protocol itself.[23] There are no clear guidelines in place describing how the protocol itself can be changed, particularly when conflicting views have to be reconciled.[24] In stark contrast to the exactness of the protocol itself, governance mechanisms are thus almost entirely lacking when it comes to changing the rules of the game in moments of dispute.

C5.3   Nearly all blockchains are maintained by a small group of people ("core developers").[25] While anyone may make proposals for updating the code, only the core developers have the power to actually implement changes.[26] Nonlinearity and unpredictability in changes to the protocol arguably result from the lack of a procedure to accommodate dissent within

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[20] See, e.g., Eric Brousseau et al. (eds), Governance, Regulation and Powers on the Internet (CUP, 2012). [64] Jeanette Hofmann et al., 'Between coordination and regulation: Finding the governance in Internet governance' (2016) New Media and Society 1, 10.

[21] Luc Boltanski and Laurent Thévenot, 'The Sociology of Critical Capacity' (1999) 2 European Journal of Social Theory 359.

[22] Jeanette Hofmann et al., 'Between coordination and regulation: Finding the governance in Internet governance' (2016) New Media and Society 1, 10

[23] On the difference between these two governance layers, see Primavera De Filippi and Benjamin Loveluck, 'The invisible Politics of Bitcoin: Governance crisis of a decentralised Infrastructure', 5(3) Internet Policy Review 1 (2016) 10.

[24] Cf. De Filippi and Loveluck, supra, 14.

[25] Cf. Gerald P Dwyer, The economics of Bitcoin and similar private digital currencies, April 2015, Journal of Financial Stability 17:81-91 at 82; Arthur Gervais et al., 'Is Bitcoin a Decentralized Currency?' (2014) 12(3) IEEE Security & Privacy 54, at 55.

[26] Gervais et al. supra 57; De Filippi and Loveluck, supra, 13-14; Angela Walch, 'The Fiduciaries of Public Blockchains' Working Paper (2017). Note only core developers have the "commit key"; Angela Walch, 'The Bitcoin Blockchain as Financial Market Infrastructure: A Consideration of Operational Risk' (2015) 18 NYU J Legislation and Public Policy 837, 865-882

the community of developers and, more broadly, of users and stakeholders.[27] Core developers use "informal processes that depend on rough notions of consensus and that are subject to no fixed legal or organizational structure".[28] They do, however, often coordinate their actions with operators of large mining pools;[29] these are entities that supply the computing power to validate transactions in the chain and that are rewarded for their efforts with newly "minted" coins.[30] A small group of agents crucial for the development and maintenance of the network (core developers and operators of mining pools) may thus acquire true power to change the protocol, even when holding less than 50 % of computing power,[31] and independent of their financial stakes in the currency. While these agents effectively regulate the crypto-economy, they are accountable to no-one, and users do not play any significant role in their appointment.[32]

The difficulty to evolve

C5.4   Bitcoin and Ethereum are exemplars of the inability to evolve. Ethereum Class, Bitcoin SV can be considered Governance failures. Even if Bitcoin wanted to improve its smart contracts capability, it is impossible to upgrade because of the lack of a governance structure. The problem is with the internet as well. IPV6 compliance is taking 20-30 years upgrade. With the increasing rate of innovation and competition, governance failures will be increasingly obvious and limiting.

C5.5   Distributed networks have long been associated with a redistribution of power relations, due to the elimination of single points of control. This was one of the main interpretations of the shift in telecommunications routing methods from circuit switching to packet switching in the 1960s and the later deployment of the internet protocol suite (TCP/IP) from the 1970s onwards,[33] as well as the adoption of the end-to-end principle which proved to be a compelling but also partly misleading metaphor.[34] The idea was that information could flow through multiple and unfiltered channels, thus circumventing any attempts at controlling or censoring it, and providing a basis for more egalitarian social relations as well as stronger privacy. In practice however, it became clear that network design is much more complex and that additional software, protocols and hardware, at various layers of the network, could (and did) provide alternate forms of re-centralisation and control and that, moreover, the internet was not structurally immune to other modes of intervention such as law and regulation.[35]

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[27] The core developers note: "We are fairly liberal with approving BIPs [Bitcoin Improvement Proposals], and try not to be too involved in decision making on behalf of the community. The exception is in very rare cases of dispute resolution when a decision is contentious and cannot be agreed upon. In those cases, the conservative option will always be preferred."
https://github.com/bitcoin/bips/blob/master/README.mediawiki (accessed on June 8, 2017).

[28] Shawn Bayern, 'Of Bitcoins, Independently Wealthy Software, and the Zero Member LLC' (2014) 108 Nw. U. L. Rev. Online 257, 259.

[29] See Angela Walch, 'The Bitcoin Blockchain as Financial Market Infrastructure: A Consideration of Operational Risk' (2015) 18 NYU J Legislation and Public Policy 837, 873.

[30] See Andreas M Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies (O'Reilly 2014)207-210.

[31] Gervais et al. supra, at 55.

[32] Gervais et al. supra, 55.

[33] Abbate, J. (1999), *Inventing the Internet*, Cambridge, MA: MIT Press.

[34] Gillespie, T. (2006), "Engineering a principle: end-to-end in the design of the internet", *Social Studies of Science 36*(3), pp. 427-457.

[35] Benkler, Y. (2016), *Degrees of freedom, dimensions of power*, *Daedalus*, *145*(1), pp. 18-32.

Avoiding the Bitcoin Governance Failures

C5.6   From a socio-technical point of view there are two co-ordination mechanisms: governance by the infrastructure (achieved by the NuGenesis protocol) and governance by the infrastructure (managed by the community). Similar to the Bitcoin precedent, in being self-governing and self-sustaining, the NuGenesis network relies on a market driven approach to social trust and coordination by embedding it directly into the technical protocol. However, unlike Bitcoin, we do not rely on the hidden unaccountable power of a small core of highly skilled developers who are the key to the development of the protocol. Nor do we allow them to coordinate or be influenced by heavily concentrated in mining pools who have an asymmetry of power.

C5.7   The Bitcoin governance crises of 2013 and 2015/2016 revealed the limitations of excessive reliance on technological tools to solve issues of social coordination and economic exchange. Whilst there is a layer based on infrastructure seeking to govern user behaviour via a decentralised, peer to peer network, there is a second layer of developers with an unacknowledged power architecting this infrastructure, exposing an antithetical centralised and undemocratic development process. This can be a technocratic power structure insofar as it is built on automated rules designed by a minority of experts with limited accountability for their decisions.

The Bitcoin Hard Fork of 2013 lesson

C5.8   On March 11, 2013, the Bitcoin blockchain forked into two chains that were no longer mutually consistent.[79] This unintended hard fork was a result of slow updating to the newly released version of the protocol. Importantly, the new chain was growing faster than the old one. However, the core developers convinced the largest mining pool (BTC Guild)[36] and other major pools via the bitcoin-dev IRC channel,[37] without any coordination with users, to back the shorter chain because it functioned under both old and new versions.[38] In doing so, they violated the basic blockchain rule of the authenticity of the longest chain.[39] Thanks to the efforts of the mining pools which controlled roughly 70 % of the hash power of the Bitcoin network, the shorter, old chain caught up and eventually surpassed the new chain.[40] Mining rewards worth 26,000 $ in the new chain were lost, and 10,000 $ double spent as a result of the fork.[41] In this case, therefore, the operators of major mining pools and core developers informally colluded to take the blockchain into a novel, non-majoritarian, direction. While their intentions to quickly resolve the fork may have been laudable, the episode shows the vulnerability of the infrastructure to ad hoc coalitions of the willing.

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[36] Arvind Narayanan, Analyzing the 2013 Bitcoin fork: centralized decision-making saved the day https://freedom-to-tinker.com/blog/randomwalker/analyzing-the-2013-bitcoin-fork-centralizeddecision-making-saved-the-day/, introductory section, and under Achtung !.

[37] http://bitcoinstats.com/irc/bitcoin-dev/logs/2013/03/11.

[38] Gervais, supra, 56; Buterin, supra.

[39] As a maximum, the new chain was 13 blocks ahead: Buterin, supra.

[40] Buterin, supra.

[41] Buterin, supra; the transactions in the lost blocks of the new chain, however, were later added to the dominant, old chain so that they could be executed.

C5.9   Even after two hard forks in August and October 2017, creating Bitcoin Cash[42] and Bitcoin Gold,[43] the Bitcoin network is still facing the challenge for a stable and sustainable future: the scaling debate.[44] With its current configuration, the Bitcoin blockchain can only validate a limited number of transactions per block.[45] The most notable implementation that would achieve increased block size is called Segregated Witness (SegWit). Without going into the details,[46] it is safe to say that the proposal that came closest to adoption, called SegWit2x, would have freed up space for transactions in the blocks and additionally raised the block size to 2 MB. SegWit2x would be have been implemented by a hard fork around November 16 if only enough miners backed it.[47]

C5.10   To demonstrate that a lack of formal governance system, inevitably leads to informal, already powerful groups exerting their influence through different avenues, a greater block size would make it more difficult for conventional computers to process transactions in the first place, making those with significant computing power even more relevant.[48] As in the case of Bitcoin Unlimited, there was a growing fear that under SegWit2x control would be effectively handed over to mining pool operators.[49] Unsurprisingly, miners, and not users, were the only ones able to cast votes on whether SegWit2x would be adopted.[50]

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[42] Alyssa Hertig, 'Bitcoin Cash: Why It's Forking the Blockchain And What That Means' (CoinDesk, July 26, 2017), https://www.coindesk.com/coindesk-explainer-bitcoin-cash-forking-blockchain/.

[43] ibid

[44] See, e.g., Ofir Beigel, 'Segwit vs. Bitcoin Unlimited and Bitcoin's Fork Explained Simply' (99 Bitcoins, March 27/April 2, 2017), https://99bitcoins.com/bitcoin-fork-segwit-vs-bitcoin-unlimitedexplained-simply/; Pete Rizzo, 'Making sense of Bitcoin's divisive block size debate' (CoinDesk, January 19, 2016), http://www.coindesk.com/making-sense-block-size-debate-bitcoin/; De Filippi and Loveluck, supra, 7-9; CoinDesk, 'Bitcoin or Bitcoin2x? News & Guides to Navigate November's Fork' (CoinDesk, October 30, 2017).

[45] Arvind Narayanan et al., 'Bitcoin and Cryptocurrency Technologies. A Comprehensive Introduction' (Princeton University Press, 2016) ch 3.6 and 7.

[46] For an excellent technical introduction, see Aaron van Wirdum, 'Segregated Witness, Part 1: How a Clever Hack Could Significantly Increase Bitcoin's Potential' (Bitcoin Magazine, December 19, 2015), https://bitcoinmagazine.com/articles/segregated-witness-part-how-a-clever-hack-could-significantlyincrease-bitcoin-s-potential-1450553618/.

[47] Pete Rizzo, 'Understanding Segwit2x: Why Bitcoin's Next Fork Might Not Mean Free Money' (CoinDesk, November 1, 2017), https://www.coindesk.com/understanding-segwit2x-bitcoins-nextfork-might-different/.

[48] De Filippi and Loveluck, Supra, at 8; Pete Rizzo, 'Understanding Segwit2x: Why Bitcoin's Next Fork Might Not Mean Free Money' (CoinDesk, November 1, 2017), https://www.coindesk.com/understanding-segwit2x-bitcoins-nextfork-might-different/.

[49] Don Tapscott and Alex Tapscott, 'Realizing the Potential of Blockchain' World Economic Forum White Paper (2017), 11; Ofir Beigel, 'Segwit vs. Bitcoin Unlimited and Bitcoin's Fork Explained Simply' (99 Bitcoins, March 27/April 2, 2017), https://99bitcoins.com/bitcoin-fork-segwit-vs-bitcoin-unlimitedexplained-simply/.

[50] This is due to the use of the BIP 9 activation protocol, see Matthew Haywood, 'All roads lead to Segwit — Segwit2x, BIP 91 Segsignal and UASF' (Medium, July 24, 2017), https://medium.com/@wintercooled/segwit2x-segsignal-and-the-uasf-all-roads-lead-to-segwitd66fedf7fba; Rizzo, supra; Alyssa Hertig, 'Why Are Miners Involved in Bitcoin Code Changes Anyway?' (CoinDesk, November 1, 2017), https://www.coindesk.com/miners-involved-bitcoin-codechanges-anyway/; critique also in Ariel Deschapel,'Why Segwit2x Is Doomed to Fail' (CoinDesk, November 6, 2017), https://www.coindesk.com/opinion-segwit2x-doomed-fail/, under "Scheduled chaos": "The almost nine-year-old cryptocurrency is facing its gravest test yet. Whether or not it will survive, or in what form, is anyone's guess";

C5.11   Many users and, notably, the Bitcoin core developers therefore opposed the SegWit2x proposal.[51] However, the alternative is also all but devoid of power problems. Earlier in 2017, the core developers held meetings with large mining pool operators, for example in China, to discuss possible solutions, raising the fear of collusion between the groups.[52] Core developers have also bee accused of illegitimate censorship in the scaling debate.[53] Again the issue is a small group of unaccountable leaders, appointed or elected by no-one, can potentially leverage their position to assume informal power in opaque ways. This tendency sparked the Bitcoin Gold hardfork heralding the restoration of user power[54], but dwarfed by the Bitcoin's chain legacy.

C5.12   The Bitcoin block-size dispute of 2015/2016 was instrumental to the crypto-verse, at least because it brought back Satoshi to weigh in on the debate. The somewhat arbitrary limitation of block sizes preventing Bitcoin from scaling and impeding its growth, and the Bitcoin XT proposal proved controversial. Increasing the block size cap inherently involved more centralisation by marginalising miners with less powerful machines and the overrun of mining pools. The governance debate resulted in outright censorship and banning Bitcoin XT supporters from the most then popular Bitcoin communication forums, even DDoS attacks. Even Bitcoin's resort to the only thing that matters being ultimately is the amount of computational resources that every node is providing to the network, has been inadequate to deal with the disturbances by mining pools having 50-75% of the network control.

C5.13   This type of situation cannot arise in NuGenesis.   Rather than being hidden in effective oligarchies, the governance is expressly recognised in the 313 positions. Save for the role of 313 executives, the NuGenesis protocol eliminates status recognition at the root by creating a trust-less infrastructure where the identity of the participant nodes is entirely irrelevant. There is no centralised authority in charge of assigning a network identifier (or account) to each individual node. The notions of identity and status are thus eradicated from the system. Even the disturbance potential of excessive computational powers has been eliminated in NuGenesis with system validators underscored by AI.

C5.14   There will always have to be some degree of points of influence.[55] Rather than a hidden technocratic, highly centralised and undemocratic approach, NuGenesis has made it express in the 313 executive positions and a voting system to regulate it.

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[51] Alyssa Hertig, 'Bitcoin 'Battle'? Core Developers Apathetic as Segwit2x Fork Approaches' (CoinDesk, November 1, 2017), https://www.coindesk.com/bitcoin-battle-developers-apatheticsegwit2x-fork-approaches/; Rizzo (n 104).

[52] JP Buntinx, 'Bitcoin Core Members Discuss Blockchain Consensus At Chinese Event' (The Merkle, December 11, 2016), https://themerkle.com/bitcoin-core-members-discuss-blockchain-consensus-atchinese-event/; Walch, supra at 9.

[53] John Blocke, '/r/Bitcoin Censorship, Revisited' (Medium, February 27, 2017), https://medium.com/@johnblocke/r-bitcoin-censorship-revisited-58d5b1bdcd64.

[54] See BitcoinGold, 'Roadmap', https://bitcoingold.org/.

[55] Internet governance has been fraught with many frictions, controversies and disputes over the years an international fight to control the basic rules and protocols of the internet described by some as a *global war*: DeNardis, L. (2014), *The Global War for Internet Governance*. New Haven, CT: Yale University Press. Even the much-praised governance model of the internet protocol suite based on the IETF s (deceptively simple) rule of *rough consensus and running code* effectively involved, at certain points, fair amounts of power struggles and even autocratic design: Russell, A.L. (2014), *Open Standards and the Digital Age. History, Ideology, and Networks,* Cambridge and New York: Cambridge University Press.

C5.15   Social organisations will continually have to face the difficult challenge of accommodating incompatible and often irreconcilable interests and values. As Bitcoin has shown, it is unrealistic to believe that human organisations can be governed by relying exclusively on algorithmic rules. In order to ensure the long-term sustainability of these organisations, it is necessary to incorporate, on top of the technical framework, a specific governance structure that enables people to discuss and coordinate themselves in an authentically democratic way, but also and perhaps more importantly, to engage and come up with decisions as to how the technology should evolve.

The Ethereum Hard Fork of 2016 Example

C5.16   Another sorry example is the Ethereum Hard folk of 2016 which lead to Ethereum Classic. The story shows that even transaction histories may be changed retroactively, sacrificing a second basic rule of blockchain: its irreversibility.[56] This is what happened on July 20, 2016 in the Ethereum blockchain, a then younger blockchain which not only defines a cryptocurrency (ether) but also enables smart contracts.[57] As is well known, Ethereum is also configured to support networks of smart contracts known such as token-based ventures. [58] These decentralized applications can take a broad variety of forms. In the specific instance, a German start-up programmed a smart contract running on Ethereum called "The DAO" which was intended to function like a decentralized investment platform. Having collected a surprising equivalent of 150 million dollars in ethers, representing 15% of all outstanding ether, The DAO was hacked and deprived of a third of its funds.[59] Overnight, ethers lost half of their value.[60]

C5.17   In an unprecedented move, core Ethereum developers decided to effectively rewrite the history of their blockchain in order to undo the hack and restore the funds to all investors via a hard fork.[61] This process is unique in so far as the blockchain, which is supposed to be an irreversible record of all transactions, was changed in order to erase the consequences of the fundamental coding error which led to the greatest hack in the history of blockchain-based organizations. The proposers of this rewriting of the Ethereum blockchain subjected their radical ideas to the majority vote of users by conditioning the hard fork on the approval by the majority of users.[62] The proposal was fiercely contested.[94] Only a minority

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[56] See, on rewriting blockchain history, David Siegel, 'Understanding The DAO Attack' (Coindesk, June 25, 2016), http://www.coindesk.com/understanding-dao-hack-journalists/.

[57] Joon Ian Wong and Ian Klar, 'Everything you need to know about the Ethereum "hard fork"' (Quartz, July 18, 2016), http://qz.com/730004/everything-you-need-to-know-about-the-ethereum-hard-fork/.

[58] Vitalik Buterin, 'Ethereum White Paper' (2014).

[59] Siegel 'Understanding the DAO attack (Coindesk, 25 June 2016); Joon Ian Wong and Ian Klar, 'Everything you need to know about the Ethereum "hard fork"' (Quartz, July 18, 2016), http://qz.com/730004/everything-you-need-to-know-about-the-ethereum-hard-fork/.

[60] Luke Parker, 'Ethereum hard fork results in two surviving cryptocurrencies, both are now trading' (Brave New Coin, July 26, 2016) https://bravenewcoin.com/news/ethereum-hard-fork-results-in-twosurviving-cryptocurrencies-both-are-now-trading/.

[61] The ethers originally collected in The DAO, which had then siphoned off to a child DAO by the attacker and to yet another DAO by friendly hackers (white hats), were restored to a WithdrawDAO recovery contract. The token holders can reclaim their investments in this way. See Jeffrey Wilke, 'To fork or not to fork' (Ethereum Blog, July 15, 2016), https://blog.ethereum.org/2016/07/15/to-fork-ornot-to-fork/.

[62] The vote was weighted by the ethers of the users, http://carbonvote.com/; see also See Jeffrey Wilke, 'To fork or not to fork' (Ethereum Blog, July 15, 2016), https://blog.ethereum.org/2016/07/15/to-fork-ornot-to-fork/.

of ether owners voted,[63] but in the end, the vast weighted majority of those users that did vote[64] and, after this, a similar majority of computing power of miners backed the hard fork.[65] Other than in the case of the unintentional Bitcoin fork just discussed, the intentional Ethereum fork was thus subjected to a dual mechanism: first, a vote by users, and then, the (unavoidable and economic) vote of miners by virtue of their computing power, who decided on whether to back the old or the newly forked version.[66] Nevertheless, in a way difficult to foresee ex ante, the principle of the immutability of the chain was sacrificed.

C5.18   It says much about the ethos of the original cyperpunk-mindset in dealing with the expectations of the mass adopters moving into the crypto space. The hard fork split of the Ethereum blockchain into mainstream Ethereum and Ethereum Classic, was led by supporters continue to maintain that the hacker rightfully exploited a bug in the smart contract and that the diverted funds should not have been returned to investors.[67] The hacker claimed that he or she had a right to do so because the smart contract provided for this opportunity, and threatened to sue anyone aiming to recover the spoils.[68] To those investing in DAO, they understood the purpose was to collect funds for investment and redistribution to all investors – the purpose which was violated by the unilateral application of funds by the hacker to his/herself. This example points to deeply conflicting views over the relationship between code and law, and appropriate governance mechanisms, within the cryptocurrency community.[69]

The Tezos example

C5.19   Tezos was the first blockchain project that sought to make Governance its feature. In July 2017, then a start-up called Tezos, almost unknown outside the world of blockchain, completed a fundraising in the form of an initial coin offering (ICO) that netted it the equivalent of around $230 million. Investors paid to receive digital Tezos tokens (or "coins") that they hoped would rise in value. The amount raised was then the largest ICO and it was accompanied by high-sounding promises to reshape social interaction through technology. Tezos pledged to use the funds it had raised to develop a software platform that would overcome the governance issues that plague existing blockchain-based networks, such as Bitcoin or Ethereum. Despite their open source roots, most such platforms are based on a take-it-or-leaveit approach, akin to the ubiquitous and non-negotiable online 'terms and conditions' that provide a kind of constitution in which users have little or no say. Tezos

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[63]Angela Walch, supra, p. 7; Luke Parker, 'Ethereum hard fork results in two surviving cryptocurrencies, both are now trading' (Brave New Coin, July 26, 2016) https://bravenewcoin.com/news/ethereum-hard-fork-results-in-twosurviving-cryptocurrencies-both-are-now-trading/.

[64] In the end, 87 % supported the hard fork: Parker, supra.

[65] Already on June 20, 2016, 85 % of miners were mining on the new fork: Vitalik Buterin, 'Hard Fork Completed' (Ethereum Blog, July 20, 2016), https://blog.ethereum.org/2016/07/20/hard-forkcompleted/.

[66] e.g.: "To me [the hard fork] is totally unacceptable and is a departure from the principles that drew me   to ethereum." (user "nustiudinastea", posted on https://www.reddit.com/r/ethereum/comments/4oiqj7/critical update re_dao_vulnerability/ (June 2016).

[67] Arvicco, 'A Crypto-Decentralist Manifesto' (Ethereum Classic Blog, 11 July, 2016), https://ethereumclassic.github.io/blog/2016-07-11-manifesto/.

[68] A Guest, 'An Open Letter' (Pastebin, 18 June, 2016), http://pastebin.com/CcGUBgDG; see also the chapter by Philipp Hacker in this volume, and David Siegel, 'Understanding The DAO Attack' (CoinDesk, 25 June, 2016), http://www.coindesk.com/understanding-dao-hack-journalists/.

[69] See De Filippi/Loveluck, 'The invisible Politics of Bitcoin: Governance Crisis of a Decentralised Infrastructure', (2016) 5(3) Internet Policy Review 1.

promised instead that its own software would empower users to democratically shape the future of the platform they were interacting on. In its own language, Tezos aimed to create a 'digital commonwealth'.

C5.20   Already shortly after its record-breaking fundraising, clouds began to gather over Tezos's technological utopia. Feuds and disagreements mounted. By the end of 2017, investors hit the company with several U.S. class-action lawsuits based on Tezos's perceived failure to deliver on its extraordinary claims. Not for the first time and certainly not for the last, a technology that promised to liberate exchange from the shackles of centralizing authority, ended in a U.S. court. Having bought into the vision of a 'digital commonwealth' with its own cryptocurrency beyond the state, the plaintiffs now turned to the U.S. legal system to recover their investments as well as any possible compensation in dollars. This mismatch between technological promise and legal reality is not unique to Tezos but a constituent feature of the new world of blockchain.

C5.21   Whilst Tezos recovered, Cardano has come to centralise the importance of Governance systems. Not only is the NuGenesis Governance system explicit with rules as to how the Governance will work such there are no power-grabs by opaque and unaccountable people, but that these Governance rules, and the funding to bring them to fruition as a virtue to ensure the NuGenesis blockchain thrives in the increasingly competitive innovation imperatives necessary for mainstream adoption.

C5.22   Our approach is to gain synergy with the world's legal systems and accordingly, whilst the NuGenesis blockchain provides its own Governance system, the Special Digital Economic Zones ('**SDEZ's**') will be introducing a blockchain Code of Conduct, which mostly voluntary will enshrine legal duties on key players in a blockchain ecosystem. This is discussed further in para [C 12].

Outline of the NuGenesis Executive Structure

C5.23   The executive structure comprises of 313 positions responsible for the management of the platform's development. The minting reward system mints coins that are allocated to the specific treasuries to fund the remuneration of these executive positions. The precise number of coins and the allocation is set out in para [B 13.10].

C5.24   Of those 313 positions, provisionally names "the Senate":

(a)   100 are filled by early investors with substantial investment in the platform and by reason of that investment, the platform arrives as fully operational and in whose interests are the business development aspects of the platform;

(b)   13 positions are appointed as technical leadership in technical aspects of the platform; and,

(c)   200 positions are elected by the community. These 200 positions will involve a multitude of requirements and will be for a specified period of time.

C5.25   By 2/3 of Senate vote, the senators will elect a President[70] who between any governance meetings will have executive responsibility. The roles and responsibilities and particulars thereto are to be determined by a vote of the community.

C5.26   Subject again to the vote by the Community, the current view is that there will be 10 governates each comprising a region of the globe[71] and that the Senators should be regionally responsible. The objective being to cater for the needs of and be responsible to the needs of the locals and their culture. For example, the needs of the middle east are for the optimisation of remittance, and the physical conversion and custody of fiat. The needs of Africa are for off-line payment systems.

C5.27   For legal reasons, it is currently proposed that the umbrella legal structure, whilst not necessary, should be in the form of Co-operative Limited Company under Australia's National Cooperative Law to which the State Governments adhere. The finalisation of this structure is to be determined by reference to the advantages of the flexibility by which an unincorporated organisation in the form of Just Social alone provides and how the legal and code interrelation is best resolved.

THE 4TH GENERATION ISSUES –
FOSTERING THE POWER OF MASS ADOPTION

C6.   AN EASY, USER-FRIENDLY BLOCKCHAIN ECOSYSTEM FOR MASS ADOPTION

Measures to add confidence

C6.1   Losing crypto by reason of lost pneumonic phrases, laptops or wallets are no longer a reason to strike fear for users. The NuGenesis blockchain serialises each crypto asset such that with appropriate proofs, we are able to recover lost crypto, recover pneumonic phrases etc. There is no reason why, for example a death, or a lost or stolen laptop should have the consequences it currently does and the inconvenience for all concerned. Accounts, wallets, and crypto assets can be reconstructed, and the old ones burned. We believe the more confident and secure new adopters are in user NuGenesis crypto assets, the greater the use and exponentially the value to the entire ecosystem if not the crypto space.

C6.2   Multi-sig wallets, conditions placed on NuCoin crypto assets etc, make for NuGenesis crypto assets to be more user friendly, versatile, and flexible for everyday use. This includes Corporate Treasuries, small business and simple household affairs being properly managed. Secondary verifications, acknowledgement or otherwise of conditions being met are just as important to the payment by a global corporate as it is for the household paying the teenager on mowing the lawn.

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[70] If no presidential candidates are able to meet the two-thirds majority requirement in the first round of voting, a second round of voting is scheduled in which absolute majority suffices.
[71] Africa, Asia, Central America, Eastern Europe, European Union, Middle East, North America, Oceania, South America, and the Caribbean

C6.3   Whilst finality is a valued imperative, it should not come at the expense of allowing fraud. As we discus below in para [B 12], the NuGenesis ecosystem seeks to synergies with SEDZ jurisdictions to provide a legal framework for both traditional and crypto markets to flourish. Where there is an adequate proof of fraud and appropriate judicial determination has been entered, we see no reason why users should be the victims of fraud. Stolen coins will simply be burned and victim's assets restored.

Capturing and fractionalising value: why do we need tokens at all?

C6.4   NuGenesis blockchain technology is intended to be used with SEDZ participating jurisdictions to allow for a wide variety of new and yet unimagined assets to be recognised, represented, valued and exchanged. From our background in seeking to find investment and financing solutions for large infrastructure projects mostly involving Governments[72], we have continued to be plagued with issues where value has been created but cannot be adequately represented, fractionalised and exchanged. Examples are:

(a)   A large subdivision setting out 1000's of homes, shopping centres, recreational facilities schools and associated infrastructure. Such a subdivision may take a decade from Greenfields stage, through the development approval processes to final registration of title deeds with necessary service facilities. Along the way there is enormous value that has been created and many multiples of return on investment that cannot be represented and captured.

These types of developments can be tokenised allowing for global sources of finance to be accessed lowering the cost of capital and risk; exchanged at any point in time providing liquidity and the opportunity for a vast array of investors be involved in projects that were otherwise reserved for those who command what are to most, prohibitive capital means to hold such illiquid assets for such a long term.

(b)   There are countries with such exceptional engineering innovations that involve again a 10 year R&D effort before they can be taken to market and realised; specialised equipment and infrastructure projects re-developing entire regions all of which have limited pool of investors/financiers. Through tokenisation, the funding sources become vast

Why shouldn't an individual's retirement fund in New Zealand not enjoy an investment in an Iraqi Cement Factory with a guaranteed buyer in the Government requiring continuous cement supply for the next 50 years? Why shouldn't returns of 100% of more be available for this farmer's retirement simply by by-passing established elite banking intermediaries?

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[72] 'ours' in this context are individual experiences of many of the founders and contractors in projects under numerous entity names.

Token-less exchanges of value

C6.5   Blockchain technology has also been used to develop digital financial marketplaces, particularly in conjunction with the 'Internet of Things', bypassing financial middlemen and allowing almost any asset to be digitised and traded over a decentralised computer network.[73] But why does their have to be the limitation of those representations of value in the form of tokens or NFTs only? The NuGenesis Blockchains provides the rails for anything of value between counterparties to be exchanged. Our Virtual Reality platform means that the exchanges mechanisms are not limited to the inventiveness of our developers. The users, within the Virtual Reality Platform, can between themselves invent representations or otherwise exchange value that satisfies their needs.   It allows completely token-less exchanges of value.

Business vehicles and combinations (DAOs) that do not need humans at all?

C6.6   The NuGenesis blockchain is agnostic as to who the user is, or whether they are human at all. The capacity is created for even a simple Digital Autonomous Organisation (DAO) to be created for a variety of business, social and household uses. A charity can be created to fund a crisis event; a buying DAO to manage a bulk-buying group to import a specialised product; or a DAO pooling potential customers seeking to customise the fabrication of specialised sporting or business equipment as an example.

C6.7   Through our relationships with participating SDEZ jurisdictions, a variety of DAOs can be given formal legal recognition. Foundations or Corporations with no members or 1 million members and/or directors for example. A Digital Will or Estate wherein in the DAO can invest according to its protocols and distribute intergenerationally between family members eliminating bitter family disputes and confident succession and estate planning.

Easy, cheap and quick blockchain projects, dApps for developers and humble users

C6.7   NuGenesis was built on the Substrate Blockchain Builder framework to allow, as Substrate upgrades its features and capabilities, these to flow naturally and accelerate the continual upgrades on the NuGenesis modules for building blockchains. The object is to allow non-expert programming of customised blockchains for individual projects, particularly in the current 'dev shortage' environment.

C6.8   The Virtual Reality world takes customisation to a new realm. The humblest user in the Virtual Reality world can interact with, represent value and exchange it with counterparties according to their own respective needs. They 'build their own rails' through inventing solutions to their particular objectives and priorities in the course of the interaction. They can make virtual reality agreements without the formality of programming code.

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[73] Konstantinos Christidis and Michael Devetsikiotis, 'Blockchains and Smart Contracts for the Internet of Things' (2016) 4 IEEE Access 2292, 2295; Alex Mizrahi, 'A Blockchain-Based Property Ownership Recording System' (2015), http://www.the-blockchain.com/docs/Chromaway-Research-A-blockchain-based-propertyregistry.pdf; see, more generally, Primavera De Filippi & Aaron Wright, Blockchain and the Law (Harvard Univ. Press, 2018), Chapter 10.

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C7. LIQUITIDY AND CAPITAL MARKET EFFICIENCY TO FUND INNOVATION

The rise of an alternative capital market for crypto

C7.1 To their credit, crypto markets have pioneered an alternative capital market for both Venture Capital and mature capital markets in the crypto space. That is, by using smart contract protocols in the form of ICOs to self-regulate fund raising. The ICO[74] model through which capital is allocated in a decentralised manner via blockchain technology, democratises access to investment opportunities. Indeed, the barriers to investing have disappeared as start-ups conducting an ICO can engage in global fundraising and disperse the high-risk venture by spreading it over a larger pool of investors.[75]

C7.2 The ICO model is particularly attractive to issuers as an efficient and convenient way of fundraising. Issuers benefit from: (i) engaging the community by enabling an ordinary blockchain enthusiast to directly contribute to the business idea instead of limiting the investment opportunity to accredited investors; (ii) lowering transactions costs associated with the ICO (since there is no need to hire underwriters, with the only costs being marketing and overseeing the ICO execution); (iii) avoiding the venture capital funding pitfalls of raising capital by stages at the expense of suffering a dilution; and (iv) community creation, whereby the digital outreach coupled with the ICO hype offers greater marketing exposure and concurrently engages early adopters who, in order to profit from their early investment, will strive to market the business idea to expand its adoption (and thereby capitalize on the benefits of the network effect).[76] ICOs are known for raising astronomical sums, usually unheard of at the seed stage in the traditional venture capital setting.

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[74] An Initial Coin Offering ('ICO') is a form of a financing method, whereby the issuing company offers cryptographically secured digital assets (usually called 'tokens' or 'coins') in exchange for fiat currency or other form of virtual currency.

[75] At the heart of the ICO funding model is a promise to utilize blockchain technology and smart contracts to enforce financial contracting via the underlying code.

[76] Howell et al. single out the following benefits of the ICO funding model: to finance decentralized networks, to raise financing from future customers, to establish immutable and non-negotiable governance, to provide rapid liquidity, to hasten network effects and to reduce transactions. See Sabrina Howell et al., Initial Coin Offerings: Financing Growth with Cryptocurrency Token Sales, European Corporate Governance Institute (ECGI) - Finance Working Paper No. 564/2018 (June 21, 2018), https://ssrn.com/abstract=3201259.

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The problems of crypto markets for mainstream investors

C7.3   However, in pioneering the alternative capital market revolution, it has been criticised for ignoring the law and expectations of capital markets and hence the technology of self-regulation doesn't work[77]. As Cohney et al. demonstrate, the underlying code effecting the token sale has failed to deliver on not just the ideational expectations, but also the whitepaper promises.[78]

C7.4   The mainstream market makes assumptions about the crypto markets that are simply non-existent. Most projects are in their infancy, and at best, juvenile. Most projects have raised capital *before* the blockchain is built or operable and indeed with the express purpose of using the capital to build the infrastructure. Few were on testnet, even fewer were on mainnet.[79]

C7.5   From the perspective of traditional capital market investors, the crypto-markets are opaque on how advanced blockchain projects are in the development, and those that appear to have an operable blockchain of significance, are opaque as to their business plans and commercial directions. They consider there is complete opaqueness as to how the business model translates to any increase in the value of the coin (other than through speculation).

C7.6   Traditional market valuations guides, such as price/earnings ratio, do not apply to Crypto assets. Empirical study that finds evidence that the long-term fundamental value of bitcoin, as of 2015, is statistically indistinguishable from zero.[80] In fundamental valuation, the fundamental value of an asset is usually defined as the discounted expected future cash flow that the asset delivers to its holder. While the market value of bitcoin is obviously far above zero, the study suggests that the price volatility of bitcoin implies that its "true", fundamental value is zero.

C7.7   Of course traditional market valuation techniques do not apply precisely because the analogy of crypto assets to securities does not work, as discussed in Part D. The appropriate valuation methodologies we suggest, may better explain the valuation of NuGenesis is discussed below in para [C 11].

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[77] To sustain the argument of self-regulation, ICO issuers painted a picture where they can design smart contracts for a specific purpose of collecting funds and distributing tokens. Consequently, in theory, smart contracts can substitute the traditional legal frameworks and embed consumer protection and securities regulation, while effectively managing agency risks and the information asymmetry between the contracting parties. However, this ideal construct does not reflect practical reality. Since 2013 (arguably when the first ICOs emerged), the ICO funding model has failed to deliver on these promises, and has instead introduced numerous investor risks.

[78] A whitepaper is a promotional document used by ICO issuers to describe the financing process and the blockchain product or service being developed, together with the functionality of the sold tokens in the blockchain product being developed. Shaanan Cohney et al., *Coin-Operated Capitalism* (July 17, 2018), COLUM. L. REV. (forthcoming), https://ssrn.com/abstract=3215345.

[79] Indeed the motto "*buy on testnet ands sell on mainnet*" is common among speculators. We are of course, way past all this and fully functional.

[80] Cheah/Fry, 'Speculative bubbles in Bitcoin markets? An empirical investigation into the fundamental value of Bitcoin' (2015) 130 Economics Letters 32, 35; see also Yermack, 'Is Bitcoin a Real Currency: An Economic Appraisal' in Lee (ed) Handbook of Digital Currency (Elsevier, 2015) 31, 36; Athey et al., 'Bitcoin Pricing, Adoption, and Usage: Theory and Evidence', Stanford University Graduate School of Business Research Paper No. 16-42 (1 August, 2016), https://ssrn.com/abstract=2826674 at 3.

C7.8   For serious institutional investors the crypto capital markets are extremely volatile; ICO investors have little bargaining power to protect themselves contractually; there are no effective gatekeepers (such as auditors or credit rating agencies) in the ICO markets to ensure that only companies with legitimate prospects will be able to successfully complete the offer; the asymmetry of information together with lack of substantial tangible assets and operational track records; and lack of independent guidance for pricing and valuation; limit the growth of the market.

C7.9   It may well be said that for all the business expertise traditional VC's may bring to funding of a project, the cost does not justify it. Ethereum stands to demonstrate that many millionaires were created by those contributing to the project whereas those gains would have been absorbed by a limited number of VC firms had the traditional route been taken.

C7.10   However, in order to capture the opportunity that mass adoption and the entry of mainstream investors into the crypto markets can create, we have been required to build an ecosphere that is much broader. One that will allow for self-regulation to mitigate these problems. As is discussed below in paras [B7.14-B7.18], we do this through our own fully fledged decentralised exchange, a venture capital launchpad "Vision to Reality" ('V2R'), and the dedicated decentralised social media platform where projects are reviewed and vetted at a community level involving a rich diversity of expertise.

The Liquidity problems that starve efficient allocation of capital

C7.11   There is a capital efficiency problem in getting the funding to the best tech project to perfect their work and effectively commercialise it as compared to the relative capital that goes to speculators. Project invariably understate the premiums, fee and liquidity demands required with Fully Fledged Exchanges[81]. Too often projects seeking listing face the outcome that the tokens are listed at unrealistically low prices (lacking as they do, a track record to prove otherwise) and the huge celebrated profits in the form of appreciation in value ('mooning') is realised by the exchanges themselves through their holdings in the liquidity pools and by some early speculators in the know. The skyrocketing token price, however, does nothing to raise capital for the project.

C7.12   EVM compatibility from a developer's perspective can be determinative in choosing to use the Ethereum environment. This is influenced by the access to liquidity which the DEXs, AMMs and liquidity pools provide. Unfortunately, this influence is a market distortion away from the choice to use the best tech. Access to liquidity, as important as it is, should be solved by a better ecosphere such as NuGenesis with our decentralised fully fledged exchange and V2R launchpad. We believe capital must flow to the best tech.

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[81] Exchanges having their own rather exorbitant costs and risks such as licencing, KYC/AML compliance, multi-wheel chains costs for large numbers of coins and of course, liquidity.

Swaps, DEXs, Automated Market Makers, Launchpads

C7.12   The relatively greater vulnerability of exchanges to regulatory intervention and volatility risk has seen ICOs losing ground to the explosion of para or quasi-capital raising methods. These are the swaps sites[82], DEXs, automated money makers and even some wallets that provide a form of capital raising for projects *before* they emerge on the exchange.[83] This part of the 'Defi' market is even more opaque and even less capable of providing investor comfort. Some liquidity pool protocols rely on a bond curve between trading pairs which divert from the true market price unless realigned by arbitrage.[84] Others rely on prices determined by the liquidity providers where any lack of depth provide opportunity for collusion risks and monopolistic price setting.[85]

C7.13   Whilst launchpads (IDO's and IEO's) have risen, they are often in the context of interoperability-driven smart contract blockchain ecosystems.[86] Through parachains and bridges, an industry of quasi-capital markets is developing by obtaining liquidity through linking with other projects. Projects need to raise capital to lease a slot on the parachain with a hope that the parachain operates as a quasi-exchange. Unfortunately, it also means that information needed to make sound investment decisions becomes even more opaque.[87] From the perspective of the mainstream investor, the overall process to navigate through swaps-DEXs and parachains is at best inefficient, expensive, cumbersome, and ultimately involves uncomfortable investor risk.

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[82] Bancor's model was popularised by Uniswap; others include Sushiswap, PancakeSwap, Curve, Battery Swap, Burger Swap. 1Inch covers the swap, DEX and aggregator role arbitraging from different exchanges.

[83] We would include platforms such as Polkastar and Superfarm DAO which provide angel-level funding to new start ups as another layer of these liquidity pools that feed off the inaccessibility to exchanges.

[84] See e.g. Uniswap, Balancer, Curve and Bancor

[85] See e.g. Kyber Network. See Luu, Loi and Velner, Yaron. "KyberNetwork: A Trustless Decentralized Exchange and Payment Service." 2017; https://whitepaper.io/document/43/kyber-network-whitepaper.

[86] Polkadot, Cosmos, Polygon, Blocknet, Aion, WanChain, Harmony, MantraDAO, Kylin, RampDeFi

[87] valuation, accounting, and auditing of the crypto projects becomes problematic. While there may be limited rating services available for cryptocurrencies (For example, Weiss Ratings: https://www.weisscryptocurrencyratings.com) there are currently no widely accepted valuation principles or models governing virtual assets across the industry. There are also no agreed standards on auditing the existence and ownership of virtual assets. Research analysts will have little choice but to rely on Slack channels, Telegraph and forums such as Reddit and Facebook groups or follow websites with undisclosed track records to obtain market intelligence.

The NuGenesis Capital Markets Solutions

C7.14 We have sought to solve the problem of inefficient capital allocation. Capital should flow to the best tech, always. Participants in the ecosystem should be able to differentiate the best tech and not be driven by FOMO.

C7.15 The NuGenesis ecosystem developed to provide connections to the expectations of the capital markets and develop its technology to provide for better financing options. These solutions are:

Fully Fledged Exchange: LedgerX

(a) A Fully-Fledged licenced Crypto-asset European Exchange, LedgerX to provide a proper ICO and market for projects connected to the NuGenesis blockchain;

The simplicity of the Exchange's multichain system technology will provide a simple, transparent and investment into all Coins and their projects by contrast to the opaque informational asymmetry of the quasi-liquidity pools obsolete.

With the use of serialised coins and crypto assets, conditions can be imposed upon those assets that will result in custody remaining with the user and unnecessary to move onto an exchange.

V2R Launchpad

(b) A Venture Capital Launchpad, Vision to Reality ('V2R') where angel, venture capital and crowd sourcing may be funded, including avenues and communication channels for the collaboration, recruitment and participation in and between projects;

'Just Social' media

(c) The above connected through a dedicated social media platform, "Just Social" where reviews, commentary and opinions can be exchanged regarding the projects and opportunities within the NuGenesis blockchain.

Furthermore, through NuGenesis technology innovations:

Community self-regulated disclosure and disciplines

(d) The NuGenesis' tech ability to put conditions, multisigs on wallets etc, allows the community may impose disciplines on the capital raises on launchpads such as:

(i) the provision of non-financial value in mentorship, guidance, facilitation of business connections and assist projects build sound revenue models and efficient capital allocation strategies;

(ii) the provision of staged release of funds on the meeting of KPI's;

(iii) Lock-in periods for initial investors and founders;

(iv) the provision of rating services, auditing and valuation services through the community to guide potential investors; and,

(v) the requirement of relevant information about the project, the revenue model and its relationship to the tokens to be used to raise funds.

A full Proper Financial Debt System – real Defi, not "pawn shop"

C7.16 The next phase in the evolution of the crypto-economy is the innovation into a fully fledged lending platform comparable to that in traditional capital markets. Currently, lending is little more than a pawn shop. It cannot advance beyond that with the current state of blockchain technology because recourse/security for lending is limited to those Coins and Tokens that are provided to the lender.

C7.17 By contrast, NuGenesis blockchains involve innovations that include effective serialisation of each individual Coin into a Digital Notarised Contract ('DNC') that allows, inter alia:

(a) each Coin to be effectively a new version of a NFT;

(b) conditions to be placed on each coin, such as a mortgage, charge, options etc;

(c) multi-signatory capacity for corporates, trusts and governments; and,

(d) comprehensive conditions on a coin that resemble those customary in traditional capital markets (rather than short smart contracts).

C7.18 As a result for example:

(a) projects can have options to access debt finance and achieve a more efficient debt/equity ratio to their projects' funding. This can allow relatively more value to be realized in the development of the tech rather than a gain for speculators.

(b) There is capacity for the development of fully-fledged lending platform, where for example, mainstream corporate adoption would be attracted to lend crypto at, for example a 90% LVR, for the purchase of new crypto secured by the lending and thereby providing greater liquidity to crypto capital markets.

(c) For Islamic finance, equity investment in the form of partnerships, ventures or fees for services can be built into funding relationship attaching to and encumbering the collateralised instruments.

C8. COMMUNITY – "JUST SOCIAL"

C8.1 The crypto community suffers from disparate sources of information with unclear quality and standards. The desire and expectation from mass adoption for forums to learn, collaborate and participation appears strong. Yet traditional social media is centralised, censored, and owns and exploits the private data of its users. With the NFT appreciation, user photos, videos owned by the major social media companies has potential commercial consequence. In the context of this demand, we established Just Social, a decentralised social media platform dedicated to crypto collaboration and innovation which serves as a one-stop shop to access information, opportunities, and services including the Ledger X exchange and V2R launchpad.

C8.2 As will be discussed in the valuation model, the "network effect" is the simplest reference that is often made to the importance of the community within a blockchain ecosphere. Widely accepted theories on network effects state that a network's value or utility to a user is positively affected when another user joins and enlarges the network. [88] As such, start-ups wishing to build products that are dependent on network effects therefore have to overcome a 'chicken-and-egg problem'. There is no utility for a seller on Ebay if the marketplace does not attract a decent number of buyers, while a marketplace is not attractive to buyers if there aren't many products available. There is little to no value in a network like LinkedIn or Facebook if only a small amount of people use it, and a platform like Wikipedia is useless without contributors.
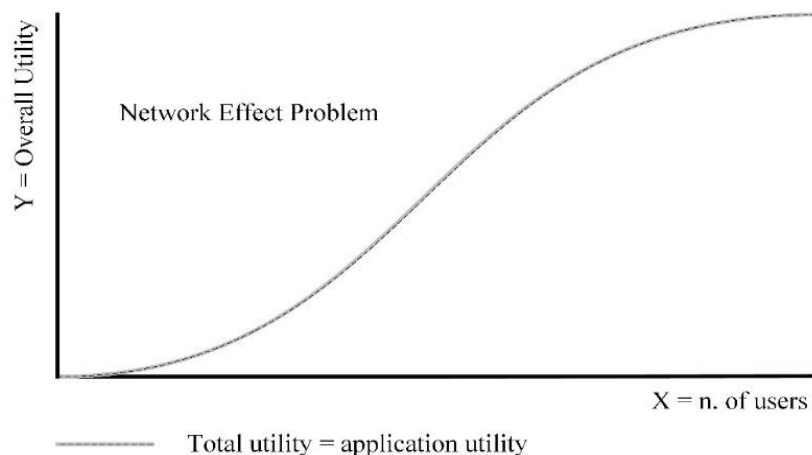
Figure 1: The Network Effect Problem

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[88] For more on the amount by which networks increase in value as they grow, see B. Briscoa, A. Odlyzko and B. Tilly 'Metcalfe's law is wrong - communications networks increase in value as they add members-but by how much?' (2006) 43 (7) IEEE J-SAC. Note however that in our discussion on valuation at para [B.11] we argue that the best evidence from studies so far is that Metcalfe's law is the best fit for blockchain ecosystems such as NuGenesis, if not the model that values NuCoin as a currency in a developing country economy.

C8.3   Similarly, a protocol like Ethereum has no value if it is not broadly used and supported, or does not have any complementary products built on top of it. Whereas the challenges of early network growth are traditionally tackled by various growth hacks and marketing strategies aiming at optimization of visibility and adoption[89] , token sales inherently position a business to deal with the challenges presented by network effects. After all, the lack of utility faced by early adopters of token-based marketplaces and networks is compensated by an increased potential of financial upside through the appreciation of the value of tokens. If users are involved very early, there is still a lot of potential for appreciation of their tokens, which compensates for the smaller amount of provided utility.

C8.4   This simplistic analysis, useful in its introduction, does adequately explain the exponential features that comes when each new user is added to the blockchain ecosystem, not the qualitative effect that comes with a deep fiercely loyal community as the experience with the XRP, Doge and Cardano armies testify. In this regard, NuGenesis has included "Just Social" as part of its ecosystem. Just Social is a decentralised social media platform dedicated to crypto and technology start-ups that are associated with blockchain technologies. Just Social serves a number of immediate functions with the capacity for community projects to add further ones:

Immediate functions

(a) to facilitate through information, easy to access, review and discuss crypto news generally and how NuGenesis relates to the broader ecosphere;

(b) to facilitate easy, efficient and effective participation in the governance of the NuGenesis ecosphere;

(c) to be conducive to learning and engaging in NuGenesis, the projects, initiatives and innovations being developed including in the crypto-verse more generally

On-going longer term improvement examples:

(d) The Campaign for Data Privacy : own your own data!

The rise of concern regarding personal data privacy is increasing and this is given a commercial edge with the recognition that all photos etc that people post on Facebook and other centralised and corporately owned social media platforms is owned by that social media platform. Data mining will be the new gold mining. Moreover, with the NFT awareness, user posts, memes, photos, audio and video recordings can have commercial value. As a result we have designed the community's social media platform to be decentralised and the ownership of you data to be owned by you and you alone.

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[89] Geoffrey Moore, 'Crossing the Chasm' (3rd edition, Harper Business Essentials, 2014) 105-129

(e) <u>Rewards for browsing, reading and participating</u>

The next phase of the social media site development is the utilisation of the data, for those who opt to commercialise it, to earn rewards in the form of crypto payments, discounts and other benefits. The plan is that advertises for example will pay for metadata (which cannot be identified to a particular individual) based targeted advertising and the viewer will receive their share of that advertising revenue.

C8.5 A NuGenesis community member has a Just Social Account. They are simultaneously a member of the NuGenesis Tech Hub Co-operative Ltd, being the legal umbrella structure through which NuGenesis operates formally. This joining is free and voluntary, but the primary means of engaging in the NuGenesis ecosphere.

C8.6 In establishing their Social Account the user establishes his/her profile, list their skills, connect with friends etc. Every community member is a staker-miner and they are mining via their laptop and/or smart phone by merely logging into their just social account. A user can therefore have

C8.7 There is a dashboard, which can be customised, giving the user access to a range of widgets that are useful information links to the cryptocurrency industry. A 'one stop shop' for everything crypto: no logging in and out of various social media accounts, trawling reddit, discourse and navigating the barrage of advertisement shills. It is a place for trustworthy perspective on the fast-moving multifarious innovations in the cryptospace.

C8.8 There is of course the link to LegerX fully fledged decentralised open market exchange, where the user can trade their NuCoin or any other crypto currency. There is of course the link to the V2R, Venture Capital and Angel Capital projects. They can access, review, comment upon the various projects being discussed. Projects will require collaborative efforts and benefit from solutions developed by other projects. User can participate, 'hands-on', in those projects that can benefit from their skills. Skills of course necessary are not limited to technical ones, they extend to marketing, administration, and commercialisation broadly.

C8.9 On-going learning at all levels is encouraged through other user explainer videos, tutorials and formal courses made available on the Just Social platform. A system of 'badges' is designed to give authority and credentials that can be recognised within the community for differing levels of expertise. These badges will be useful in considering the reviews and opinions preferred on the various projects discussed.

C8.10 Ultimately, we believe the Just Social platform will be an easy to use and therefore effective means by which community participation can be made an everyday reality. We believe that it is an effective vehicle through which mass adoption can be affected.

C9. COMMUNITY IN THE PHYSICAL WORLD -
THE NuGENESIS TECH HUBS AND LOCAL MEET UPS

C9.1 A thriving community will maximise the opportunities for collaborative innovations often by physical interchange. Often a screen will not fully communicate all there is to learn. To that end, the NuGenesis community will commence with a prototype local meet up facility for regular meetings both with and without specific topics of discussion, and the streaming of presentations to international counterparts.

C9.2 A prototype site in Farley, being 2 hours from Sydney, Australia, has been acquired for the sub-division into a 'NuGenesis Tech Hub', being an approximately 900 housing lot tech community that will feature common facilities for social, sporting, recreational use to compliment to campus style tech centre. Within the Tech Centre will be offices for invited VC companies, presentation halls, audio—visual labs and studios and workplaces designed for the residents to maximise their productivity and sense of community.

C9.3 Should these initiatives prove successful, they will be roll-out internationally as those in the community with the initiative to take them to other regions do so. Of course, all goods and services, including rent uses crypto as the medium exchange, not fiat currencies.

C10. THE MONETARY POLICY OF NUGENESIS BLOCKCHAIN AND ECOSYSTEM

C10.1 Most cryptocurrencies/assets have a fixed and finite supply of their token/Coin with a formula as to how much of it is produced in block-time time intervals.[90] Any value that is subscribed to it, is determined by those who agree to use it. The naked external market is therefore used to determine the price.

C10.2 However there have been innovations in the crypto-monetary policy design since Bitcoin for various ecosystems, such as Sora on Polkaswap, which using various monetary policy theory of technocrats seeks to provide infinite supply of currency based on protocol curves and limit its exposure to the external markets[91]. At NuGenesis, we have reviewed the existing blockchains and determined the appropriate trust model is naked exposure to external markets as being the most neutral and transparent approach. However, those projects designing their own ecosphere using a customised version of the NuGenesis are free to add such modifications as appropriate to their circumstances.

C10.3 Libertarians herald Bitcoin as an alternative monetary system, capable of bypassing most of the state-backed financial institutions with all of their shortcomings and vested interests which have become so obvious in the light of the financial crisis of 2008 (if not more obvious today)[92]. Indeed, as opposed to traditional centralised economies, Bitcoin s monetary supply is not controlled by any central authority but is rather defined (in advance) by the Bitcoin protocol which precisely stipulates the total amount of bitcoins that will ever come into

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[90] Solana, Cardano, Tezos, Zilliqua, Chainlink, Theta all have supply limits. Eth and Eos that don't, However by Eth Code change 1559, a max supply is expected.

[91] XOR supply is elastically managed by a token bonding curve smart contract founded on the theories of Professor Werner.

[92] Reference is being made to all the Corporate Welfare in particular arising from the Covid 19 Pandemic that has seen an unprecedented rise in Government Debt and Helicopter money printing.

being (21 million) and the rate at which they will be issued over time (currently 6.26 per ten minutes). They are assigned as a reward to those who lend their computational resources to the Bitcoin network in order to both operate and secure the network. In this sense, Bitcoin can be said to mimic the characteristics of gold.

C10.4   Leaving aside the debate about whether controlling the money supply is a right (if not duty) of the State (or even private consortium of Banks posing as the State), a widespread concern about the integrity of fiat currency is the fractional-reserve banking. That is commercial banks acquired the ability to (temporarily) increase the money supply by giving out loans which are not backed up by actual funds[93]. The fractional-reserve banking system (and the tendency of commercial banks to create money at unsustainable rates) is believed to be one of the main factors leading to the global financial crisis of 2008 which has brought the issue of private money issuance back into the public debate[94] and is very much an even greater concern today explaining Bitcoin, if not all crypto, having an independent investment class category.

C10.5   We do respect Sora for example, trying to limit the impact of 'pump and dumps' on the price of the currency in the ecosphere. One proposal for community vote in our governance model is the banning of 'pump and dumps' on the exchange. However, we do not believe that technocratic models of monetary policy should replace the brutal discipline and raw honesty of an open, unfettered as possible, market. Accordingly, the price of NuCoin will be left to the market to determine the valuation which the formula 12 NuCoin per 3 second block, reducing linearly minus 1 every 10 years for 110 years when no more NuCoin can be minted.

C10.6   Those projects seeking an alternative monetary policy for their ecosphere can, of course, customise the NuGenesis blockchain which they can run as self-governing para-network with NuGenesis and allowing such exposure to our LedgerX exchange as suits their objectives.

C10.7   Of course, we remind the reader that the minting of NuCoin, the allocation to the various treasuries for the continued evolution and innovation of NuGenesis, and the rewards for the various tears of miner-stakers is set out in Tokenomics Report that is attached as Part B2.

Deflationary Policy

C10.8   Capacity is provided to adopt, through community governance voting, measures for deflationary policies and NuCoin burns. One measure is that the treasury wallets are used to trade and any profits make above the target 15% return (or some other figure voted upon) the excess coins are burned.

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[93] Ferguson, N. (2008), *The Ascent of Money. A Financial History of the World,* London: Penguin.
[94] Quinn, B.J. (2009), "The failure of private ordering and the financial crisis of 2008", *New York University Journal of Law and Business* 5(2), pp. 549-615.

C11. VALUATION METHODS FOR NuGENESIS BLOCKCHAIN AND ECOSYSTEM

C11.1 The main utility of the NuCoin currency is not to generate future cash flow but to make functional use of the blockchain ecosystem. It is to participate in other investments – from staking, specific investments, to collaborative projects and para networks established as a result of them.

C11.2 There are many models advocated for the valuation of crypto currencies based on a large number of econometric studies that have varying predictive success depending upon the assumptions used in the model and the nature of the crypto asset concerned.

C11.3 For the purposes of NuGenesis, it is our view that potential valuation over the time may be best explained by approaching NuCoin as a currency in a developing economy. Alternatively, in the medium to long-run, Metcalfs' law may be helpful in evaluating NuCoin as the NuGenesis network grows. In the shorter term, because of the strong correlation between the size of the network and the market price expected, this can often be a sign for mimetic behaviour of investors who enter the market driven by expected returns which is where the potential for speculative exponential bubbles to occur.

C11.4 Hayes (2016/7) found cryptocurrencies to have intrinsic value with attributes similar to commodities, such as labour value.[95] Mining for bitcoin requires the use of electricity to win bitcoins which can be viewed similarly to running an oil rig in search for oil. Hayes states that "instead of approaching bitcoin as a digital money or currency, it is perhaps more appropriate to consider it a virtual commodity with a competitive market against producers." Hayes argues that the more mining power employed the more acceptance of the Crypto Asset. A Crypto Asset with no acceptance or usage will have neither value nor computational power directed at it. Whilst the relationship between users and value may be accepted, computational mining power does not assist newer generation of crypto-assets that have moved beyond mining.

Valuing cryptocurrencies as an emerging economy's currency

C11.5 In "Cryptoassets: The Innovative Investors Guide to Bitcoin and Beyond"[96], co-authors Chris Burniske and Joel Monegro approach is valuing crypto assets as a currency, particularly of a small emerging market country. They propose valuing Crypto Assets using the Equation of Exchange formula, originally developed by Irving Fisher.[97] This equation was originally developed to predict the value of a currency based on the acceptance and speed of economic transactions in the macro-economy. This model is less useful for Bitcoin and Ether for example where fees are charged and the cost of production is not taken into account as a variable. The fees could exceed the value of the transaction. It would be more applicable to

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[95] See "What Factors Give Cryptocurrencies Their Value," Adam S. Hayes, March, 2015: "Cryptocurrency Value Formation: An Empirical analysis leading to a Cost of Production Model for valuing bitcoin," Hayes, Adam, May 2016; "Bitcoin price and its Marginal Cost of Production: supporting evidence," Adam S. Hayes, September 2017.

[96] "CryptoAssets: The Innovative Investor's Guide to Bitcoin and Beyond," Chris Burniske and Jack Tatar, -McGraw-Hill, 2018, pp. 174-179

[97] David Hume and Irving Fisher on the Quantity Theory of Money in the Long Run and the Short Run" Dimand, Robert W, (2013) European Journal of The History of Economic Thought 20, no. 2: 284-304.

NuCoin analysis because fees and mining costs are eliminated and replaced with infrastructure costs of running nodes that are relatively insignificant.

C.11.6   The limitation of the approach is that the total size of the market can be of limited appeal utility where the crypto markets as a whole are experiencing mass adoption with new money flowing into them at an exponential rate.

C11.7   Nevertheless there is some appeal in the Burniske and Monegro approach where the NuGenesis protocol is considered similar to the constitution of a country. The community is similar to a constituency of the country with the users being the demand side of the economy and the miner-stakers being the supply side. The 313 positions being similar to the executive branch with the core developers executing code on the approval of the community. NuCoin is the same as the Country's currency with investors buying and selling NuCoin in the same way they trade fait currencies, based on how attractive the small emerging country economy is.

C11.8   By this approach crypto currencies or fiat currencies involve investors looking for the same features such as productivity, a good degree of equality (particularly of opportunity), low corruption, good governance, and sound monetary policy.

Valuing Crypto Assets as a Network

C11.9   In the 1980s, Robert Metcalfe, the co-inventor of Ethernet, stated what was called later the Metcalfe's law (Gilder 1993): the value of a network is proportional to the square of the size of the number of connected users. Whilst in the original formulation of the Metcalfe's law, the value of the network should be proportional to the squared number of network users; however, in the case of cryptocurrencies, the actual number of users is unknown and we need to use a proxy for it, i.e. the number of unique addresses.

C11.10   Research conducted suggests that the relationship when applied to large social networks may be accurate. Metcalfe attempted to validate his findings in a 2013 paper using Facebook as a proxy[98]. The theory is that a network has little or no value with just one or two users, however with each new user, the utility value of the network more than doubles.

C11.11   In his paper *Digital Blockchain Networks Appear to be Following Metcalfe's Law*, Alabi suggests that the value of bitcoin can be measured by relying on Metcalfe's Law. Alabi uses three (3) different Crypto Assets as examples, Bitcoin, Ethereum, and Dash.[99] Alabi suggested using the number of unique addresses participating daily in the network as a proxy for the relative number of active users on the network. Alabi proposed a variation of Metcalfe's Law, based on the exponent of the root of the number of active users. Using past Crypto Asset data, Alabi shows that historical market prices do in fact follow the model.[18]

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[98] Metcalfe, B. (2013). Metcalfe's Law after 40 Years of Ethernet. Computer, vol. 46, no. 12, pp. 2631, 2013.
[99] "Digital Blockchain Networks Appear to be following Metcalfe's Law" Alabi, Ken, 2017, pp.23-29.

C11.12 In addition to Alabi's research, FundStrat's co-founder Tom Lee (Lee), a former strategist at J.P. Morgan uses a similar method to confirm a 94% price movement explanation.[100] Metcalfe's law was validated in various contexts, by using social network data: Zhang et al. (2015) proved the validity of the law for Facebook and Tencent (Chinese social network). Other researchers (Madureira et al., 2013[101], Van Hove, 2014, 2016,[102] Metcalfe, 2013) have shown the validity of the law, mostly regarding internet networks.

C11.13 Peterson (2017)[103] showed that the Metcalfe's law can be used to explain the evolution of the Bitcoin transaction price, by using factors relating to supply (number of bitcoins) and demand (number of wallets). Wheatley et al. (2018)[104] estimated the Metcalfe's law for Bitcoin, proving the existence of a log-linear relationship between the market capitalization and a proxy for the number of network users (the number of unique addresses). In 2019 Pele et all[105] and again recently by Alabi revisiting his 2017 thesis,[106] confirmed Metcalfe's law as the best predictive model in that there is a long-term dynamic between price and network size.

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[100] Lee stated in a recent interview with Business Insider that, "If you build a very simple model valuing bitcoin as the square function of the number of users multiplied by the average transaction value, 94% of the bitcoin movement over the past four years can be explained by that equation.": "Bigger than Bitcoin," Business Insider, http://www.businessinsider.com/bitcoin-price-movementexplained-by-one-equation-fundstrat-tom-lee-metcalf-law-network-effect-2017-10.

[101] Madureira, A., Den Hartog, F., Bouwman, H. and Baken, N. (2013). Empirical validation of Metcalfe's law: how internet usage patterns have changed over time. Information Economics and Policy, Vol. 25, No. 4, pp.246–256.

[102] Van Hove, L. (2014). Metcalfe's law: not so wrong after all. NETNOMICS: Economic Research and Electronic Networking, Vol. 15, No. 1, pp.1–8.; Van Hove, L. (2016). Metcalfe's law and network quality: an extension of Zhang et al. Journal of Computer Science and Technology, Vol. 31, No. 1, pp.117–123

[103] Peterson, T. (2018). Metcalfe's Law as a Model for Bitcoin's Value. Alternative Investment Analyst Review, Q2 2018, Vol. 7, No. 2, 9-18. Available at SSRN: https://ssrn.com/abstract=3078248 or http://dx.doi.org/10.2139/ssrn.3078248

[104] Wheatley, S., Sornette, D., Huber, T., Reppen, M. & Gantner, R. N. (2018). Are bitcoin bubbles predictable? Combining a generalized Metcalfe's law and the LPPLS model. Swiss Finance Inst. Res. Pap. No. 18-22. (2018).

[105] Pele, Daniel Traian; Mazurencu-Marinescu-Pele, Miruna (2019) : Metcalfe's law and herding behaviour in the cryptocurrencies market, Economics Discussion Papers, No. 2019-16, Kiel Institute for the World Economy (IfW), Kiel

[106] Ken Alabi; A 2020 perspective on "Digital blockchain networks appear to be following Metcalfe's Law" Electronic Commerce Research and Applications Vol. 40, No. CA 2020

C11.13 However, for more precise predictive capacity in the short term, modifications will be required. Pele et al (2019) can find a reverse causality where price causes user growth.[107] The study uses Log-Periodic Power Law ('LPPL') models to explain bubble behaviour in cryptocurrencies.[108] They find that extended price increases are a driver to more users joining the network even to the point of super-exponential growth due to herding behaviours of investors. Accordingly for the short-period sub-window data analysis, LPPL models are useful.

C11.14 There are other modifications to the Metcalfe's law that should be considered. De Meo and Young argue that the Hayes approach be integrated to consider the cost of production.[109] Similarly, Juhl[110], in seeking to explain the price of Ethereum, suggests combing Metcalfe's law with the model proposed by Briscoe, Odlyzko and Tilly[111] to refine for the cost of computing power. For NuCoin, where mining computational power is insufficient, such a modification would be relatively inconsequential.

C12.   THE SYNERGISTIC RELATIONSHIP WITH THE WORLD'S LEGAL SYSTEMS

Varying regulatory intersections and policy tensions

C12.1 We do not believe that any crypto-ecosystem can operate in a legal vacuum. Following the imbrication of blockchain technology with various forms of state action, the inherent tensions between enabling and constraining modes of law, and between libertarian and regulatory political narratives, become ever more apparent.

C12.2 The emergent technocracy of FinTech experts, digital currency promoters, miners, and Big Data aggregators may demand new and imaginative legal tools as they sail the turbulent and still largely undiscovered seas of the digital revolution.

C12.3 Blockchain, in this way, is replicating the regulatory curse of the Internet,[112] whose content is often ruled by a multitude of intersecting, partially contradicting national and supranational legal orders.

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[107] Pele, et al, supra.
[108] See Fry 2015 who used it to explain Bitcoin price bubbles.
[109] Valuing Crypto Assets, Luigi D'Onorio DeMeo, and Christopher Young
[110] Juhl, Morten Arrild "Can the value of Ether be explained or predicted?" (2018).
[111] Briscoe, B., Odlyzko, A. and Tilly, B. (2006). Metcalfe's Law Is Wrong. IEEE Spectrum, 43(7), pp.34-39.
[112] See, e.g., Jack Goldsmith and Tim Wu, Who Controls the Internet? Illusions of a Borderless World (Oxford University Press, 2006); Jacqueline D. Lipton, 'Law of the Intermediated Information Exchange' (2012) 64 Florida Law Review 1337, 1361-1367; Dan Svantesson, 'Digital Contracts in Global Surroundings' in Stefan Grundmann (ed) European Contract Law in the Digital Age (Intersentia 2018) 49.

Increasing attention of policy makers on the cryptospace

C12.4 Regulators and Policy makers have become more interested in blockchain technology.[113] New York established its BitLicence Framework[114]. ICOs have increasingly become the focus of regulatory interest, with not only the U.S. Securities and Exchange Commission (SEC) offering its report on the DAO,[115] but also the European Securities and Markets Authority (ESMA)[116], the UK Financial Conduct Authority (FCA)[117], and regulators from other countries equally issuing warnings or guidelines on ICOs[118], or even banning them entirely[119]. Despite significant enforcement activity of the SEC[120], detailed legal guidance and broader analysis is dearly lacking. Except for regulators operating in the field of finance, government

[113] See, e.g., UK Government Office for Science, 'Distributed Ledger Technology: beyond block chain (2016); European Commission, 'Consumer Financial Services Action Plan: Better Products, More Choice' COM(2017)139 final, 12-13 (announcing, inter alia, the creation of a FinTech Task Force at the Commission, and a pilot project to reinforce capacities concerning distributed ledger technology); European Parliament, 'Virtual currencies. European Parliament resolution of 26 May 2016 on virtual currencies' 2016/2007(INI) (noting high volatility, "absence of traditional forms of regulatory supervision, safeguards and protection" as well as "legal uncertainty surrounding new applications of DLT"); World Economic Forum, 'The future of financial infrastructure. An ambitious look at how blockchain can reshape financial services' (2016) (exploring nine "case deep-dives" from payment systems via insurance to investment management and market provisioning); European Banking Association (EBA), Cryptotechnologies, a major IT innovation and catalyst for change, Report (May 11, 2015) (similarly documenting use cases in trade and finance); European Central Bank, 'Eurosystem's vision for the future of Europe's financial market infrastructure' (2016) 6 (announcing an assessment of the relevance of distributed ledger technology to European financial services and market structures); European Central Bank, 'Virtual Currency Schemes – A Further Analysis' (2015); Andrea Pinna and Wiebe Ruttenberg, 'Distributed ledger technologies in securities post-trading', European Central Bank Occasional Paper No 172/2016 (2016); European Central Bank, 'Distributed Ledger Technology' (2016) (1) In Focus; Bank of England, 'FinTech Accelerator Proof of Concept. Distributed Ledger Technology' (2016) (documenting an experimental transfer of assets using blockchain); Sead Muftic, 'Overview and Analysis of the Concept and Applications of Virtual Currencies' JRC Technical Report (2016); d'Artis Kancs et al., 'The Digital Agenda of Virtual Currencies' JRC Technical Report (2015).

[114] See 23 NYCRR Part 200 Virtual Currencies; see also Stan Higgins, 'New York Lawmakers Open to Revisiting the BitLicense' (CoinDesk, 23 February, 2018), https://www.coindesk.com/bitcoin-crypto-nylawmaker-pledges-make-bitlicense-something-works; Primavera De Filippi & Aaron Wright, Blockchain and the Law (Harvard Univ. Press, 2018),179.

[115] SEC, 'Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO', Release No. 81207 (25 July, 2017)

[116] ESMA, 'ESMA alerts firms involved in Initial Coin Offerings (ICOs) to the need to meet relevant regulatory requirements', Statement (13 November, 2017); ESMA, 'Report. The Distributed Ledger Technology Applied to Securities Markets' (February, 2017), at 2: "the presence of [distributed ledger technology] does not liberate users from the need to comply with the existing regulatory framework".

[117] FCA, 'Initial Coin Offerings' (12 September, 2017).

[118] See, e.g., German Federal Financial Supervisory Authority (BaFin), 'Initial coin offerings: High risks for consumers' (15 November, 2017); French Autorité des Marchés Financiers (AMF), 'Discussion Paper on Initial Coin Offerings (ICOs)', (26 October, 2017); FINMA, Guidelines for enquiries regarding the regulatory framework for initial coin offerings (ICOs) (16 February, 2018);

[119] See the ICO ban in China (The People's Bank of China, Central Office of the Ministry of Industry and Information Technology, Banking Regulatory Commission, and China Regulatory Commission, 'Notice on the Prevention of Tokens', (4 September, 2017), http://www.circ.gov.cn/web/site0/tab6554/info4080736.htm, translation: https://www.coindesk.com/chinas-ico-ban-a-full-translation-of-regulator-remarks/) and South Korea (O'Leary, 'South Korean Regulator Issues ICO Ban' (CoinDesk, 29 September, 2017), https://www.coindesk.com/south-korean-regulator-issues-ico-ban/) (all accessed on 2 November, 2017).

[120] SEC, In the Matter of Munchee Inc., Order (December 11, 2017); SEC complaint against LBRY filed 29th March 2021; SEC complaint Against Ripple Labs et all filed 22nd December 2020.

agencies ranging from tax authorities to commodities regulators[121] have also dealt with the applications of the blockchain technology. The European Commission has, in its FinTech Action Plan of March 2018, made the monitoring and analysis of ICOs, and blockchain applications more generally, a priority, without embracing regulatory action at this point or providing specific guidance[122].

Growth of Cryptoeconomy a systemic risk for mainstream economy

C12.5   The rate of innovation in economic activity, from fundraising to peer-to-peer lending challenges not only the traditional banking sector but also existing forms of regulation and monetary policy. Zimbabwe and Turkey are recent examples of the threat to their economic management.

C12.6   Accordingly, there is not only regulatory interest in regulation to protect outsiders who enter the cryptomarkets from information and power asymmetries, but the negative externalities that cryptocurrencies might impose, via its volatility and systemic risk as it grows, on the mainstream financial system.[123] Surpassing $US2.5 Trillion in market capitalisation and increasingly integrated into the mainstream economy as a means of payment[124], crypto regulation becomes more pressing.

The Common Group favourable to crypto adoption

C12.7   We have established relationships with numerous Co-operating governments arising from their desire to facilitate global access for infrastructure investments in their Countries, which Private Blockchains offers solutions.   This interest in private blockchains gives rise to exploration of and development of blockchains for a range of government and corporate scale blockchain for the trade in commodities, supply chain management, transportation, cloud storage, government services, healthcare and power management[125].

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[121] In re Coinflip, Inc., d/b/a/ Derivabit, et al., (17 September 2015) Order Instituting Proceedings Pursuant to Sections 6(c) and 6(d) of the Commodity Exchange Act, Making Findings and Imposing Remedial Sanctions ('Derivabit Order'), CFTC Docket No. 15-29, <http://www.cftc.gov/ucm/groups/public/@lrenforcementactions/documents/legalpleading/enfcoinfliprorder 09172015.pdf>.

[122] European Commission, FinTech Action plan: For a more competitive and innovative European financial sector, COM(2018) 109 final, at 4-7.

[123] See, e.g., Angela Walch, 'The Bitcoin Blockchain as Financial Market Infrastructure: A Consideration of Operational Risk' (2015) 18 NYU J Legislation and Public Policy 837.

[124] An early example is The Swiss region of Zug, for example, even accepts Bitcoin as legal tender to pay tax: Lutz Reiche, 'Steuern zahlen mit Bitcoins - die Schweiz prescht vor' (Manager Magazin, May 10, 2015), http://www.manager-magazin.de/finanzen/artikel/bitcoin-zug-akzeptiert-das-cyber-geld-alszahlungsmittel-a-1091646.html. More recent examples in 2021 is the Dude County, including Miami accepting Bitcoin to pay local taxes: https://www.miaminewtimes.com/news/miami-dade-county-may-let-people-pay-taxes-with-bitcoin-12117680, or Miami allowing employees to be paid by Crypto: https://www.thestreet.com/crypto/bitcoin/miami-dade-to-accept-bitcoin-for-taxes#:~:text=On%20February%2011%2C%202021%2C%20the,to%20take%20payments%20in%20Bitcoin.

[125] Some useful reading, see: Mike Orcutt, 'How Blockchain Could Give Us a Smarter Energy Grid', MIT Tech. Rev. (October 16, 2017), https://www.technologyreview.com/s/609077/how-blockchain-could-give-us-a-smarter-energy-grid/; see also World Economic Forum, 'The Future of Financial Infrastructure. An Ambitious Look at how Blockchain Can Reshape Financial Services' (2016) (exploring nine 'case deep-dives' from payment

C12.8 The plan is that government private blockchains can be arranged in networks of blockchains separating sensitive data that remain in private blockchains and linking them through bridges to be ultimately interoperable with a NuGenesis public blockchain.[126] In working with these Governments, the NuGenesis blockchain was developed to cater for:

(a) Security concerns, particularly regarding KYC/AML and as a result, we have built into the NuGenesis blockchain, the optional modular capital for the worlds' most advanced AI driven KYC/AML system; and,

(b) Environmental responsibility, with the result that NuGenesis blockchain is near zero-carbon emitting and resource efficient.

Most Governments are not part of the elite financial establishment and can benefit from Blockchain

C12.9 Only a third of the world's Central Banks are part of the Bank of International Settlements. The two thirds are not. They do not have such vested interests in the current banking elite-fiat system with US Dollar Hegemony. Crypto technology allows most of the worlds' governments to open and neutral access global investment. These countries desire their own CBDCs and the use of smart contract technology to raise infrastructure bonds or resource-directed bonds for their own development. Their interests are in attracting skills and talent and building the technical infrastructure for the technical revolution that crypto markets can now financially power. Accordingly, they are willing to prove pro-crypto enabling laws and administrative infrastructure that allow the crypto economy to properly flourish.

Optimal Crypto-regulation in SDEZs

C12.10 In the special digital economic zones ('SDEZs) of the participating countries, regulation favourable for the development of crypto include:

(a) legal recognition of digital citizenship and passports; instruments, wills/estates and organisations;

(b) judicial arbitration for the resolution of the boundaries of code and law;

(c) legal enforceable standards and voluntary codes for Crypto project Governance;

(d) transparency disclosure rules for capital raising by Crypto projects;

(e) recognition of privacy and ownership of personal data; and,

(f) establishing a crypto valuation standard measure for the new economy as unit of measurement.

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systems via insurance to investment management and market provisioning); Future Thinkers, '19 Industries The Blockchain Will Disrupt', http://futurethinkers.org/industries-blockchain-disrupt/.

[126] Given the national security issues involved, there is a very high hurdle towards having sufficient decentralised security nodes to validate a 2way bridge.

Legal recognition of digital citizenship and passports;
Instruments, wills/estates and organisations

C12.11   The Crypto legislation will give legal recognition and rights for a number of digital instruments including:

(a)   Digital Wills and Estates wherein, without human intervention, a DAO protocol will invest and distribute amongst the estates' beneficiaries;

(b)   Digital citizenship and passports. By virtue of the AI KYC/AML system the identity of a citizen, once verified, will be accepted throughout all participating countries. Furthermore, unless security reasons require otherwise in a particular case, 'zero-knowledge proof' transactions will be default preferences on public, private and hybrid blockchains protecting the verified persons, identity and privacy; and,

(c)   Digital DAOs whether involving 0 to 1 million directors/members will be recognised in a number of forms of collective organisation and combination for social and business purposes such as corporations, trusts, foundations, collective investment vehicles etc.

C12.12   Qualifications and competency standards will be recognised in various crypto related fields to provide some measure of trustworthy professional accreditation.

Judicial arbitration for the resolution of the boundaries of code and law

C12.13 Lawrence Lessig has explored how in cyberspace, code complements or even substitutes law as a normative order.[127] Blockchain potentially reinforces and complicates this tendency as it enables code to run autonomously, with very limited third-party intervention, and to produce real effects in terms of value transfers.[128] In the crypto space, the relationship between code and the law has a factual, a legal, and a political dimension. On a factual level, it is true that it is difficult for the law (absent a regulatory intervention interface[74]) to directly alter the code of a smart contract, stop its execution, or reverse its effects if they were contrary to the law. This inflexibility not only impedes "legal overruling", but also creates, for the parties, significant costs for filling gaps in incomplete smart contracts.[129] Moreover, it may be difficult for parties to some smart contracts to enforce their legal rights if their counterparty is unknown (due to pseudonymity) or based in a country with a weak judicial system. If, for example, a person in the EU buys a mobile phone directly from an Asian merchant by means of a smart contract, the payment is executed after GPS-verified delivery, but the phone is not in conformity with the contract, the buyer may, depending on the applicable legal regime, have remedies against the merchant, irrespective of and in fact (partially) reversing the automated payment under the smart contract.[130] However, if the buyer fails to undertake due diligence before contract formation by seeking unambiguous identifying information, it may be factually difficult in practice to recover the payment or to enforce remedies. To this extent, code, which is *ex ante* specified, may trump the law that only offers remedies *ex post*. This merely shifts, however, contractual risks between parties and does not affect the general relationship between code and the law. It bears noting, however, that such risks, as well as the need to import offchain data (e.g., GPS localization; information on contractual conformity), does reinfuse a necessary and significant element of trust into blockchain transactions initially thought to dispense of it.[131]

C12.14 Accordingly, the SDEZs will give paramount presumption in favour of recognition to the finality of a blockchain payment, but will allow for that presumption to be displaced where appropriate cause has been shown to justify it. Precedents for this judicial system include codified rules that apply to Bills of Exchanges, Promissory Notes and Bearer Instruments and Instrument summary proceedings regimes.

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[127] Lawrence Lessig, Code: and Other Laws of Cyberspace (Basic Books 1999).

[128] See de Filippi/Wright, Aaron Wright and Primavera De Filippi, 'Decentralized Blockchain Technology and the Rise of Lex Cryptographia', Working Paper (2016), https://papers.ssrn.com/abstract_id=2580664, Chapter 12; Karen Yeung, "Regulation by Blockchain: The Emerging Battle for Supremacy between the Code of Law and Code as Law", Modern Law Review (forthcoming).

[129] Jeremy Sklaroff, 'Smart Contracts and the Cost of Inflexibility' (2017) 166 University of Pennsylvania Law Review 262; cf. also Usha Rodrigues, 'Law and the Blockchain' (2018) 104 Iowa Law Review (Forthcoming), https://ssrn.com/abstract=3127782, at 47-63; for a seminal treatment of incomplete contracting, see Ian Ayres and Robert Gertner, 'Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules' (1989) 99 Yale Law Journal 87.

[130] Elisa Mik, 'Smart Contracts: Terminology, Technical Limitations and Real World Complexity' (2017) 9 Law, Innovation and Technology 269, 287.

[131] Cf. Benito Arruñada, 'Blockchain's Struggle to Deliver Impersonal Exchange' (2018) 19 Minnesota Journal of Law, Science & Technology 55; Mik, supra, 277-278, 296-298.

Legal enforceable standards and voluntary codes for Crypto project Governance

C12.15 Co-operating Jurisdictions adopt a Blockchain Governance Code in the Special Digital Economic Zones ('**SDEZ's**'). Using the European Union's development of the law on Corporate Governance as a model[132], it began as largely voluntary,[133] self-regulation[134], companies had to either adhere to the Code or explain to what extent and why they didn't.[135]

C12.16 There is every incentive for the Cooperating jurisdictions to embrace the development of a Blockchain Governance Code giving Crypto assets registering for the benefits of the SDEZ, to either:

(a) voluntarily comply with the legislation or parts thereof; or

(b) explain to the markets why they have opted not to comply to various components.

C12.17 In February 2016, a group of high-level experts, including the Chief Economist of the Bank of England, recommended the use of complexity theory for the predictive modelling of behaviour and outcomes on financial markets.[136] The theory is helpful to crypto markets which have elements of both structural regularity by virtue of protocol, mixed with volatile market swings and the uncertainty that it brings. Complexity theory models system-environment relationships, with a focus on the interaction between system members and their spontaneous self-organization. [137] Therefore, the time dimension is of the essence. Complexity models are dynamic, describing the evolution of systems as iterative processes, where the outcome of one cycle is simultaneously the start of the next.[138]

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[132] Patrick Leyens, 'Comply or Explain im Europäischen Privatrecht – Erfahrungen im Europäischen Gesellschaftsrecht und Entwicklungschancen des Regelungsansatzes' (2016) ZEuP 388, 419.

[133] John Roberts, 'Between the Letter and the Spirit: Defensive and Extensive Modes of Compliance with the UK Code of Corporate Governance' in Thomas Clarke and Douglas Branson (eds) The SAGE Handbook of Corporate Governance (SAGE 2012) 196.

[134] Cary Coglianese and Evan Mendelson, 'Meta-Regulation and Self-Regulation' in Robert Baldwin et al. (eds) The Oxford Handbook of Regulation (OUP 2010) 146.

[135] Klaus Hopt, 'Comparative Corporate Governance: The State of the Art and International Regulation' (2011) 59 American Journal of Comparative Law 1, 10-11; R I (Bob) Tricker, The Evolution of Corporate Governance in Thomas Clarke and Douglas Branson (eds) The SAGE Handbook of Corporate Governance (SAGE 2012)45-46.

[136] Stefano Battiston et al., 'Complexity theory and financial regulation. Economic policy needs interdisciplinary network analysis and behavioral modeling', 351 Science 818 (2016).

[137] M Mitchell Waldrop, Complexity. The Emerging Science at the Edge of Order and Chaos (Simon & Schuster 1992) 11; Michael Strevens, Bigger Than Chaos. Understanding Complexity through Probability (Harvard University Press 2003), p 7.

[138] Tim Blackman, 'Complexity theory' in Gary Browning et al. (eds), Understanding Contemporary Society: Theories of the Present (SAGE 2000) 139, 145.

C12.18 Complexity theory was first introduced in the study of biological systems.[139] Since the 1990s, chaos and complexity theory have been increasingly applied to the social sciences as well.[140] Particularly, organizations were fruitfully modelled as complex institutions.[141] From there, it was but a small step to an application in economics.[142] After the stock market crash of October 19, 1987, academics began turning to non-linear models, found in non-linear dynamics and complexity theory, to explain the interaction of market participants, and of financial markets in particular.[143] Specifically, those theories are better able to model sudden changes of behaviour and stark movements, such as those witnessed during financial crashes, than conventional, linear models.[144] They may thus provide some much-needed structure for such seemingly random events. The contribution made by Stefan Battiston et al.[145] is, as far as can be seen, the first to apply the insights of complexity and chaos theory not only to the modelling of financial markets, but explicitly to financial regulation. The moment of its appearance is suggestive: the financial crisis has made it abundantly clear that the models used to inform financial regulation before were inadequate.[146]

C12.19 Cryptocurrencies are excellent candidates for complexity theory in so far as they are to a large extent self-organised. They are based on peer-to-peer systems which connect a set of nodes into a self-organising network that anyone can join at any time; and the network uses a protocol which is maintained and updated by participants. In the parlance of complexity theory, there is a high degree of interconnectedness of the different independent agents.[147]

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[139] Stuart Kauffman, At Home in The Universe. The Search for Laws of Self-Organization and Complexity (OUP 1995) Chapter 1.

[140] David Harvey and Michael Read, 'The Evolution of Dissipative Social Systems' (1994) 17 Journal of Social and Evolutionary Systems 371, 373.

[141] RA Thiétart and B Forgues, 'Chaos Theory and Organization' (1995) 6 Organization Science 19.

[142] William Baumol and Jess Benhabib, 'Chaos: Significance, Mechanism, and Economic Applications' (1989) 3 Journal of Economic Perspectives 77, 92; David Byrne, Complexity Theory and the Social Sciences (Routledge 1998)

[143] David A Hsieh, 'Chaos and Nonlinear Dynamics: Application to Financial Markets' (1991) 46 Journal of Finance 1839; Edgar E. Peters, Fractal Market Analysis. Applying Chaos Theory to Investment and Economics (Wiley 1994).

[144] Ying-Ying Hsieh et al., 'The Internal and External Governance of Blockchain-Based Organizations: Evidence from Cryptocurrencies' in: Campbell-Verduyn (ed.), Bitcoin and Beyond: Blockchains and Global Governance (Routledge, forthcoming), https://ssrn.com/abstract=2966973, p 1839.

[145]Stefano Battiston et al., 'Complexity theory and financial regulation. Economic policy needs interdisciplinary network analysis and behavioral modeling', 351 Science 818 (2016).

[146] See Stefano Battiston et al., 'Complexity theory and financial regulation. Economic policy needs interdisciplinary network analysis and behavioral modeling', 351 Science 818 (2016), at 819.

[147] Cf. also, for the financial system as such, Battiston et al., supra, 818.

Legal enforceable standards for blockchain governance

B12.20   At para [C 5] we explained that we have created a Governance system by code which has replaced, as tech can do, traditional corporate governance systems.[148] Unfortunately too few blockchains have internal governance systems. The case for suggesting that externally enforced legal standards are necessary, and as such, to form part of the Code are:

(a)   Core developers and important miners wield powers that are comparable with those of management of publicly traded companies yet are not subject to comparable rules of scrutiny, transparency and accountability.

(b)   There is no formal way to oust the core developer team by means of a 'takeover'.

C12.22   There is of course difficulty in seeking to apply principal and agent and hierarchical structural analysis to decentralised flat hierarchies. Moreover the Corporate Governance Code model has been criticised in itself as too focused on control and accountability[149]. Selling coins or initiating a hard folk however, however are not satisfactory redress mechanisms.

C12.23   A voluntary code can allow projects, particularly fledgling ones, to selectively opt out of all or parts of the Code provided they explain there reasons for doing so. It should not operate as a barrier to entry to new projects where less open participation may be required for its early phase of business cycle. An exception may be made for those cryptocurrencies that have reached such a critical mass as to be a systemic risk on the world's financial system.

C12.24   The driving incentive for undergoing adoption of the Code by registering a crypto project in SDEZ is competitive advantage, otherwise the compliance costs counsel against such adoption. With the mass adoption from the traditional capital markets, more traditional investors would expect to see greater transparency and accountability. The Tezos commercial success suggests that there is a demand for governance solutions.

The Blockchain Governance Code

C12.25   The Code would require, in the absence of an internal governance structure:

(a)   the imposition of fiduciary duties owed by core developers, including duty of loyalty and duty of care, duty to maintain the code and update the chain.[150]
(b)   allow core developers to take into account broader duties, beyond the users to systemic financial stability;
(c)   provide rules on hard folks;
(d)   provide rules for responsible use by mining operators particularly where fiduciary duties coming into play where any group can control more than 50% of computational power;

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[148] David Yermack, 'Corporate Governance and Blockchains' (2017) 21 Review of Finance 7; Wright and De Filippi, supra.

[149] Thomas Clarke and Douglas Branson, 'Introduction: Corporate Governance – And Emergent Discipline?' in id. (eds) The SAGE Handbook of Corporate Governance (SAGE 2012)4-5, 11; John Roberts, 'Between the Letter and the Spirit: Defensive and Extensive Modes of Compliance with the UK Code of Corporate Governance' in Thomas Clarke and Douglas Branson (eds) The SAGE Handbook of Corporate Governance (SAGE 2012) 197; Eberhard Vetter, 'Der Deutsche Corporate Governance Kodex – nur ein Testballon für den Gesetzgeber?' (2004) ZIP 1527.

[150] Angela Walch, 'Call Blockchain Developers What They Are: Fiduciaries', American Banker (August 10, 2016)

(e) provide user rights to demand information[151]

(f) provide rules enshrining that, for example the longest in conflicting chains is to be considered the authentic one and that information in the authentic chain cannot be retrospectively changed and the extreme circumstances such as a hack, where this can be modified; and,

(g) provide rules requiring technical infrastructure to be designed by developers to allow for communication and conducting voting procedures.

C12.26 Ultimately the Code would be a means to embody the spirit of Satoshi Nakamoto's White Paper which introduced blockchain technology as means to overcome the problem of trusted parties precisely to allow for decentralised but secure interaction between diffused users.[152]

Transparency disclosure rules for capital raising by Crypto projects

C12.27 The standard market practice has been that the issuer publishes a so-called "white paper" on its website.[153] Although some white papers are quite comprehensive, their level of detail cannot be compared with a prospectus required under securities regulation.[154]

C12.28 A tokenholder is not only exposed to higher asymmetries of information and likely more behavioural biases but also to various forms of opportunism by the founder. In some cases, founders might not pursue the promised projects.[155] In other circumstances, managers might not do so in an efficient manner, wasting tokenholders' resources. Several factors make these managerial (or 'vertical') agency problems particularly important in the context of ICOs. First, tokenholders do not usually have the ability to appoint, remove and remunerate the directors. Second, white papers may not cover how managers should behave in many cases in which the interests of the tokenholders may be at stake. Moreover, unlike what happens in a typical relationship between directors and shareholders where fiduciary duties may help fill some gaps, developers do not usually owe fiduciary duties to tokenholders. Therefore, white papers may become more incomplete than a typical corporate contract. Third, while managers in listed companies are subject to public scrutiny and the market for corporate control, and these market forces may encourage managers to behave in better and more efficient manner, the same market forces will unlikely take place in a private company issuing tokens.

C12.29 Accordingly, under the Code, the obligations in paragraph XX apply. Furthermore, the Code requires, for new ICO projects, conditions to be imposed on the release of Coins by founders/issuers/key developers staged in accordance with project deliverable targets.

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[151] Ethereum must be complimented on its early move to publish transcripts of core developer calls showing that transparency does not have to be prohibitively burdensome: Don Tapscott and Alex Tapscott, Blockchain Revolution (Penguin, 2016) p. 102-3.

[152] Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System (2008)

153 Dirk A. Zetzsche, Ross P. Buckley, Douglas W. Arner and Linus Fôhr. *The ICO Gold Rush: It's a scam, It's a bubble, It's a super challenge for regulators.* EUROPEAN BANKING INSTITUTE WORKING PAPER SERIES – NO. 18. (2018) at 10.

154 *See id.*

[155] Corporate governance is, after all, about promises between managers and investors. See Jonathan Macey, CORPORATE GOVERNANCE: PROMISES KEPT, PROMISES BROKEN (Princeton University Press, 2008).

C12.30 Under the code, there is a system of smart disclosure in the white paper. Through this approach, more attention should be paid to the way issuers provide the information rather than the amount of information itself. While this proposal has been developed by various securities regulators for the information provided in the prospectus, and some authors have criticized the effectiveness of this policy, this system of smarter disclosure may be more relevant and effective in a world of tokenholders.

Insolvency rules

C12.31 The participating SDEZ jurisdictions provide simple rules for crypto project insolvencies. Tokenholders are treated effectively as the functional equivalent, from an economic and finance perspective as shareholders would be traditional bankruptcies. They are therefore subordinated to creditors and as a result create greater financial opportunities to project to raise capital more efficiency on the debt market.

Recognition of privacy and ownership of personal data

C12.32 The GDPR[156] in force since May 2018, the issue has gained prominence not only in the EU, but also internationally. Blockchain data processing may fall under the scope of the GDPR to the extent that the offering of blockchain-based transaction services extra-EU is envisaged to address data subjects in the EU (Art. 3(2) GDPR).[157]

C12.33 Data privacy has become an increasingly significant given the centralisation of data privacy and the recognition that most social media platforms own the intellectual property of user's posts. This has commercial dimensions in the wake of NFT's. As Data mining is the new gold mind, the 'own your own data' campaign is starting to be of concern.

C12.34 The participating SDEZ jurisdictions provide clear and helpful data ownership restoration to users and encourage the use by blockchain projects to use 'zero-knowledge proofs' for the storage and transmission of data wherever possible.[158]

Establishing a crypto valuation standard measure for the new economy as unit of measurement

C12.35 The NuGenesis blockchain is designed to optimise the ability to give recognition to and exchange value, including in virtual reality, beyond tokenisation. Value and a monetary measure representing it, becomes increasingly more abstract. As a result, in the new economy traditional 'measures', in the form of dollar values, are increasingly less relevant. How much is a crypto, when the cryto is the measure? How long is a metre when the metre is the measure?   Yet in allocating jurisdiction for things like taxation, how and where and by whom value was created and relatively as between them remains important to nation states. We are working on a 'basket' of assets including fiat currencies, land, commodities and resources which can appropriately proxy for and measure the relative contribution of resources and energy to the creation of value, to be measure of value in the new economy.

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[156] REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 April 2016
[157] On the GDPR's international reach and impact, see Ira Rubinstein and Bilyana Petkova, 'The International Impact of the General Data Protection Regulation' in Marc Cole and Franziska Boehm (eds), Commentary on the General Data Protection Regulation (Edward Elgar forthcoming), https://ssrn.com/abstract=3167389; Bart Sloot and Frederik Zuiderveen Borgesius, 'The EU General Data Protection Regulation: A New Global Standard for Information Privacy', Working Paper (2018), https://ssrn.com/abstract=3162987.
[158] Subject of course to AML/KYC requirements of each SEDZ jurisdiction.