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Proceedings of 2nd Annual BAF Summit on Crypto Policies & Global Economy

5th Blockchain International Scientific Conference ISC2023, 18 March 2023, Manchester, UK

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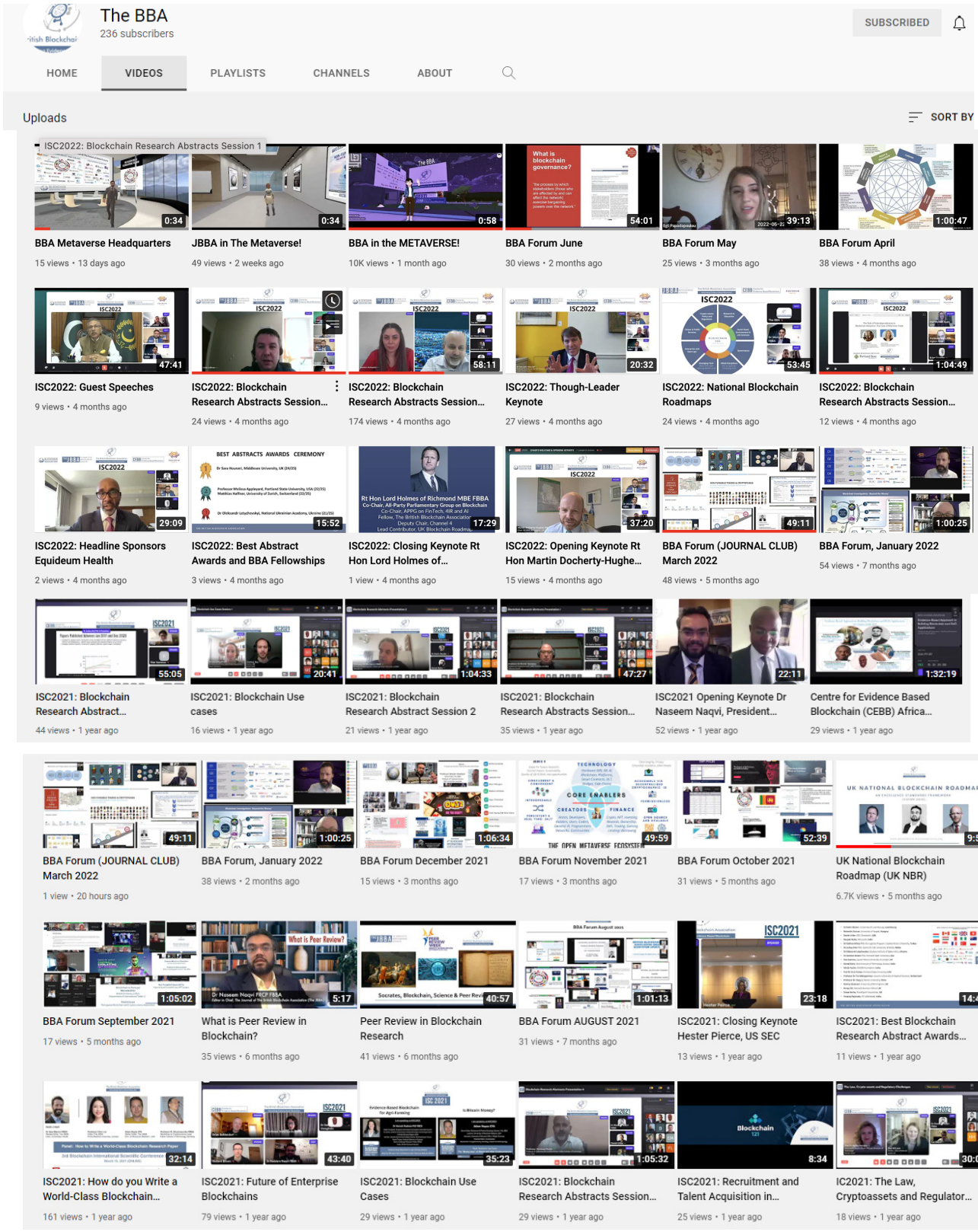

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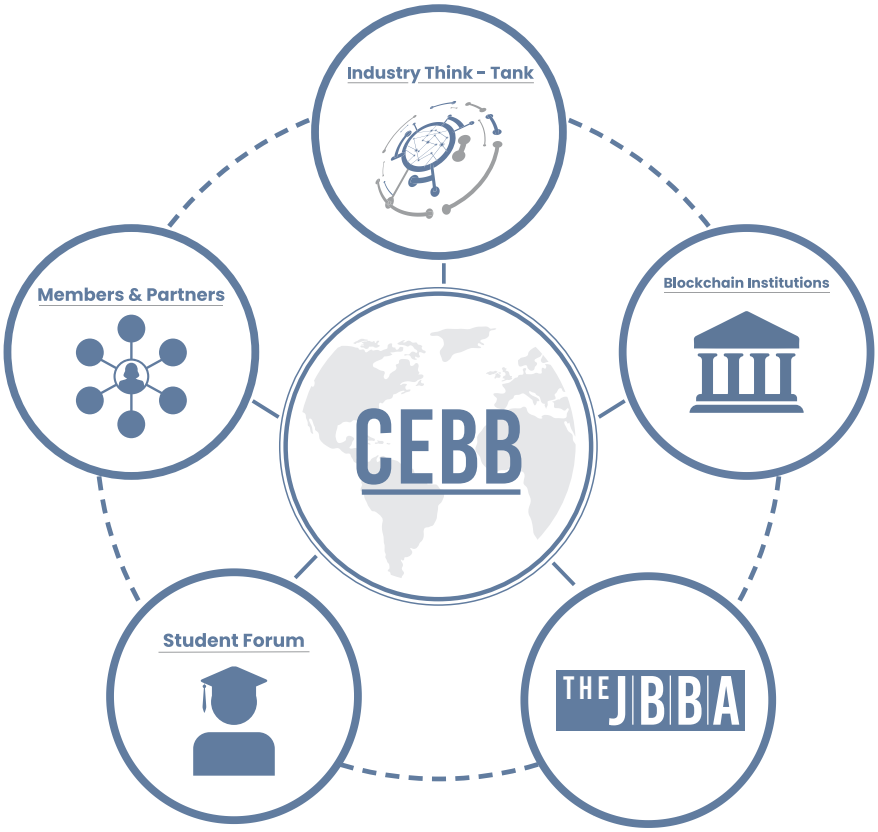

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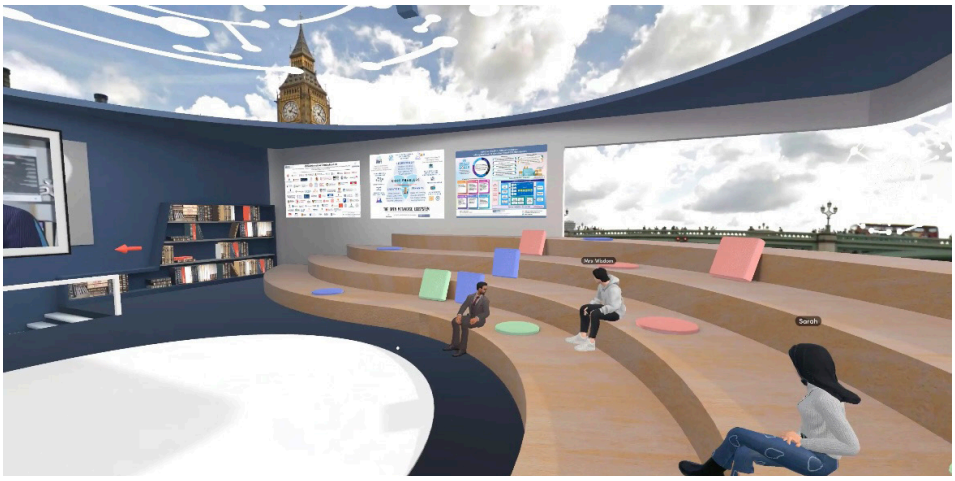

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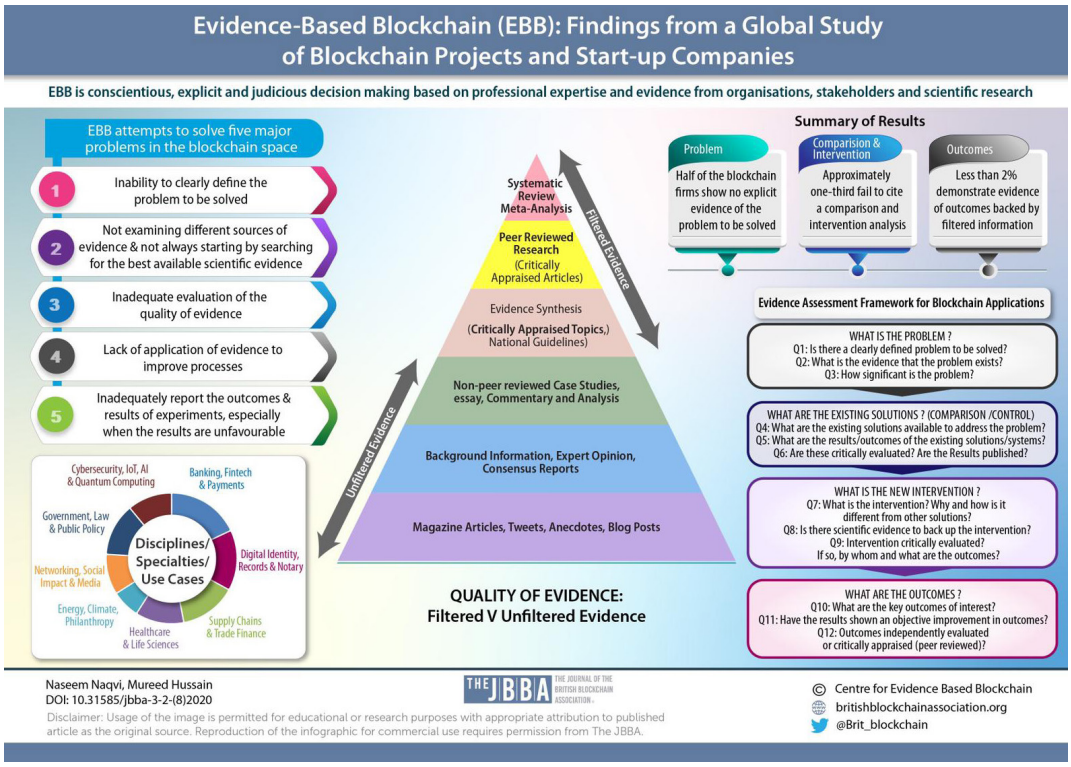

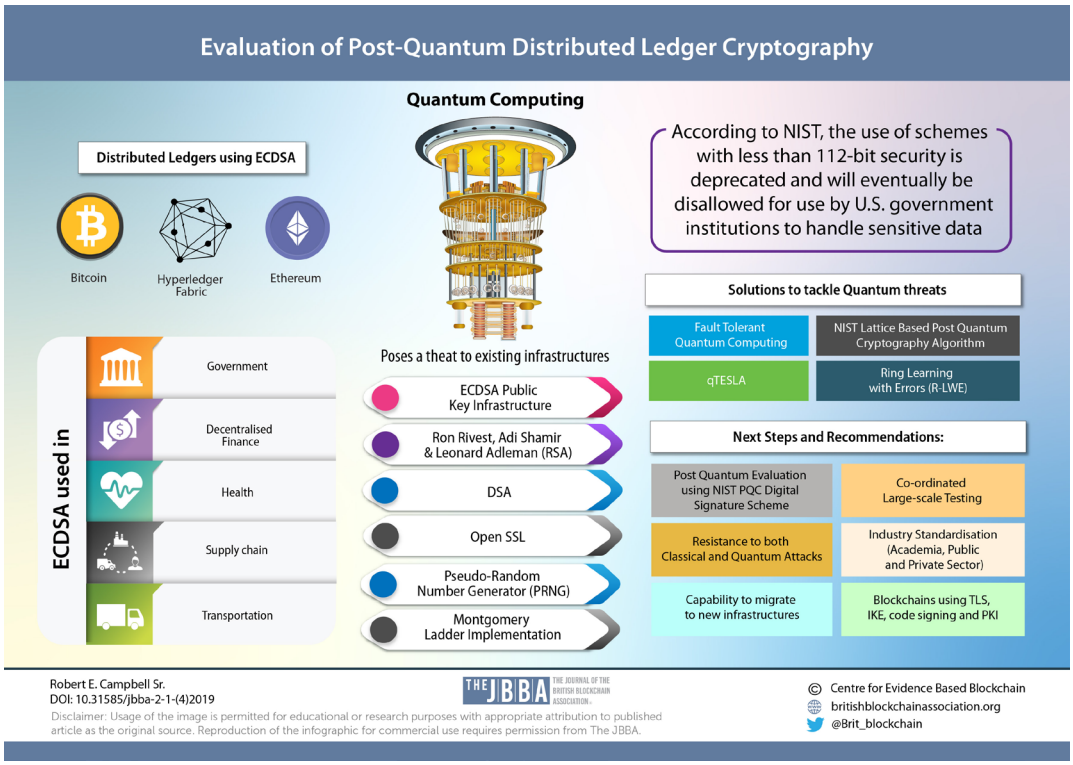

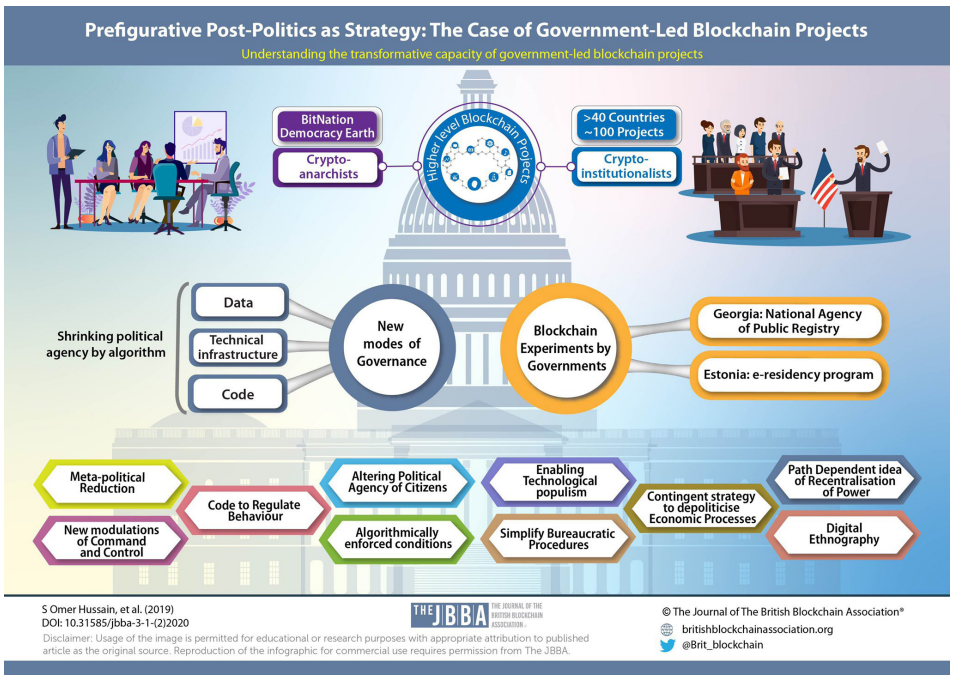

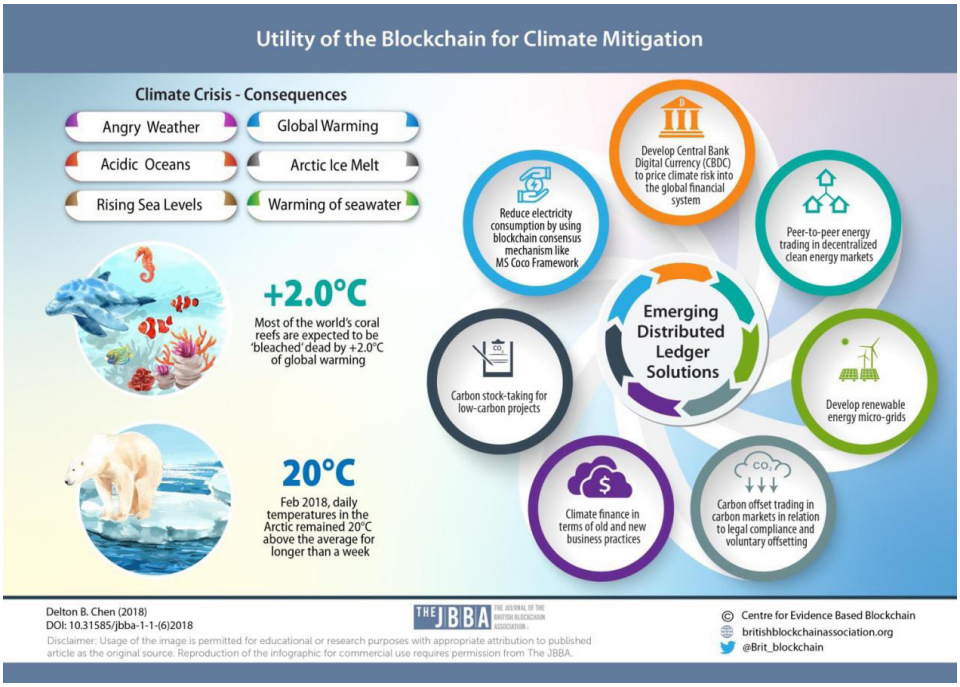

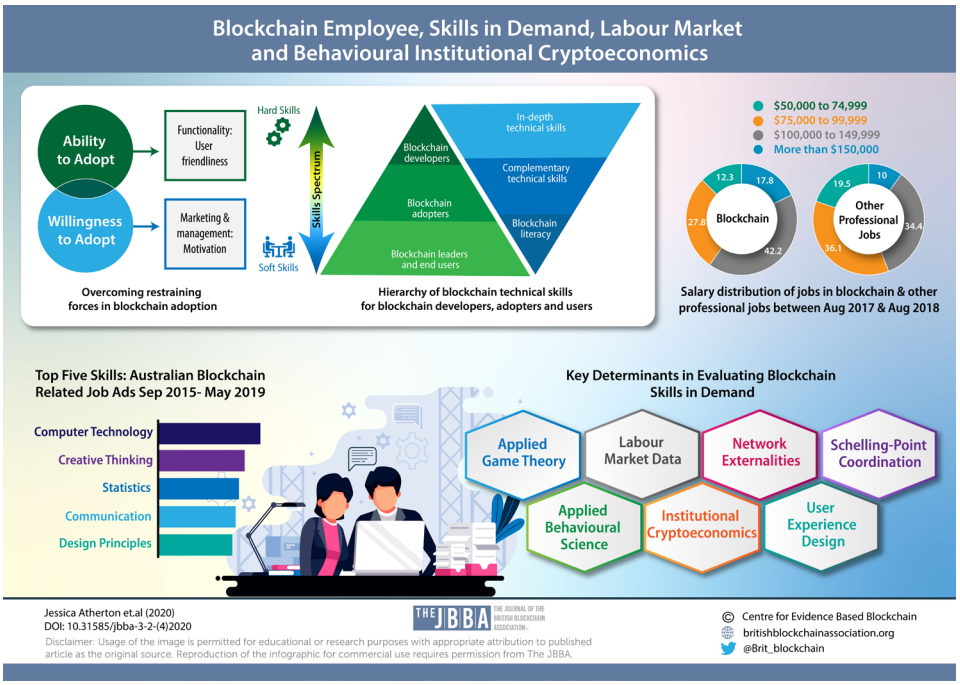

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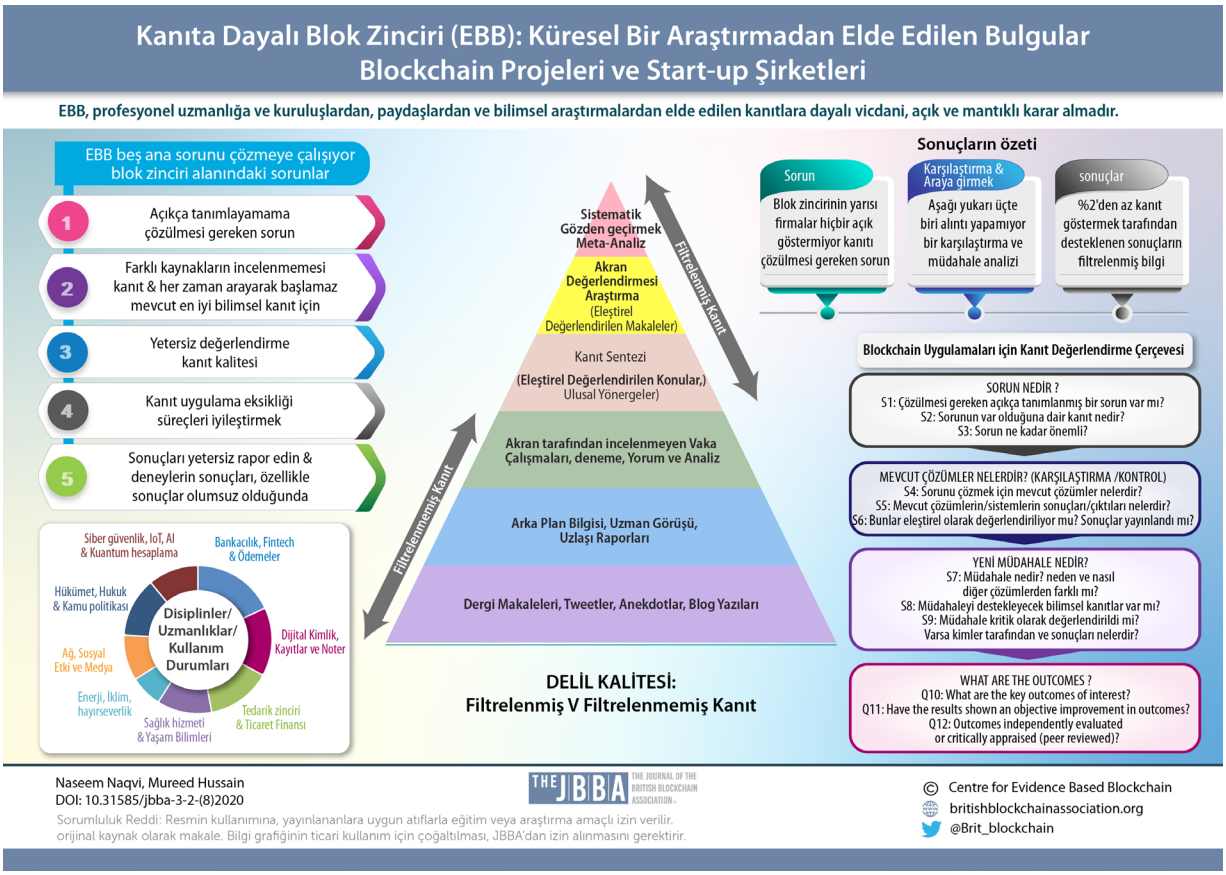

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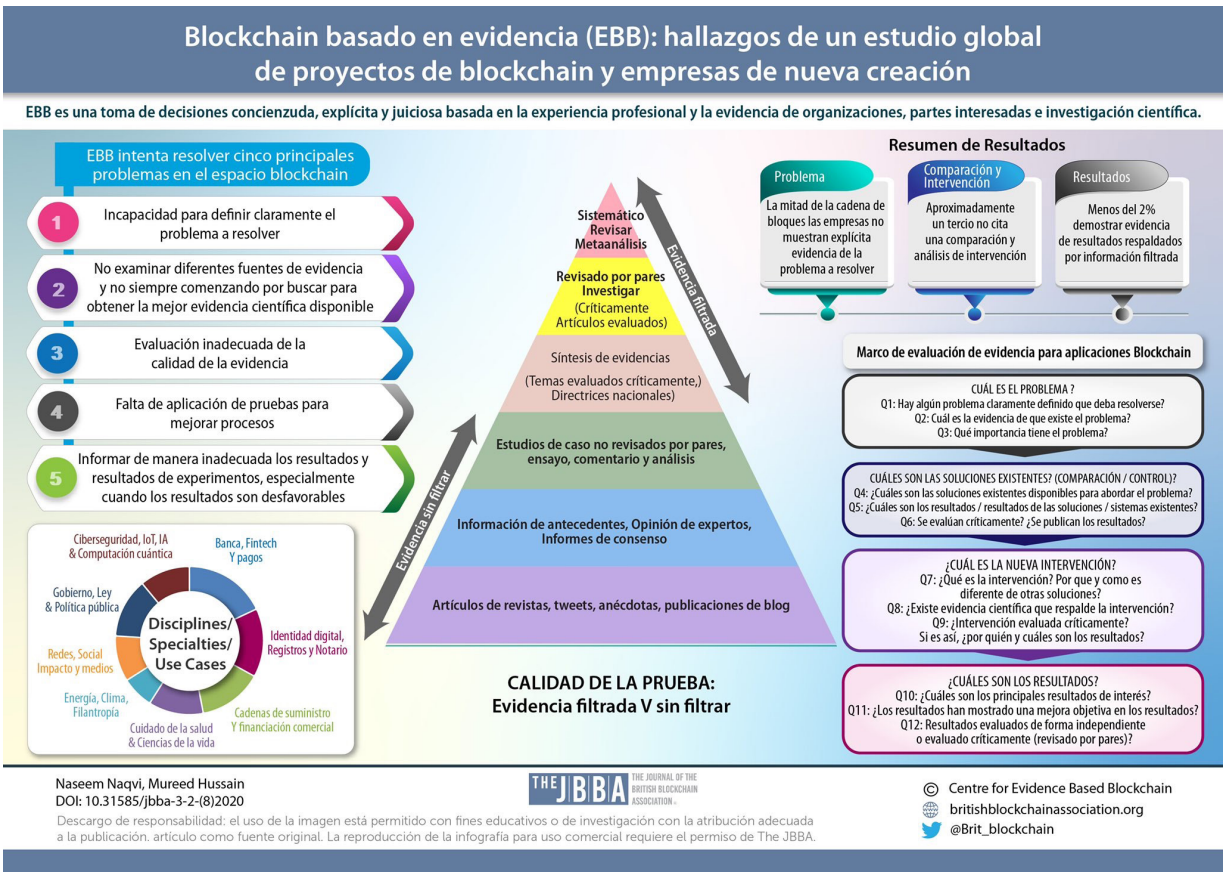

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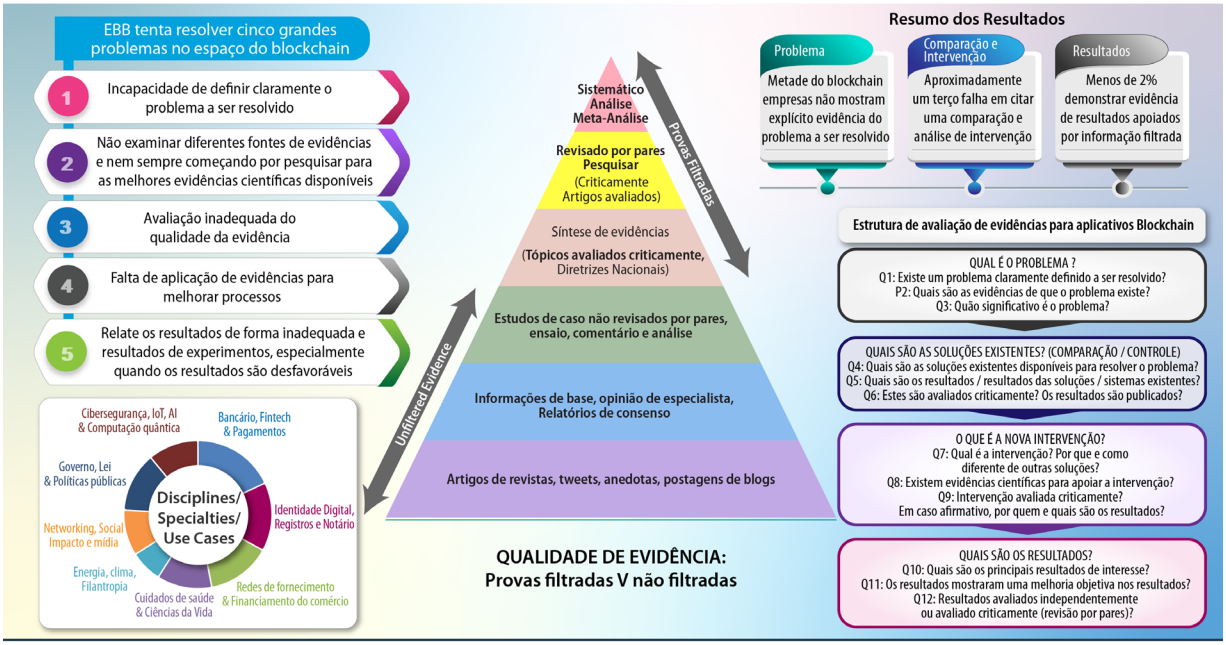

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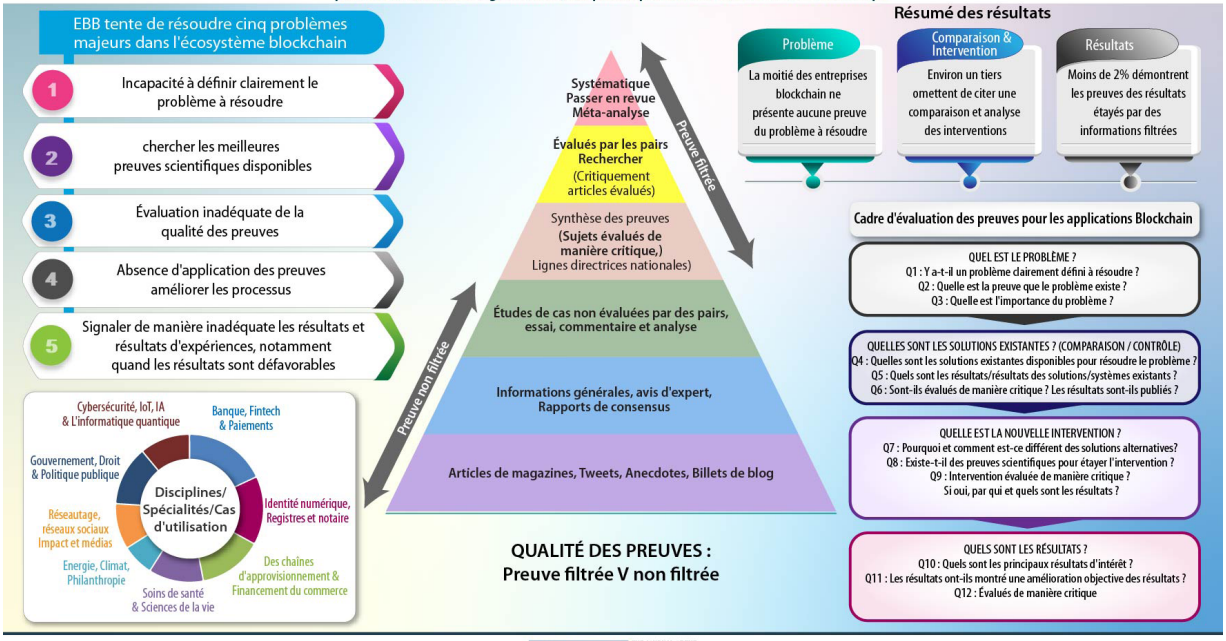

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EDITORIAL

It gives me great pleasure to present to you the *10th* issue (Vol. 5 Issue 2) **November 2022** of The Journal of British Blockchain Association. As I write this editorial, the UK mourns the death of Her Majesty the Queen, who passed away in September this year. The journal's editorial board is ever so grateful to The Queen for her letters of acknowledgement and recognition of the work we have been doing at the JBBA over the past many years.

The articles featured in this issue represents a broad overview of the Web3 ecosystems, namely:

1) *Auditing Tokenomics: A Case Study & Lessons from Auditing a Stable Coin Project*
2) *The Role of Interdependencies in Blockchain Adoption: The Case of Maritime Trade*
3) *Open Access Blockchain and Cryptoasset Research: Why it Matters Now More Than Ever Before*
4) *A Distributed Ledger Technology Roadmap for Albania: Some Preliminary Reflections*
5) *How Many Public Corporations Recognise "Token Economy" Technologies as Materially Significant? Evidence from 10-K Reports*
6) *NFT of NFT: Is Our Imagination the Only Limitation of the Metaverse?*

While we trust the blockchain, it is imperative that the blockchain service providers are methodically audited to enable safe adoption of web3 ecosystems. Recent collapse of some of the stable coins have prompted the debate that there needs to be in place a check and balance mechanism for trust service providers. The case study of auditing a stable coin project by *Dr Stylianos Kampakis* highlights the necessity of tokenomics audit to establish transparency and trust in decentralised finance.

As the blockchain ecosystems mature, the role of interdependencies becomes paramount. With multiple players operating as collaborators, many key questions arise: How do we diagnose critical "illuminating points of leverage in DLT consortia? How do we standardise cross-enterprise open blockchain innovation? How do we establish blockchain collaboration continuum? What are the legal, regulatory and standards interdependencies in blockchain ecosystems? The research from *Yuthas and Appleyard* provides a framework of blockchain interdependencies, with three levels of cooperation, interdependence, and mutualism, as well as socio-technical, economic, and ecosystem-level interdependencies.

Fewer than a dozen countries in the world have published their national blockchain roadmap. I was pleased to see scholars from Albania publishing an overview of the country's DLT landscape and some preliminary reflections on how Albania's policymakers can put together a national DLT roadmap.

The token economy promises to enable new business models that will likely disrupt many market leaders. How many corporations envision these technologies to be materially significant to their business today? The paper from *Lacity et* al provides an analytical review of 39,522 10-K reports and discussed the results through the lens of the Theory of Disruptive Innovation.

The metaverse has arrived, and according to a recent report, it is predicted to be worth $13 trillion of total addressable market by 2030. We are already seeing an exponential growth in the adoption of the metaverse with major brands opening their headquarters in the metaverse. The British Blockchain Association has also launched its headquarters in the metaverse. We now have a JBBA gallery showcasing all past issues of the journal as well as infographics of ground-breaking research papers published over the past five years. While our imagination may be the only limitation of the metaverse, the ethics, governance, and ways to incentivise peer creations remain the keys to a sustainable open metaverse, as highlighted in the article from *David Lee et al* of *Singapore University of Social Sciences.*

Approximately $2.3 trillion is spent each year funding 8 million scientists to produce 2 million research papers. $10 billion a year is then spent globally by universities to access scientific research which is published in subscription journals. Einstein once said that if he was able to see far it was because he was standing on the shoulders of giants, we cannot stand on the shoulders of giants if the giants are behind a paywall. My article on open access blockchain research explores the challenges and solutions to closed research, and the significance of change in paradigm shift needed in the global context of blockchain research.

The British Blockchain Association hosted the 2nd Annual Member Summit of the Blockchain Associations Forum on 17 September, featuring representatives and heads of national blockchain and digital asset associations from 53 countries across six continents. The theme of the summit was *'Cryptoassets Policymaking and the Future of Global Economy'*. I was honoured to chair the forum. You will find the summit's proceedings in this issue, providing a comprehensive summary of the key recommendations for regulators, industry, and the policymakers.

To conclude this editorial, I would like to thank the authors for their thought-provoking and path-breaking papers, the reviewers for their time and dedication with the peer-review process and my fellow editors for their commitment and selfless contributions to the journal.

Professor Dr Naseem Naqvi FBBA
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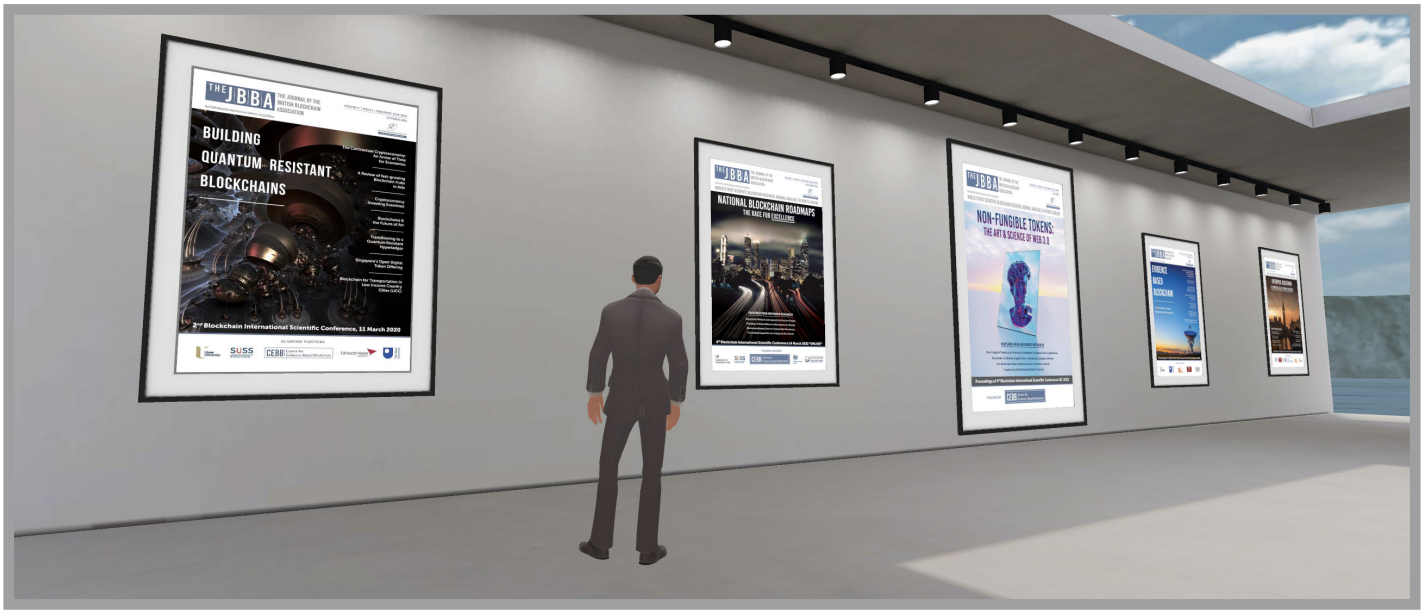

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"Our group submitted a paper to ISC2021. The paper was reviewed, accepted and subsequently published in The JBBA. We were quite impressed by the speed of the review cycle and submission to publication time. JBBA has become an important journal in the field of Blockchain, given its efficient reviews and timeliness in the publication of research articles."

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"The JBBA is an exciting peer-reviewed journal of a growing, global, scientific community around Blockchain and Distributed Ledger technologies. As an author, publishing in the JBBA was an honour and I hope to continue contributing to in in the future"

Evandro Pioli Moro, Blockchain Researcher, British Telecommunication (BT) Applied Research

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Auditing Tokenomics: A Case Study and Lessons from Auditing a Stablecoin Project

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Abstract

Tokenomics is a vital part of any blockchain project. It is the study of how crypto tokens are used within the blockchain ecosystem, their role in the project, and how they are designed to incentivise certain behaviours. There are many ways that crypto tokens can be designed for use within an ecosystem. For example, they can be designed to have a fixed supply so that there is no inflation or deflation in the system. Founding teams can also create tokens that provide voting or governance rights to holders, thereby incentivising them to hold onto their tokens rather than sell them on exchanges. They can also be used simply to pay fees.

The range of options that founding teams have when designing token economies often leaves them with more questions than answers. Even deciding whether the token economy design is robust can be a challenge. Furthermore, a blockchain project not only has to convince its founders but its prospective investors. As a result, innovative crypto-projects often create for themselves interesting narratives, but they are not always viable. For that reason, a recent trend in the industry is "the tokenomics audit." The goal of a tokenomics audit is similar to an audit in any other industry (e.g., accounting). The auditor has to assess the viability of a project, while also suggesting potential improvements. The end goal is to provide an independent view on whether a token economy is viable or not.

This paper discusses general principles that can be followed when running a tokenomics audit. The paper uses as a case study a recent tokenomics audit, conducted for the BankX stablecoin (https://bankx.io/), by the author of this paper. The paper first discusses in general the different methods and mechanisms that a tokenomics auditor can employ to audit a project. The paper then proceeds to demonstrate how these methods were used in the audit of the BankX project.

Tokenomic auditing is still a new area, and there is no set of established methods to conduct an audit. By reviewing this case study, this paper helps provide some lessons to the community, upon which future research can improve.

Disclaimer: Nothing in this paper can be interpreted as constituting financial advice. This paper was written for academic purposes only.

Keywords: *tokenomics; bitcoin; audit; ecosystem; crypto token; structural analysis; marginal case*

JEL Classifications: *A10*

1. Introduction

Tokenomics is a relatively new term and describes the use of tokens in the context of business models. It is a combination of two words, "token" and "economics." Tokenomics is an emerging field that studies how tokens can be used as a form of currency for digital services.

The first mention of tokenomics is believed to have been in an article by Chris Dixon, a venture capitalist at Andreessen Horowitz [1]. He discusses how tokens can be used to incentivise desired behaviours and create an economy around a product or service.

The first token was introduced in 2009 by Bitcoin [2], created as an alternative to fiat currencies. The idea was to create a decentralised currency that would not be controlled by any government or central bank.

The rise of Ethereum, and its ability to function as a virtual computer, gave birth to an explosion in blockchain projects, with each one using its own token. This popularised the concept of a token economy. The space has evolved since then, with tokenomics achieving greater depths of complexity, especially in areas such as decentralised finance.

The field of tokenomics is still nascent. As of the time of writing this paper (22 January 2022), there are only 816 search results on Google Scholar for the term "tokenomics." The combination of a field that is still in its infancy with a blockchain space that is moving and innovating very fast has often made things difficult to follow. There are not many established best practices, and the ones that exist are not necessarily easily found by entrepreneurs or prospective investors.

This has given rise to the recent practice of auditing. As in other sectors, e.g., accounting, the purpose of an audit is to provide a critical inspection of a project. This practice has elements of both an art and a science, and the auditor might combine quantitative techniques with subjective judgement.

There is no set framework for auditing tokenomics, but it is an area that is likely to grow in importance. This paper presents a case study of a tokenomics audit and some general methods that were used in order to perform the audit. This helps draw lessons from how these methods can be used in practice, and set the frame for future work. It is the hope of this author that this case study will help the community learn and eventually come up with generally accepted standards for how to audit tokenomics.

2. Methodology

It is important to note that the term "tokenomics" can be used to describe

different aspects of a blockchain project:

1) The number of tokens issued and the way they are issued (vesting schedule, airdrops, etc.).
2) The economics of a consensus algorithm; largely referred to as crypto-economics.
3) The general structure of the system: game-theoretic and economic incentives.

In this paper we will mostly discuss point 3. Point 1 is also very important, but it wasn't the focus of the case study audit, and is considered a separate concern. Additionally, with regard to point 1, many projects adopt a formulaic approach when issuing and releasing tokens, and this approach can be enough to avoid a project's token crashing. The long-term viability of a project mostly depends on point 3. If a project's token economy does not provide the right incentives, or if it does not have a compelling business case, then it's unlikely to survive. However, it should be noted that the success of blockchain projects as a whole, as well as initial coin offerings (whether on an exchanged, often called IEOs, or a decentralised exchanged, often called IDOs), depends on multiple factors [3], which might also themselves be shifting as the technology evolves.

Point 2 is relevant not so much for tokens, as for coins (e.g., like ETH) and layer 1 solutions, and is not discussed in this paper, which is focused on a token case study.

3. Core Principles

Auditing tokenomics before the official launch of a project is a challenging endeavour; first and foremost because the analyst is being asked to create a model of something that doesn't exist. The study of existing real-world economies is challenging, but at least economists have access to proven data which they can use to develop econometric models and test their theories.

In contrast, a tokenomics audit for a project in its pre-launch phase needs to find ways through which the auditing and thinking processes can be structured. Also, a tokenomics audit needs to have a particular goal. This can be different depending on the purpose of a project. However, in general, we can define the goal of a tokenomics audit as follows:

"The goal of a tokenomics audit is to convince an informed but sceptical reader that the properties and claims of a project are true, given the current and foreseeable conditions in the world."

This is an open-ended definition, because different projects have different priorities. However, some possible goals can be:

1) Price stability (for stablecoins) or appreciation.
2) Creating a store of wealth against inflation.
3) Ensuring real-world utility of the token.

An example of such goals is provided for the case study analysed in Section 3.

To that extent, an audit can use different tools, some of which are described below.

It is important to note that the list of the methods outlined here is not, necessarily, exhaustive. It is very likely that other auditors might prefer a slightly different set of methods, or even use their subjective judgement. These methods, however, provide a good template and can be adapted to various circumstances.

Empirical Proof, Data Analysis, and Benchmarking

The first method an audit should always employ is that of learning from similar cases. When coin offerings were initially invented, there was a high chance that a new project was creating a proposition or mechanics never encountered before. Now, it is likely that a new project will find at least some points of similarity with existing projects.

For example, there is a lot that can be learned from the successes and failures of different types of stablecoins. From the controversy that has surrounded USDT [4], to the success of Terra/Luna or the bank run and the eventual collapse of Iron Titanium [5], it is likely that a project can learn a lot through similarities with existing projects.
The analysis becomes even more useful if data is available which can be used to make an argument. An example of this approach is seen in an audit of the tokenomics of Frax by Albaron Ventures, where they compared the peg stability of Frax and other stablecoins, as shown in Figure 1.

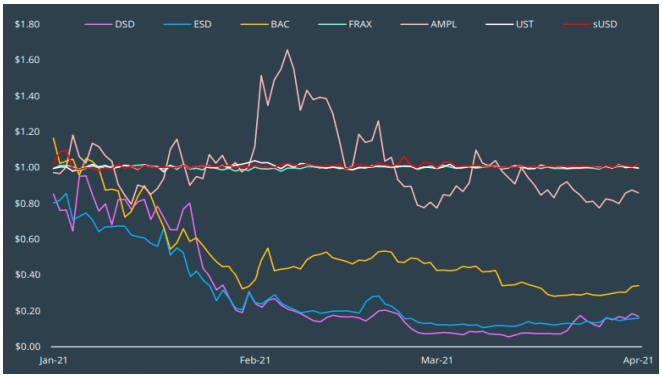

Figure 1. Comparison of peg stability of different stablecoins. Source: [6]

Agent-Based Modelling

One of the methods suggested by the author in the past is agent-based modelling [7]. Agent-based modelling is used to study complex systems and to solve problems that are difficult or impossible to solve analytically.

The agent-based modelling process starts with the identification of the system's components and their relationships. The next step is to identify the rules governing how these components interact with each other, which can be done by observing the system in operation or by using expert knowledge. The final step is to run simulations with different sets of initial conditions and parameters and compare them against one another in order to find an optimal solution.

The flexibility of agent-based modelling has given rise to different flavours of this approach. For example, some simulations might incorporate intelligent agents, through the use of reinforcement learning, a famous example of this being the multi-armed bandit problem.

In the domain of networks, diffusion models are a popular choice, and they have been used in many different areas from biology [8] to social networks [9].

Also, agent-based modelling is often implemented via Monte Carlo methods, whose objective is to use repeated random sampling in order to identify equilibria and possible evolutionary paths in a model [10], [11].

Agent-based modelling is an excellent method for analysing token economies, given their complexity and the interconnected parts.

Game Theory

Game theory is a branch of mathematics that studies the mathematical models of conflict and cooperation between rational decision-makers, first devised by Von Neumann [12]. Game theory is mainly used in economics, political science, and psychology in order to understand how humans interact with each other when there is limited, or no, trust.

Game theory has an integral significance to blockchain, given that the root of the blockchain lies in how, through the use of algorithms, trust can be ensured in a network without trust. It therefore follows that game theory can be a useful tool for a tokenomics audit.

One of the best examples of this is probably OlympusDAO. While OlympusDAO did not go through a tokenomics audit (it has gone through a smart contracts audit only) [13], the project is well known for its use of game-theoretic analyses to prove the sustainability of its protocol [14]. A famous image depicting the game theory behind this project is shown in Figure 2.

	Stake	Bond	Sell
Stake	(3, 3)	(1, 3)	(-1, 1)
Bond	(3, 1)	(1, 1)	(-1, 1)
Sell	(1, -1)	(1, -1)	(-3, -3)

Figure 2. Olympus DAO game theory. Source [15]

Structural/Balance-of-Forces Analysis

Another type of analysis, closely related to game theory, is what we will term "structural" analysis but which can also be called "balance-of-forces" analysis. This is a higher level of abstraction, where the analysis lists all possible dynamics and their impact upon a token economy, but without explicitly creating an incentives matrix.

The dynamics and the tools employed create a narrative, which aims to convince an informed reader that they should work as expected when deployed in real life. The balance of the different forces that are applied to a token and an ecosystem should ideally be driven by a clear objective, such as token appreciation, stability, or sustainability.

While this is not explicitly stated, the majority of new blockchain protocols follow this logic, starting with Satoshi Nakamoto's original bitcoin paper [2]. A more recent example of a successful project outlying this is Terra/Luna's documentation [16].

However, the aim of a structural analysis for a tokenomics audit should be to formalise the different dynamics at play in a more structured way, and troubleshoot for issues that might arise, thereby highlighting weaknesses.

Marginal Cases

Another mechanism which is often employed, albeit informally, is the study of marginal cases. These are purely hypothetical scenarios that could break a system, though they never happen in practice. This is similar to the stress test practice which financial institutions undergo. It has become popular for analysts to publish these types of analyses on Twitter, as a series of posts. An example of such an analysis is shown in Figure 3.

Probability Theory

Some analyses prefer to resort to probability theory and stochastic models, sometimes also combining aspects of some of the previous tools mentioned, like game theory and agent-based modelling. A good example of this approach is the analysis of Bitcoin's defences against attack vectors [18] and mining pools [19].

3. Case Study: The BankX Audit

Overview

This case study presents the way in which the BankX audit was conducted. While the full audit can be found in the references list [20], this case study will present an overview of the thinking processes governing this audit.

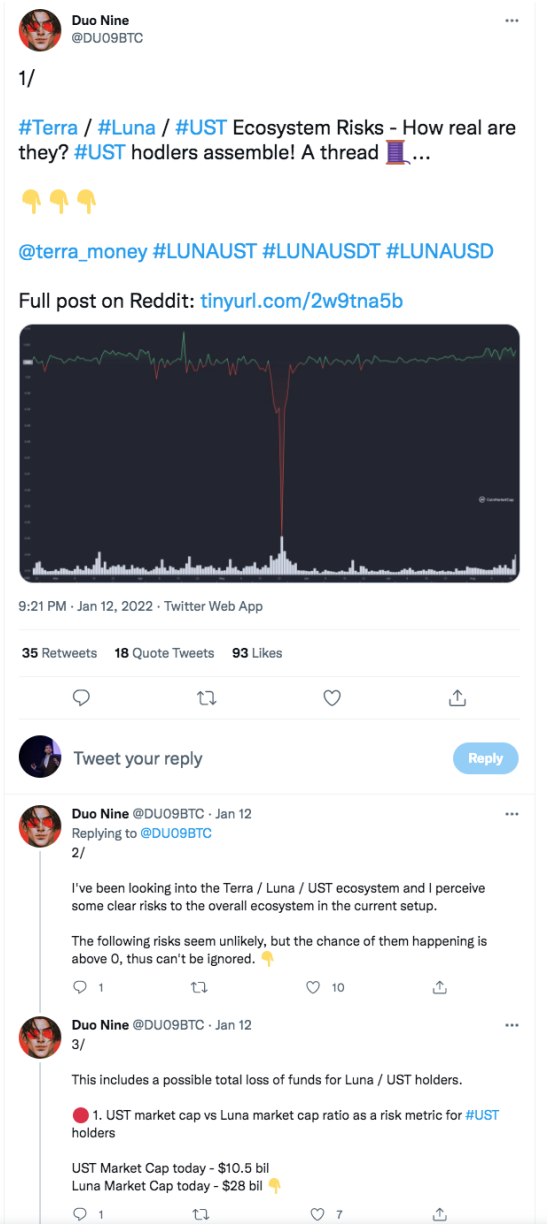

Figure 3. Example of a popular thread discussing a potential scenario was Terra/Luna crashes. Source: [17]

The audit was broken down into a series of steps.

1) Foundation
   a. Define the goals of the system
   b. Define the tools of the analysis
   c. Define the assumptions
2) Analysis
   a. Balance-of-forces analysis
   b. Empirical and data analysis
   c. Game theory analysis
   d. Marginal cases analysis

Foundation

BankX is a stablecoin that has been inspired by elements of two other blockchain projects, Hex [19] and Frax [16], while also adding its own mechanisms. Both Hex and Frax seem to have flourished since their inception (both of them were launched in 2020). At the time of writing, Hex is at position 201 of Coinmarketcap [21] and Frax is at position 204.

The goals of the analysis were tied to the goals of the system in a hierarchical manner, with the most important goals at the beginning. The goals are copied and pasted below from the original audit [22].

Goals of the Analysis

1. The peg doesn't break. This is the number 1 goal of any stablecoin system.
2. The BankX token's price will not crash completely, or spike to unsustainable heights. In other words, the BankX token's price should either be stable, or slowly appreciate over time.
3. The BankX token is a store of wealth.
4. The system is moving towards increased usage of the BankX token as collateral to mint XSD (meaning there is more and more demand for XSD).
5. BankX has autonomous, sustainable liquidity pools.
6. BankX token can achieve the goal of being Always Net Deflationary (A.N.D.).

The audit then proceeds to define the tools of the analysis (presented below, copied and pasted from the audit).
Tools of the Analysis

1. *Empirical proof: If something has been proven to work in other systems, then it is assumed that it can also work for BankX.*
2. *Balance-of-forces analysis: It is assumed that if an action, within the system, applies an inflationary or deflationary force, this can always be balanced against another action/force within the same system. The actual magnitude forces applied depend on the economic levers in the protocol.*
3. *Numerical analysis: When relevant, we will apply numerical techniques and simulations.*
4. *In this analysis, points 3 and 1 refer to the first mechanism discussed in the previous section. The audit also employed game theory, but in a minor role.*

Analyses
Once this foundation is established, the audit then proceeds to describe the various mechanisms and how they interact. The audit also contains a full table of the dynamics at play and describes whether they work in an inflationary or deflationary way.

The audit then proceeds to an analysis of the peg stability of different stablecoins, demonstrating through empirical evidence that Frax, at least at the time of the audit, could perform just as well, or even better, than "traditional" stablecoins, such as USDT and USDC. The similarity of BankX's and Frax's mechanics is, therefore, considered a positive aspect, which provides evidence that the stablecoin can work as expected and maintain its peg.

The audit then goes on to use game theory in order to analyse BankX's bonding curve mechanism, before moving on to the marginal cases analyses. One of the marginal cases includes data from the Terra/Luna crash that took place in 2021 (shown in Figure 4), therefore combining empirical evidence with hypothetical structural analysis.

The analysis tries to unravel whether something similar could take place for the BankX token, and what is the likelihood of such an event occurring. The audit also analyses one more marginal case relating to the interest rate provided by BankX and the collateral ratio, analysing some of the vulnerabilities of the system, and how the system can intervene to prevent a crash.

The audit finally concludes with a summary of all economic incentives provided by the system, shown in Figure 5.

Figure 4. The Terra/Luna crash. Source: [16]

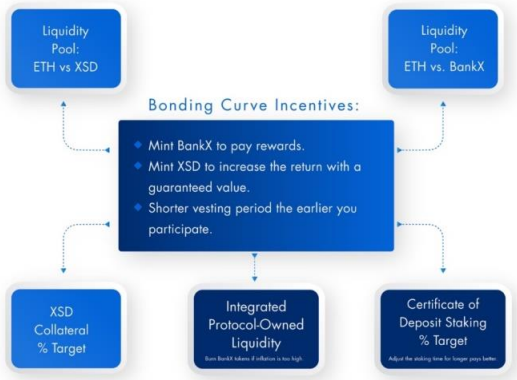

Figure 5. Listing different mechanisms, each one functioning as a deflationary/inflationary dynamic. Source: [23]

4. Conclusion

This paper discussed the different methods and techniques that can be used in order to conduct a tokenomics audit and provided a case study of one such audit.

It is clear that as blockchain adoption grows across multiple industries, tokenomics will play an ever-larger role in this process. Therefore, being able to audit and analyse tokenomic designs objectively, and suggest potential improvements, is a process that is only destined to grow in significance over the next few years.

This is still a new area, and it is likely that many of these methods will adapt and evolve over time, as more audits are published.

The audit presented in this paper was one of the first of its kind. Therefore, some of the methods employed might seem rough, especially from the perspective of traditional econometrics that are more data driven.

Nevertheless, the rapid expansion of blockchain, and methodologies such as agent-based modelling, are going to allow for more complicated audits as new knowledge is built on top of existing knowledge.

Future work should focus on verifying some of the methods used in this paper and extending them. Also, an important research topic for future work is the development of a more concrete framework which can be used to analyse projects end to end. Right now, such a framework is missing.

Perhaps, in the near future, auditing tokenomics will be an integral process of launching a project, much like smart contracts auditing is currently. It is the author's hope that this paper helps achieve this vision.

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The Role of Interdependencies in Blockchain Adoption: The Case of Maritime Trade

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Abstract

Despite its many potential economic and organisational benefits, enterprise blockchain (distributed ledger) technology has still not been widely adopted. From the viewpoint of the participants, the deployment of a blockchain that links collaborating enterprises requires value creation that will exceed investment, including investment in operational and strategic change. The theory behind and practice of cross-enterprise open innovation can inform blockchain adoption. Blockchain implementation requires and creates interdependencies across collaborators, both among enterprise consortium partners and with stakeholders in the broader ecosystem. Distinguished from arm's-length forms of collaboration, interdependencies occur when organisations intentionally collaborate to become reliant upon one another. In this paper, we develop a framework of blockchain interdependencies and explore key factors that promote or inhibit interdependence. We propose a blockchain collaboration continuum with three levels: cooperation, interdependence, and mutualism. We then explore factors that influence the level of interdependence: two types of consortium-level interdependencies – socio-technical and economic, and two types of ecosystem-level interdependencies – standards and legal/regulatory. We illustrate these interdependencies and their payoffs through the example of supply chains in maritime trade. This work can be used as a starting point for diagnosing critical factors influencing adoption and for illuminating points of leverage that may sway hesitant organisations to participate in blockchain consortia.

Keywords: *blockchain adoption, collaborative innovation, consortia, ecosystems, enterprise blockchain, interdependencies, maritime trade, open innovation*

JEL Classifications: *M15, O33, O36*

1. Introduction

Blockchain technology [or distributed ledger technology (DLT)] has been touted for its ability to create commercial value in numerous industrial sectors distinct from its role in enabling cryptocurrencies [1]. Firms recognise that technology-enabled transparency and digital mediation are here to stay and will shape collaborative dynamics well into the future [2]. This reality plays to blockchain's strengths. Nevertheless, blockchain has still not been widely adopted by enterprises [3, 4], which remains a puzzle, and there is a lack of clear evidence of the benefits of its adoption [5].

Research has started to probe what contributes to blockchain adoption, moving beyond questions about compatibility of technology architectures and towards organisational and strategic considerations [6, 7, 8]. We extend this vein of the literature by examining blockchain adoption through the theoretical lens of open innovation [9, 10] coupled with transaction cost economics [11], in the context of organisations jointly pursuing innovation with positive net payoffs. From this perspective of cross-enterprise collaboration, we explore how blockchain adoption relies upon and creates interdependencies among the participants. Long-term value creation from blockchain collaboration relies on interorganisational relationships that escalate in obligation.

In this article, we develop a framework of blockchain interdependencies and explore key factors that promote or inhibit interdependence. We propose a collaboration continuum with three levels: cooperation, interdependence, and mutualism. We then explore factors that influence the level of interdependence: two consortium-level interdependencies – socio-technical and economic, and two ecosystem-level interdependencies – standards and legal/regulatory.

We illustrate blockchain interdependencies and their payoffs through the example of supply chains in maritime trade. Maritime trade includes freight forwarders, large oceangoing carriers, port operators, customs agents, inland carriers, and many other parties. Over 80% of global trade in goods is transported by the maritime industry and transaction flows can link hundreds of organisations [12]. The maritime industry currently deploys a number of blockchain systems, and all of the largest carriers in this oligopolistic industry participate in blockchain consortia [13, 14]. Blockchain technology not only offers a way to track movement and digitise handoffs, but can automate and streamline surrounding processes, creating value as contracts between trading parties are fulfilled.

In the next section, we present the theoretical grounding of our analysis. This is followed by the development of our framework, and then an examination of the four blockchain interdependencies with examples from maritime trade. The subsequent sections discuss our findings, conclusions, and areas of future research.

2. Theoretical Grounding of Blockchain Technology Adoption

Much of the research on blockchain adoption takes the perspective of the individual firm [15, 16], as does relevant maritime trade literature (e.g., [17]). This work typically focuses on pain points or frictions and emphasises efficiencies and cost savings attributable to participation in a blockchain project, while opportunities for innovation are not widely addressed [18].

The open innovation literature can inform an understanding of

opportunities for multi-party innovation. It provides a foundation for considering the gains from two or more firms intentionally cooperating to create new value. Organisations often are members of value chains where individual firms do not possess the resources to operationalise complex value propositions from start to finish [19]. They instead develop relationships and interdependencies with other organisations, forming ecosystems that support innovative projects that combine the contributions of individual firms. Enterprise blockchain adoption can facilitate such innovation, but its success can only be realised with multi-party participation.

Technology-based collaboration across enterprises requires firms to move beyond arm's-length market negotiations through cooperation to interdependence [20, 21]. Interdependent organisations intentionally collaborate and become reliant on one another. Interdependence hinges on "high levels of trust, commitment and information sharing among supply chain partners" [21].

In the case of blockchain, interdependence additionally requires agreement on governance and processes for information sharing, which lead to "industrialized trust" [22, 23]. Industrialised trust, reflecting that economic exchanges among members are verifiable, is established among the organisations participating in a blockchain project. This trust relies on the governance rules that support the decentralisation of transactions and the fidelity, transparency, and immutability of the entries in the distributed ledger. Interdependence based on industrialised trust can lead to co-created value through integrated relationships, where events are contingent on one another [24, 25, 26].

As existing literature demonstrates, the collaboration required for enterprise blockchain deployment typically occurs in a consortium setting and deepens to the point of shared governance [6], allowing participating firms to benefit from interdependencies [21, 27]. In the case of blockchain, interdependencies create value through coordinated action that companies involved in traditional transactional relationships cannot achieve. The rules governing the execution of a blockchain support interfirm data and process integration, which constitute the basis of interdependence in the blockchain setting [27].

Going a level deeper to establish the theoretical grounding for the willing creation of interdependencies, transaction cost economics (TCE) provides justification for boundary-spanning collaboration. TCE considers how people and organisations interact to, in effect, fulfil a contract [11], where interactions are characterised as transactions. In the case of blockchain, participating in a DLT project and recording transactions in a shared ledger reflect collaboration.

The foundational assumptions of TCE are that people operate with bounded rationality and are prone to opportunism [11]. Regarding the former assumption, because blockchain enables the execution of smart contracts, i.e., programmed-in decision rules, it can help reduce limitations to human information processing [2]. Opportunism can be mitigated through smart contracts as well as through automation of transactions and transparency of entries.

TCE distinguishes between the types of costs incurred to engage in a transaction where ex ante costs can include search costs to identify an exchange partner plus the costs of drawing up the agreement, which requires negotiations and the adoption of safeguards as needed [11]. Once the agreement is finalised and the exchange proceeds, if outcomes diverge from expected outcomes, the parties might face haggling and re-contracting costs [11].

Prior to the explosion of the internet in the 1990s, Malone [28] explored hierarchical and market structures and the trade-offs between production and coordination costs related to these structures. Malone and colleagues proposed the electronic market hypothesis (EMH) which argued that information technology would reduce the ex ante and ex post transaction costs, promoting a shift from hierarchies to markets as a means of coordinating economic activity [29, 30]. This hypothesis was later used to explain and propose decentralisation of project teams and transaction networks [31], as well as the decentralisation of decision-making, both within hierarchical organisations and among market participants [32].

Because of its features, blockchain technology helps overcome both ex ante cooperation costs and possible ex post costs once coordination is underway. Hence, blockchain technologies offer a new way to establish trust in an economic exchange [1] and new areas of value creation requiring a new approach to governance [2]. Blockchain has the potential to disrupt existing hierarchies and business models [1] and represents not only technological change but institutional change [33].

3. Progression of Value Creation through Intensity of Collaboration

Blockchain represents a paradigm shift in collaboration; it provides a new way to organise economic activity [33]. Lumineau et al. [2] explore blockchain technology as a new form of organisational governance; they argue that blockchain is among "the most disruptive technological innovations of recent times that may fundamentally change how collaborations are organized" (p.1). In a blockchain setting, increasing levels of interdependence enable engagement in blockchain-based collaborations that have the potential for increasing economic payoffs for participants. As intensity of collaboration and open innovation increases, so does the potential for value creation.

To contextualise how open innovation and the underlying TCE processes give rise to value creation in a blockchain consortium, we consider the payoffs to blockchain adoption in maritime trade. Specifically, organisations that have joined maritime trade consortia have benefited from the digitisation of trade documents, improved information sharing including more precise tracking of containers in the global supply chain, and increased speed of transactions through smart contracts [34]. These benefits have accrued to the participating organisations once they have committed to going beyond arm's length open innovation exchanges to interdependent ones as part of a consortium with their transactions captured in the digital ledger. It is the intensity of collaboration that forms the basis of our blockchain adoption framework as captured in Table 1.

Table 1. The Blockchain Collaboration Continuum

	Cooperation	Interdependence	Mutualism
Technology	3rd Party Provider	Consortium Blockchain	Consortium Blockchain Backbone + Additional Industry 4.0 Technologies
Performance outcomes	Enhanced Speed, efficiency, reliability, transparency, consortium database	Additive Shared governance, consortium goals, automated inter-company processes, shared resources	Multiplicative Shared intellectual property, new products, services, business models

The continuum characterises three types of multi-firm relationships associated with various forms of blockchain collaboration: cooperation, in which firms collaborate to integrate processes and share data; interdependence, in which the success of firms is interconnected; and mutualism, in which participating companies innovate beyond typical blockchain affordances to develop and execute new strategic initiatives. For each of these relationship types, we explain representative blockchain

solutions that support them and the associated performance outcomes. We illustrate the three categories using examples from maritime trade.

Cooperation

Cooperation relationships can be supported by third-party blockchain providers. Participating organisations opt into these systems but do not typically take ownership in ongoing development and governance. These systems are akin to centralised collaborative technologies, but they offer advantages including trust, security, and privacy, which can promote achievement of existing objectives for the collaboration among its participants. These systems are typically implemented to remove transaction inefficiencies, such as reconciliation problems, or to enable multi-party information sharing. The payoffs often take the form of speed and efficiency of transacting, resulting in cost savings for participants, as well as reliability and transparency, which reduce transaction risk among participants. Information stored in the ledger can provide expanded visibility to participants with access, as well as to outside parties such as auditors and regulators.

Prior to adoption of blockchain, the maritime industry had a history of collaboration via centralised service providers. Industry members moved beyond arms-length cooperation by agreeing to follow standards and share data through centrally managed portals such as INTTRA and GT Nexus [35, 36]. Companies collaborated through these centralised portals by sharing location and booking-related data. These systems enhanced value primarily by automating and streamlining existing processes and enabling better planning through data sharing.

Currently in the maritime industry, there are many third-party blockchain solutions for a variety of issues. For example, shipping consortia have adopted technology developed by CargoX that enables participating firms to use the smart bill of lading systems based on the Smart B/L token, which can be used upon receipt of a shipment to demonstrate that it has been paid for [13]. Maritime Blockchain Labs and the Lloyd's Register Foundation's prototype for digital audit trails and due diligence for dangerous goods cargo is another example. This system is designed to reduce serious incidents aboard containerships caused by mis-declared cargo [12].

Interdependence

Interdependence relationships represent a high degree of collaboration and open innovation among participants. Collaborators agree to participate in mutually-beneficial relationships in which they share common goals and work together to achieve them often in a consortium structure. Their activities and outcomes are intertwined such that the success of one party is dependent on the actions of other organisations in the multi-party relationship.

The consortium of participants functions much like an organisation. Participants jointly govern the consortium and commit to a shared set of goals. Governance features of blockchains such as jointly designed and enforced membership, usage, and voting rules lead to interfirm interdependence [37]. Participating organisations share in the design, development, and deployment of these systems along with the ongoing creation and maintenance of shared governance agreements. While small participants and those joining the consortium after its implementation may play a lesser role, participants involved in governance engage in extensive open innovation as they form agreements on the strategic and operational aspects of these systems.

At the interdependence stage, value creation can be considered additive in nature. Participants can create and capture value beyond what could have been achieved through cooperation. Through interdependence relationships, participants may utilise numerous blockchain artefacts that provide new sources of value. Interorganisational processes can be coordinated and streamlined; smart contracts can be developed for the automation of processes and agreements; data generated through traditional and IoT-generated transactions can be mined to identify further opportunities for performance enhancements; and resources and competencies such as advanced know your customer (KYC) capabilities can be shared among participants.

In maritime trade, blockchain-enabled interdependence has been prevalent, resulting in performance benefits for participating firms. In 2020, TradeLens reported processing over 14 million documents involving over 30 million containers linking over 200 organisations in the maritime supply chain, including the majority of container ships worldwide [38]. Other active implementations include initiatives in trade finance and trade insurance [39].

Ancillary value has been created including the establishment of provenance and the elimination of counterfeiting through the enforcement of intellectual property rights via the blockchain, as well as other services like the execution of insurance contracts or the tracking of contaminated food [40].

Mutualism

As literature on interfirm interdependence finds, increasing the intensity of cooperation and open innovation can lead to mutualism. In these relationships, shared strategic direction arises as the partners collaborate on shared intellectual property and create new products, services, and business models. The ability to collaborate in this way is greatly enhanced for firms that have previously interacted through well-established interdependencies. Mutualism is enabled and supported by these relationships and the multi-party blockchain technology backbone.

Mutualism enables multiplicative returns for participants. When firms reach this stage, they work together towards mutual objectives, which may be novel and unique to the group. Innovations build on the resources created and supported through the blockchain system in which they engage [41]. Through their collaboration with each other on the blockchain project, participants develop and hone strategic technology partnering (STP) capabilities that enable them to more effectively organise, innovate, learn, and create value through future technology-based collaborations [42].

The potential for value creation supported by blockchain platforms can be informed by the capabilities achieved through other platform ecosystems such as those provided by Apple, Facebook, Google, and Uber [43, 44]. Along with the data, the network of participants itself can be a source of innovation, and in many situations, the greater the number of participants the more value is created through network effects [14, 45]. For example, participants could create an app for service providers seeking to collaborate with these organisations. Vetting and performance ratings could be shared, providing benefits to participants seeking to collaborate with these vendors in the future. New products that rely on shared systems and historical data could be developed, such as end-to-end products for self- or external party-insurance or financing arrangements. Experience and expertise can be drawn upon as specific needs arise, expanding the capabilities available to participants.

In the maritime space, blockchain-based mutualistic collaborations have been foundational to the development of beneficial innovations and increasingly involve other "Industry 4.0" technologies like artificial intelligence, big data, IoT, and/or machine learning. Green et al. [13] summarise a number of examples, including TradeLens, Blocklab, and BunkerTrace. TradeLens is developing a smart bill of lading technology similar to that provided by CargoX. This technology will be used by consortium participants for automated processing and actionable document flows. Blocklab, a subsidiary of Port of Rotterdam built on its blockchain relationships and experience to launch a green energy innovation that

uses smart contracts to enable high-frequency energy trades, balance supply and demand, and increase clean energy use. BunkerTrace, which uses blockchain technology for digitalisation of fuel trade documents, has built on this system to develop a blockchain innovation for fuel tracking. BunkerTrace uses DNA-based tags that can be added to fuel. The tags enable the fuel to be quickly tested en route to ensure provenance and quality.

4. Identification of Adoption Factors

As we have argued, increasing the intensity of collaboration and open innovation among blockchain consortium participants can result in significant economic and other performance returns. The factors that contribute to blockchain adoption and use not only influence an organisation's adoption but the level of interdependence they can achieve across the blockchain collaboration continuum.

To identify the contributors to blockchain adoption through the lens of interdependence, we began with a systematic analysis of the academic literature. Such an analysis provides transparent and auditable documentation of the researchers' approach to gathering and evaluating evidence. Because academic research can lag behind practice, we supplemented academic findings with factors from grey literature, particularly in international maritime trade, which we use to illustrate and validate the factors.

Our research approach followed the PRISMA-S guidelines [46]. We began with database searches narrowed to relevant literature and then expanded to related academic and trade resources. We searched the Web of Science database of high-impact journals for blockchain AND (adoption OR diffusion) within subject categories of business, management, and operations research. This search resulted in a starting sample of 156 papers, which were reviewed for relevance. We identified 16 papers from this sample and added five additional highly relevant papers that addressed factors beyond individual organisation and technological concerns. Based on the factors in these papers, we identified four areas of interdependency that affect blockchain adoption.

Interdependencies Enabled by Blockchain

Building upon our analysis of the blockchain adoption literature, we grouped the primary interdependencies enabled by blockchain technology into four categories. The first two categories, socio-technical and economic, create value by integrating the actions and objectives of blockchain participants. We refer to these as internal interdependencies. The latter two categories, standards-setting and legal/regulatory, require engagement with additional players. We refer to these as ecosystem interdependencies (Table 2).

Table 2. Blockchain Interdependencies

Internal Interdependencies – among blockchain participants	
Socio-technical	Socio-technical interdependencies include shared language, routines, practices, and mindsets.
Economic	Economic interdependencies include synergies and trade-offs associated with costs, productivity, and market access.
External Interdependencies – with organisations in the ecosystem	
Standards	Standards interdependencies include shared technical and procedural specifications relating to transactions, workflows, and systems.
Legal/regulatory	Legal/regulatory interdependencies include rules and regulatory requirements governing the use of data and information, materials, currencies, practices, and systems.

Internal Interdependencies

Internal interdependencies refer to dependencies among firms that participate or could participate in an enterprise blockchain project. Socio-technical interdependencies include shared language and collaborative technological integration. Economic interdependencies affect the distribution of value creation from the adoption of blockchain across the collaborating parties.

Socio-technical Interdependence

Blockchain can be understood as a social technology that both requires and enables social coordination. While these systems can help to build trust and support open innovation, the manner in which they interact with existing socio-technical systems will influence adoption and effectiveness. Teece et al. [47] suggest that for individual firms, existing routines and practices as well as current endowments of technologies and relationships will affect how a firm adapts to strategic opportunities. Industries, too, have histories, practices, mindsets, and relationships that affect their trajectories. Theories about the diffusion of innovations suggest that adoption of new technology is an iterative process through which ideas affect actions that over time influence social structures. These structures, in turn, affect beliefs and actions [48]. Achieving blockchain objectives requires a cultural willingness to integrate new practices into existing socio-technical systems. Use of an "industrial age methodology and mindset" when evaluating blockchain and other advanced technologies may inhibit adoption [49]. In industries considering blockchain adoption, for example, low levels of digitalisation can create further challenges, particularly when long-established process and practices have functioned smoothly.

By way of illustration, the adoption of blockchain along the maritime supply chain was impeded to some degree by "institutional grind," where some of the supply chain players, particularly the small- and medium-sized firms, were reluctant to either replace these existing systems or integrate blockchain into them [50]. However, other organisations in the industry had already implemented precursors to blockchain-based systems through digital shipping portals like INTTRA and port community systems which enable information exchange between a port and its customers [51]. Adoption of these systems modernised industry practices and laid the foundation for future digitalisation. Participation in pre-blockchain projects also reflected potential participants' willingness to coordinate with other industry players. Collaborating via pre-blockchain systems helped establish multi-party relationships. In addition, leading industry participants gained experience managing such relationships, which could be drawn on as blockchain consortia emerged.

Like other interorganisational systems, blockchain technology holds the potential for enhanced performance through "IT-enabled coordination of interfirm processes" requiring both IT integration and communication across firm boundaries [25]. This interdependence requires shared governance along the supply chain necessitating high-level communication about business objectives and a consensus on how to manage the relationship [25]. Value creation occurs through relational rents derived from the streamlining and improved quality of interfirm linkages that rely on self-enforcement [24].

When Maersk and IBM introduced the TradeLens blockchain, Maersk's direct competitors were hesitant to join [1]. A customer advisory board helped to improve transparency across member firms, facilitate communication and shared governance, and quell concerns of Maersk's dominance [52]. Expansion of TradeLens membership followed [36].

Economic Interdependence

Technology-based innovations can create economic benefits in a variety of ways, including cost savings through efficiency and productivity, revenue increases through market expansion, and innovation of new products and services [53]. Participation in a blockchain consortium establishes or amplifies economic interdependencies among participants. Individual firms

must anticipate a net positive payoff that exceeds switching and integration costs to ensure their willingness to adopt blockchain technology. Resources required for implementation include the appropriate infrastructure and the knowledge to operate and integrate the new technology [54].

By spanning organisational boundaries and facilitating data sharing and aggregation across supply chain partners, blockchain can further enhance the performance of other technologies already deployed, such as RFID and IoT devices, and enterprise systems such as ERP, EDI, and CRM systems [55]. Direct interorganisational transactions enabled by blockchain can reduce transaction costs in ways not possible for tacit transactions [2].

In maritime trade, adoption of blockchain technology has enabled three primary areas of value creation: digitised paperwork including bills of lading and ship registry information; information sharing, ranging from commercial data such as cargo movements to technical data such as engine data; and automated processes focused on the execution of smart contracts when shipping terms are fulfilled [56]. Blockchain facilitates the integration of "granular information" and "exceptions related to physical flows" to allow supply chain partners to more effectively manage their interdependencies [25, 57]. Additional payoffs include streamlined connections among supply chain partners.

Numerous intermediaries are involved in arranging shipments in maritime trade, including freight forwarders, carriers, and brokers who link the supplier, the "shipper," with the buyer, the "consignee." Some of these intermediaries may be eliminated in the future by smart contracts enabled by blockchain, which has contributed to the hesitation of some firms to participate in the emerging consortia. For the surviving supply chain players, this will improve their return by decreasing: search costs, fees charged by intermediaries, errors and time associated with paper document exchange, and fraud and settlement transaction times [58]. Digitalisation has allowed carriers to start directly offering capacity to shippers [59]. Taking these changes into consideration, disruption and reconfiguration of existing relationships along the supply chain could be considered a countervailing cost to blockchain implementation.

Across case studies of firms in maritime trade contemplating replacement of existing digital shipping portals with blockchain technology, participants viewed confidentiality of information to be paramount in choosing interorganisational information systems [35]. In the case of TradeLens, the blockchain architecture based on Hyperledger Fabric allows information to be walled off into "channels" so only specified participants can view the information [36]. Hyperledger Fabric is open source, which provides assurance that the software will continue to improve due to a committed community of developers and that the source code of current and future versions will be transparent.

Ecosystem Interdependencies

An ecosystem can be described as a network of economically connected organisations that may span the boundaries of multiple industries [60]. Ecosystems emerge for a variety of purposes. They enable interdependent organisations to coordinate without hierarchical decision-making authority. Ecosystems support multilateral dependencies based on the unique resources and capabilities of participants [43].

Adoption of blockchain technology affects and is affected by the broader ecosystem within which the consortium operates. Blockchain workflows require coordination in areas such as terminology, codes, transaction features, processes, and timing. While some industries and ecosystem have well-established standards and regulations in place, it is more common for them to be lacking or inconsistent. This is particularly problematic when consortium partners operate in multiple jurisdictions or across industry lines. Thus, the consortium and its ecosystem stakeholders have interdependent relationships regarding standards, laws, and regulations.

Standards Interdependence

Standards are technical specifications that enable consistency across processes, products, and systems. Open standards can be characterised as public goods that all of the players in the industry can use at the same time without diminishing their usefulness for any one player, whether or not they contributed to the development of the standards [61, 62].

Effective deployment of blockchain technology may require broad agreements on workflows and sequencing or small agreements about the timing, identification, or contents of specific transactions. Standards and standardisation thus play a key role in blockchain adoption to facilitate these agreements [63]. To help spur technology adoption, the creation of standards has become prevalent in high tech sectors through interfirm cooperation and the participation of international standard-setting organisations [61, 62, 64, 65, 66, 67].

For standards interdependence in maritime trade, a fundamental requirement is shared terminology. This is challenging due to the cross-border nature of trade involving multiple governmental jurisdictions [40]. The United Nations has created a library of core components of the semantics of trade information from which reference data models facilitate the exchange of business data [68]. The International Organization for Standardization (ISO) and the International Chamber of Commerce (ICC) have also been active in digital trade standards [40].

The Digital Container Shipping Association (DCSA), which counts nine of the ten largest ocean carriers among its members [69] initiated implementation of Track & Trace standards to provide a common data model and standards for interfaces and API definitions to create a common understanding of the process flow [70]. Additional standards are emerging in a coordinated fashion. For example, DCSA members are pursuing Just-In-Time port call standards consistent with the work of the International Maritime Organization (IMO), and cybersecurity standards in keeping with an IMO resolution [71, 72].

Legal/Regulatory Interdependence

Similar to standards, collaboration with legal and regulatory authorities in the broader ecosystem is critical for blockchain adoption. Adoption of blockchain requires clarification of the legal status of blockchain transactions and the manner in which data can be gathered, stored, and used. Variation in laws across jurisdictions can impede blockchain adoption [3]. Governments and trade organisations around the world are working on legislation governing blockchain trade and finance, but rules can be inconsistent and do not yet exist in many domains. Consortium participants, regulators, agencies, and others have interdependent interests and responsibilities that will affect whether and how blockchain is implemented.

Maritime trade provides a rich example of this type of interdependence. Extensive rules and regulations governing international trade have been developed over centuries, and are difficult to change. Since 2010, the European Union has sought to harmonise the electronic reporting of import and export documents and customs clearance [73]. This intensive process will inform the multilateral efforts to deploy blockchain technology including "legal certainty and establishment of interoperability standards" [58]. Blockchain holds promise as the vehicle by which to implement single windows across the 164 signatories of the 2017 Trade Facilitation Agreement [74]. UNCITRAL's MLETR digital/physical document equivalency project will contribute to global harmonisation [75].

Collaboration can also cause legal problems, however. If close collaboration is viewed as constricting downstream competition, antitrust regulations may come into play. Blockchain consortia in the maritime industry that wish to operate in the US must secure antitrust exemption by filing a cooperative working agreement with the Federal Maritime Commission

[76]. This type of agreement forbids sharing vessel capacity and customer-sensitive information including terms and conditions and rates charged. However, it allows collaboration on information/data exchange including documents and events along the supply chain. Further, it can support mutualism among participants by allowing derivation of products and services from this information/data and the marketing of these products and services [77].

5. Conclusion

Building on theory and research, we identify and explicate key points of leverage affecting blockchain adoption as firms move across the collaboration continuum towards mutualism. These insights can be used by individual firms, consortia, and other ecosystem stakeholders to better understand the forces affecting adoption from within and outside of the consortium and to identify issues that promote adoption and those that inhibit it. These inhibiting factors can slow or halt adoption even in the context of clear net positive value creation for the consortium and its stakeholders. A better understanding of the interdependencies required for and created by blockchain-related relationships can influence both the short-term and long-term viability of blockchain solutions.

Our exploration of integration strategies and actions in the maritime trade industry demonstrates how interdependencies have contributed to adoption and have resulted in net value creation. From a socio-technical perspective, industry participants have been collaborating on supply chain efficiency projects for decades, and this history of collaboration provides the foundation for the higher level of integration required for interdependence and mutualism. Economically, these organisations are highly interdependent, as reflected by the container shortages during the COVID pandemic. Standards organisations and initiatives in maritime trade have long been active, and modernisation efforts for digitalisation are progressing rapidly due to the players in the maritime industry as well as in global trade organisations. Legal and regulatory frameworks associated with electronic documents, electronic payments, cybersecurity, and the storage of private information are being developed, and global framework templates are being shared [40].

Previous research focuses in large part on technological barriers to the adoption of blockchain and takes the perspective of the individual firm, particularly at the point of decision-making around adoption. In this article, we shifted focus to a multi-firm perspective and non-technological barriers for two reasons. First, individual firms do not make adoption decisions in a vacuum, and successful enterprise blockchain solutions require buy-in and participation from multiple firms. Second, technological barriers are well-covered in the business, computer science, and other literatures [78], and technological innovations are moving rapidly to solve critical problems such as integration, scalability, and interoperability [79]. It has been frequently stated that blockchain is a team sport. The literature on open innovation and interorganisational information systems provides a theoretical foundation from which to understand blockchain adoption from a value-creation perspective. Building on this theoretical foundation and the extant body of research on blockchain adoption and diffusion drivers, we have developed our framework of organisational interdependencies.

Lumineau et al. [2] argue, "Organization scholars may run the risk of underappreciating the vast social implications of this important empirical phenomenon [of blockchain adoption] …" (p.1). We contribute to this understanding in three primary ways. First, we combine existing theories and re-cast them from the lens of interdependent organisational relationships in a blockchain context. Prior research has identified how the resulting interdependence lends support to the electronic market hypothesis [22], whereby advances in information technology have been expected to revolutionise the structure of industrial activity [28, 29, 30]. It has taken the features of blockchain to create a new industrial structure, the so-called "V-form organisation," whereby blockchain consortium governance enables independent firms to, in effect, behave like a vertically integrated firm through the coordination of their transactions along the value chain through a distributed ledger [1, 80]. Second, we provide actionable insights that can help illuminate adoption costs and benefits, enabling ecosystem participants, as well as solution providers and consultants, to identify where change is needed and where pressure can be applied to increase adoption. Third, we demonstrate the application of a framework of interdependence in the context of the maritime trade ecosystem, drawing on existing studies that illustrate the interorganisational requirements to make blockchain deployment successful.

The need for future research on adoption and its potential benefits is great. Viewing adoption through the lens of interdependence provides new insights into adoption and its net benefits. Additional research on successful movement along the collaboration continuum and, in particular, on how mutualism can and has been achieved will provide important future contributions towards realising the full potential of enterprise blockchain

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How Many Public Corporations Recognise "Token Economy" Technologies as Materially Significant? Evidence from 10-K Reports

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Abstract

The token economy promises to enable entirely new business models that will likely disrupt many market leaders. The seeds for disruption are already upon us, powered by technical innovations such as blockchains, fungible tokens, non-fungible tokens, metaverses, and decentralised autonomous organisations. How seriously are corporations taking these emerging token economy technologies? How many corporations envision these technologies to be materially significant to their business today? We answered these questions for United States (US) corporations by analysing the five most recent annual 10-K reports, a report required by the US Securities and Exchange Commission (SEC). Of the 39,522 10-K reports examined, only five percent of corporations recognise token economy technologies as materially significant. We focus upon the top 21 corporations with the most mentions of these technologies and discuss the results through the lens of the Theory of Disruptive Innovation.

Keywords: *enterprise blockchain, cryptocurrency, virtual worlds, metaverse, non-fungible tokens (NFTs), stable coin, decentralised autonomous organisation (DAO), Web 3.0, token economy*

JEL Classifications: *G10, G20, G30*

1. Introduction

The "token economy" is a term used to describe new economic models made possible by tokenised digital assets. Bitcoin, launched in 2009, was the bellwether application. Satoshi Nakamoto wanted to eliminate the need for financial intermediaries to validate transactions, but Nakamoto still needed somebody trustworthy to perform the validation functions. Nakamoto's brilliant solution was to incentivise an anonymous community to validate and secure peer-to-peer transactions by paying the validators with new digital tokens called "bitcoins" [1].

Thirteen years later, we find a Cambrian explosion of tokenised assets, including over 20,000 fungible tokens, serving a variety of functions, including stable coins, which peg digital tokens to assets like sovereign currencies, barrels of oil, and ounces of gold [2]. We also have millions of non-fungible tokens (NFTs) – a unique digital token that represents a particular asset in the physical or virtual world. While we must be careful to separate technical functionality of an NFT (control over an NFT by possessing the private key) from legal ownership as defined by law and which varies by jurisdiction, NFTs allow new economic models of digital commerce like fractionalised ownership and peer-to-peer sales.

In addition to fungible and non-fungible tokens, other foundational technologies for the token economy include blockchains to immutably record transactions and decentralised autonomous organisations (DAOs) to provide new ways to organise and govern economic activities. Token economy transactions will increasingly happen in metaverses, where our digital avatars interact in persistent virtual worlds for work, play, and commerce. These technologies are sometimes bundled as "Web 3.0" – a term used to describe the next version of the Internet where users own and monetise their own data and digital assets, exchange value peer-to-peer without relying on trusted third parties, and control their identities and credentials in digital wallets – but Web 2.0 ecosystems (with a centralised platform provider) will also leverage the token economy. Although it's still the early days, the disruption to existing business models is inevitable [3].

2. Methodology

How seriously are United States (US) corporations taking these emerging technologies? How many corporations envision these technologies to be materially significant to their business today? One place to find the answers to these questions is Form 10-K, a report the US Securities and Exchange Commission (SEC) requires corporations to file annually. Some of the information a company is required to disclose in the 10-K includes details on the nature of its business, risk factors, financial data, organisational structure, subsidiaries, and management's discussion and analysis about the financial and operational results. Because it is regulated by the SEC, audited by an independent auditor, and scrutinised by analysts and institutional investors, the 10-K is considered a credible report and source of information [4]. Given its inherent credibility compared to, say, a press release or social media post, as well as the focus of these reports on current shareholders and future investors, we examine corporations' propensity to discuss blockchains, cryptocurrencies, metaverses, and other token economy technologies in their 10-K reports to assess the degree of investments and/or recognised risks of these technologies [5].

We used the SEC's Edgar database to extract the five most recent 10-K and associated 10-K/A (amendment) reports that mentioned the terms "blockchain," "cryptocurrency," "virtual worlds/metaverse," "NFT," "stable coin," "DAO," and "Web 3.0." The five most recent reports for each corporation spanned the time period from June 16, 2017 to June 15, 2022. We counted the number of corporations that mention each keyword, tallied the number of times a corporation used them, and analysed the results for the corporations that most frequently mentioned them.

3. Results

We adopt a data-driven exploratory approach with the goal of identifying emergent token economy trends among US corporations. We share four insights from our analysis:

3.1. In formal 10-K disclosure reports, 95% of corporations didn't reveal any efforts associated with these technologies and did not yet recognise relevant material threats to their business

Of the 39,522 10-K reports in the database spanning the five most recent filings, only 1,940 10-K reports – representing about five percent – mentioned one or more of these technologies. If they are pursuing any of these technologies, they are not reporting on them because they have yet to materially impact their businesses, risk factors, and/or financial and operational results.

3.2. For the five percent of corporations that invest in or recognise the risks of token economy technologies, blockchains, and cryptocurrencies are more materially significant than other token economy technologies

Among the 10-K reports:

- **Blockchain** was mentioned 14,405 times by 645 corporations
- **Cryptocurrency** was mentioned 9,778 times by 333 corporations
- **Virtual world/Metaverse** was mentioned 331 times by 77 corporations
- **NFT** was mentioned 519 times by 55 corporations
- **Stable coin** was mentioned 51 times by eight corporations
- **Web 3.0** was mentioned 21 times by eight corporations
- **Decentralised autonomous organisation (DAO)** was mentioned five times by three corporations

On the one hand, it's not surprising that blockchains and cryptocurrencies have more mentions by more corporations because they have been around longer than NFTs, stable coins, and DAOs. On the other hand, virtual worlds/metaverses predate blockchains and cryptocurrencies; most notably with Linden Lab's launch of Second Life in 2003, but the combined terms of virtual world/metaverse was only found in 91 reports across 77 corporations.

3.3. The material significance of the technologies increased over time

Figure 1 shows the breakdown by year. Except for the dip in the number of corporations mentioning cryptocurrency in 2020, all seven technologies are becoming more materially significant. What's even more compelling is that many corporations have yet to file 10-K reports in 2022, so 2022 counts are likely under-reported.

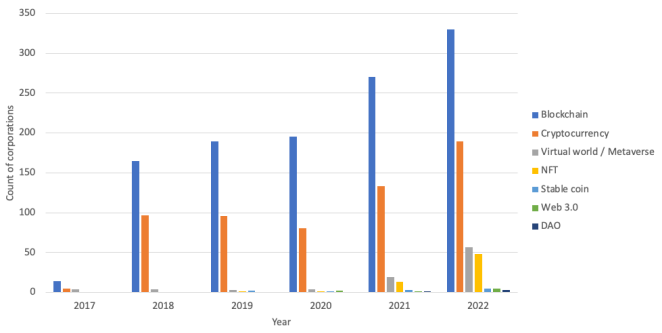

Figure 1. Number of corporations that mentioned a keyword at least once in a 10-K report

3.4. Meet the top 21 corporations that find token economy technologies to be materially significant

Figure 2 lists the top three corporations that mentioned each of the seven keywords most frequently, resulting in 21 distinct corporations. We also wanted to see if there was a pattern among the corporations: Are they outperforming the pack? Are they primarily newer or older corporations? Which industries dominate? We analysed revenues, profits, market capitalisation, Standard Industrial Classification (SIC) code, and age of firm. We only found two patterns. First, corporations in the services sector dominate the list, including business services, prepackaged software services, and computer processing services. Retail is the next most common sector among these 21, including catalog and mail-order houses, computer software, and retail stores. Second, the most consistent financial story was one of recent financial losses: 18 reported financial losses during their most recent 10-K reporting period. Most corporations attributed the losses to impacts of COVID-19, not to the failure of these technologies.

Among the three corporations that did not suffer recent financial losses, two are trusts that do not report revenues or profits. The other exception was Overstock.com; it reported positive earnings on its 2021 gross revenues of $2.8 billion. The biggest move it made related to these technologies was a divestment. Overstock.com divested from Medici Ventures and its blockchain assets: "after six years of committed effort to advance blockchain technology, Overstock has determined that the Medici Ventures businesses will be better served under the management of Pelion, a professional asset manager with technology expertise in early-stage companies."

4. Discussion

Overall, our analysis of 10-K reports suggests that most public corporations are moving more slowly to the token economy than suggested by media coverage or do not yet recognise the impact the token economy will have on their business. The nascent and evolving legislative and regulatory infrastructure around the token economy complicates adoption of these technologies and recognition of material impacts [6]. This makes us ask: Will incumbents be ready for the disruption caused by the token economy? Current market leaders may dismiss the companies in Figure 2 as non-threatening due to current financial losses, but they could benefit from a history lesson.

Remember Blockbuster? Founded in 1985 in Dallas, Texas, its business model was based on retail brick-and-mortar stores that rented videos to customers. Netflix was founded in 1997, a year when Blockbuster earned $3.54 billion in revenues. The next year, Netflix lost $11 million while Blockbuster continued to grow – tiny Netflix hardly seemed a threat to Blockbuster. Initially, Netflix mailed videos stored on physical devices to customers. When the Internet advanced enough to transmit large digital files, Netflix easily pivoted from mail delivery to digital streaming services, whereas Blockbuster could not. Blockbuster was too encumbered by its retail model, and it went bankrupt in 2010 [7].

Why don't market leaders see disruption coming? The late great business theoretician Professor Clayton Christensen sought to answer this question. Beginning with his first book on the subject, the *Innovator's Dilemma* [8], Christensen noted that market leaders spend most of their resources pursuing sustaining innovations, i.e., those innovations that incrementally improve products and services within existing markets. He defined **disruptive innovation** as a *process* by which a new entrant creates a new market that eventually disrupts an existing market, thereby displacing the market leaders. New entrants have little to lose, are less risk-averse, and are unconstrained by legacy investments and bureaucracy. Because market leaders cannot monitor every possible source of disruption (most ideas fail anyway), it's often too late to pivot when a real threat emerges [9].

Keyword	Top Three Corporations by Frequency of Keyword Mentioned (2017–2022)	# of Mentions	Standard Industrial Classification Code
Blockchain	BTCS (BTCS)	689	**7372** SERVICES-PREPACKAGED SOFTWARE
	Overstock.com (OSTK)	515	**5961** RETAIL-CATALOG & MAIL-ORDER HOUSES
	Future FinTech Group Inc. (FTFT)	481	**7389** SERVICES-BUSINESS SERVICES, NEC
Cryptocurrency	Riot Blockchain (RIOT)	842	**7374** SERVICES-COMPUTER PROCESSING & DATA PREPARATION
	BitNile Holdings, Inc. (NILE)	701	**3679** ELECTRONIC COMPONENTS, NEC
	Red Cat Holdings, Inc. (RCAT)	388	**7372** SERVICES-PREPACKAGED SOFTWARE
Virtual world/metaverse	Super League Gaming, Inc. (SLGG)	57	**7900** SERVICES-AMUSEMENT & RECREATION SERVICES
	Esports Entertainment Group, INC. (GMBL, GMBLW)	31	**7900** SERVICES-AMUSEMENT & RECREATION SERVICES
	Worlds, Inc. (WDDD)	26	**7372** SERVICES-PREPACKAGED SOFTWARE
NFT	Takung Art Co. (TKAT)	105	**5990** RETAIL-RETAIL STORES, NEC
	1stdibs.com (DIBS)	51	**5961** RETAIL-CATALOG & MAIL-ORDER HOUSES
	Vinco Ventures (BBIG)	42	**3944** GAMES, TOYS & CHILDREN'S VEHICLES
Stable coin	Innovative Payment Solutions (IPSI)	27	**5961** RETAIL-CATALOG & MAIL-ORDER HOUSES
	Coro Global Inc (CGLO)	8	**7372** SERVICES-PREPACKAGED SOFTWARE
	CurrencyWorks (CWRK)	6	**7389** SERVICES-BUSINESS SERVICES, NEC
Web 3.0	Troika Media Group (TRKA, TRKAW)	6	**4841** CABLE & OTHER PAY TELEVISION SERVICES
	MCX Technologies (MCCX)	4	**7372** SERVICES-PREPACKAGED SOFTWARE
	GameStop Corp. (GME)	3	**5734** RETAIL-COMPUTER & COMPUTER SOFTWARE STORES
DAO	Core Scientific (CORZ, CORZW)	2	**7374** SERVICES-COMPUTER PROCESSING & DATA PREPARATION
	Grayscale Ethereum Trust (ETH) (ETHE)	2	**6199** FINANCE SERVICES
	Grayscale Ethereum Classic Trust (ETC) (ETCG)	1	**6221** COMMODITY CONTRACTS BROKERS & DEALERS

Figure 2: Corporations that most frequently mentioned a keyword

5. Conclusion

We assert that token economy technologies are a real threat to current business models that generate revenues by serving as a trusted third party. Bitcoin proves we can validate transactions without them, and it is only the beginning. Beyond peer-to-peer payments, the token economy will affect every industry, so it's time for corporations to take it seriously.

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NFT of NFT: Is Our Imagination the Only Limitation of the Metaverse?

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Token economy and Web 3.0 have caught the attention of financial and investment institutions worldwide. Temasek, one of Singapore's major sovereign wealth funds, led a $200 million investment in Amber Group – a firm that provides liquidity and market-making services to clients throughout Asia (Lee, 2022). It has also teamed up with the Chinese tech giant Tencent and metaverse investment agency Animoca Brands to invest $200 million in Immutable, an Australian non-fungible token (NFT) start-up (Lim, 2022). As one of the world's key token economy hubs, the Singapore government and regulators adopt an encouraging, open, and inclusive approach towards innovative business models harnessing cutting-edge technology.

"Metaverse" was first mentioned in Neal Stephenson's 1992 science fiction novel Snow Crash. In that context, the metaverse is a virtual reality-based successor to the internet, where humans use digital avatars to explore the online world. Matthew Ball (2021) defined metaverse as a "massively scaled and interoperable network of real-time rendered 3D virtual worlds which can be experienced synchronously and persistently by an effectively unlimited number of users with an individual sense of presence, and with continuity of data, such as identity history entitlements, objects, communications, and payments."

The metaverse is persistent, live, and synchronous in the time dimension. The metaverse's time and interactions do not pause for a user after it powers off the device it uses to connect to the metaverse. Interactions between users happen in real time, and the experience is consistent for all users within a specific metaverse space. In the space dimension, the metaverse consists of virtual spaces. Metaverse users (or inhabitants) are represented in the form of digital avatars. Businesses can create a metaverse version of their physical stores (or simply a virtual space that exists only in the metaverse). Such spaces may expand themselves to accommodate more digital avatars as and when needed.

The metaverse concept means that we can simultaneously exist in one or more parallel worlds (or universes). Our cloned selves, i.e., digital avatars, can live in the metaverse, and we can switch seamlessly in and out between the virtual and the real worlds. Therefore, the "metaverse" is meta (transcendence) + verse (universe). It may be a kind of universe that transcends reality, virtual reality, and the two realms of virtual and real.

Milgram and Kishino defined "mixed reality" as an environment that blends real and virtual objects (Skarbez, Smith, & Whitton, 2021). While augmented reality is where we augment the real world with virtual content, augmented virtuality is where real-world content is in or made aware in a virtual world. Kevin Kelly, the founding editor-in-chief of Wired magazine, put forward an idea of a "mirror world" by expounding on mixed reality (CoinYuppie, 2022). In Kelly's notion of a mirror world, users wear glasses to see the superimposed real world with a virtual world composed of digital assets. Instead of experiencing a virtual space using our digital avatars, we can envision that the virtual space is also the physical space. Whatever happens in the virtual space is mirrored in the physical space and vice versa.

Therefore, the metaverse is not a simple fusion of technologies such as virtual reality, augmented reality, and extended reality. Instead, there will be "mirrored" virtual reality, i.e., real virtuality, augmented virtuality, extended virtuality, and various combinations which enable more novel applications.

If the metaverse does not integrate the virtual and the real worlds and if it does not realise decentralisation, it is no more than just a game infused with real-life elements or simply a contextualised game. On the other hand, a "distributed metaverse" that removes boundaries between the virtual and the real worlds, governed by a decentralised autonomous organisation (DAO), will see a paradigm shift in human–computer interaction (HCI).

Human–Computer Interaction

In the early 1900s, programmers would use punch cards (also known as Hollerith cards or IBM cards) to feed instructions, i.e., programs, into early computers (Computer Hope, 2021). Computer data and instructions were punched by hand or machine into holes and fed into a card reader. The card reader would convert the sequence of holes to digital information. Troubleshooting is exceptionally tedious if anything goes inadvertently wrong. Subsequently, the introduction of the disk operating system (DOS) and the Microsoft DOS systems significantly improved human–computer interaction (HCI) efficiency as they allowed humans to interact with the machines through typed instructions. The emergence of the graphical user interface (GUI) fundamentally changed how humans interact with computers. GUI translates complex (and low-level) computer language into visualisations. As Google's Clay Bavor (2017) pointed out, every time we removed a layer of abstraction between humans and machines, the machines became more broadly accessible, useful, and valuable to us. Now, HCI is no longer a specialised field that relies on large organisations that can afford high computation power; the technology has scaled and become practical and widely accessible on consumer computing devices (Frank, 2022). In other words, large-scale HCI is now becoming a reality.

The fusion of big data, artificial intelligence, virtual reality, cryptography, distributed technology, and other emerging technologies enables eight essential elements in the metaverse – identity, friends, incentive system, ownership, culture, diversification, immersive experience, and economic transaction system. Coupled with immersive HCI technology, we can lead an attractive on-chain lifestyle with an unprecedentedly rich interactive experience in the metaverse.

In fact, such an HCI interface blurs the boundary between "virtual" and "real." Research and development in brain neuroscience brings a possible realisation of the brain–computer interaction. This realisation further blurs the boundary between the "living" and the "non-living." Now, machines can perceive human thinking and "respond" accordingly. New value

systems and new forms of collaboration will gradually emerge. We may need to redefine humans as biological beings and challenge or subvert many traditional cognitions and viewpoints in such an instance.

Ownership Rights

"Property rights are human rights" is an idea brought forward by the former British Prime Minister William Pitt in a March 1763 speech. While the idea was progressive and advanced in the early days of the capitalist revolution, it may become irrelevant in the future. As the metaverse integrates both the virtual and the real worlds in a live and synchronous manner, it requires and generates a massive amount of data. Therefore, the metaverse is only sustainable when decentralised and based primarily on user-generated content. Every inhabitant in the metaverse is a user and the creator. In other words, we are going into the realm of a "distributed metaverse." A metaverse token economy is therefore vital to incentivise creation (or co-creation), promote inclusiveness, and encourage community effort to contribute to the metaverse economy sustainably.

It is thus an opportune time to look at ownership from a broader perspective – that is, to ensure that every user in the metaverse owns equal usage and creation rights in the metaverse. Private property in the metaverse should be subordinate to the common usage right and subject to the idea that it is created for everyone in the metaverse. By ensuring the self-sovereignty of a user's data, we safeguard the permanence of metaverse assets and the interest, sustainability, and stability of the metaverse community. A metaverse without the altruistic spirit is not a true, perfect, and secure metaverse.

However, we are now experiencing the Matthew effect, where the rich get richer, and the poor get poorer. The floor price of Bored Ape is as high as 110 ethers, which is an unattainable reach for the majority of players in the metaverse. On March 17th, Yuga Lab (the parent company of BAYC) airdropped ApeCoin, the governance token for their metaverse plan, to holders of Bored Ape NFTs with an equivalent value of about 35 ethers. This wealth-making effect is a manifestation of the active market. It begs the question of whether the metaverse is an equal, just, and a shared world, or is it a winner-takes-all society?

The metaverse must not become centralised. It must avoid oligopoly, ensure a fair distribution and ownership of digital items (e.g., assets), and incentivise participation to use and create in the metaverse. How could we achieve this goal while providing reasonable ownership protection to guard the interest of the metaverse inhabitants?

To this end, the non-fungible tokens (NFTs) provide us with the opportunity to design a new value system. One of the more popular methods now is for high-value NFT owners to lock their NFTs in smart contracts. The owners then issue ERC20 tokens representing the NFT shares to improve the liquidity of NFTs and lower the barrier of entry for ordinary users to participate. This approach is innovative. However, it ignores a critical property of NFTs – ownership determination.

In the above approach, the ERC20 tokens represent the governance rights of the NFT; the ownership remains with the NFT holder who issued the NFT.

In response to this phenomenon, we innovatively put forward the idea of "NFT-ing the NFT." A standard on "divisible NFTs" will allow hundreds of millions of future metaverse inhabitants to share ownership and collectively be the user and creator of metaverse items.

The first idea of "NFT-ing the NFT" is to NFT non-fungible tokens with a single, consistent representation. These NFTs include music, movies, virtual real estate, club membership, and so on. For example, a song's NFT can be divided into 25 NFTs, allowing 25 buyers to own the piece jointly. For an NFT representing virtual real estate, separating a 100 sqm NFT land into ten 10 sqm of NFT lands enables more residents to own a piece of land. It promotes land transfers, which are conducive to the overall metaverse economy.

Another example would be club membership. If a country club offers access to swimming pools and golf courses with a minimum service threshold and one is only interested in swimming, it is possible to buy the club's NFT with another resident interested in golf. Such ability to "aggregate demand" benefits consumers and fuels the overall economy.

The second idea of "NFT-ing the NFTs" is to NFT the unique non-fungible tokens. Popular and unique metaverse characters such as Doodles, Azuki, and Clone X are pre-designed by the designers. If we can further create divisible NFTs from these NFTs (e.g., dividing the various parts of the characters into unique NFTs), players can freely compose and combine different parts of these NFTs to create their own NFTs. This possibility makes the metaverse more interactive and playable. Dividing the NFTs effectively distributes the creator's control across the metaverse inhabitants. It decentralises ownership rights while incentivising all users to participate, create, and own their creations. This bottom-up gameplay allows users to enjoy the metaverse at an affordable price. The composability will be welcomed by the market. In return, it will bring awareness to the true usage and development of NFTs. Such awareness drives further creation of new NFTs, which further invite community contribution, fuelling the ecosystem to be self-sustainable.

Governance

A distributed metaverse must have a sound governance structure that takes care of its user's interests to ensure stability, security, and sustainability of the metaverse economy. The governance should be baked into the system, transparent, and based on the community's collective decision. The decentralised autonomous organisation (DAO) is an on-chain governance structure based on community consensus. It is exclusively online and operates based on smart contracts on the blockchain. The DAO allows members to work together to achieve a joint mission without trusting each other; the rules are coded in a smart contract. Whether it is on a change to the DAO's mission, governance rules, or the token economy model, decisions are made based on community consensus.

Conclusion

Metaverse is not a new concept. In the 1990s, Sainsbury's had a shopping demo using virtual reality. However, the metaverse is a parallel virtual world that is persistent, live, and synchronous. While virtual reality, augmented reality, or mixed reality is essential, open blockchains that enable secure and verifiable NFT transaction settlement will fuel the metaverse economy. The technology will motivate users to co-create and facilitate verifiable ownership of their digital assets. On another note, virtual reality adoption is low. In 2020, global virtual and augmented reality headset shipments were at 5.5 million units, and the main factor hindering adoption is content offerings, followed by user experience (Gilbert). We may see exponential growth in adoption only with advances in more immersive human–computer interaction experience (or even brain–computer interaction). Overcoming the barrier means having a truly distributed, decentralised, and inclusive metaverse. However, ethics, governance, and ways to incentivise peer creations are the keys to sustainable social scalability. It is thus essential to have a sound decentralised governance structure such as the DAO and an effective token economy model that distributes ownership control and encourages user-generated content in the metaverse.

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COMMENTARY

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A Distributed Ledger Technology Roadmap for Albania: Some Preliminary Reflections

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Abstract

Albania is a small country of the West Balkans situated in Southeast Europe still in the early stages of distributed ledger technology (DLT) adoption. In this research note, we begin to investigate the cryptocurrency regulatory framework and propose a national blockchain roadmap for the country. Albania was one of the first European nations to elaborate a cryptocurrency regulatory framework aimed at safeguarding users from the dangers of fraud and imposing sanctions in situations of misuse. Our proposed national blockchain roadmap includes emerging priorities such as licensed entities, digital divide reduction, remittances digitisation, Ethereum 2.0, blockchain FDI, e-voting, and the quadruple helix system.

Keywords: *Distributed ledger technology, Albania, regulatory framework, national roadmap*

JEL Classifications: *O14, O31, O33, O38, P27*

1. Introduction

The Republic of Albania is a small country populated by 2.845 million inhabitants (in 2020 [1]) situated in the West Balkans. Seldom featured in the global payment innovation headlines, let alone in the distributed ledger technology (DLT) landscape, the time is ripe, however, for the publication of pathbreaking research tackling the untapped technological potential of one of the fastest growing emerging economies in South-Eastern Europe that has since June 2014 been an official candidate for accession to the European Union.

Challenges posed by unlocking opportunities for socio-economic development are numerous and significant as around 60% of the adult population remain excluded from the traditional banking sector [2] with a corollary, the persistent heavy reliance on cash. In a joint survey titled "The Retail Payment Costs and Savings in Albania", conducted by the Bank of Albania and the World Bank [3], it was found that cash, as the most used payment instrument, is also the most expensive, costing around 1.7% of the Gross Domestic Product on a yearly basis [4].

In this research note, we investigate the Albanian regulatory framework in Section 2, and we sketch out the bullet points of a novel DLT national roadmap for Albania in Section 3. Finally, we conclude in Section 4.

2. The Albanian regulatory framework

The Law "On Securities" No. 9879 and by-laws issued on 21 February 2008 by the Financial Supervisory Authority (FSA) recognises only two types of money-making instruments for funding purposes, namely bonds and shares, issued either through private offering or IPO, and necessitating the submission of a document called "Prospectus", whereby investment risks are disclosed. It follows that the Albanian legal framework does not contain provisions for International Coin Offerings [5]. Yet Albania was one of the first European countries to adopt a regulatory framework for cryptocurrencies, aimed at protecting users from the risks of fraud, and impose fines in cases of abuse [6].

Law No. 66/2020 "On Financial Markets based on Distributed Registry Technology", containing 107 articles, regulates the licensing of entities operating in the field of cryptocurrency trading and the issuance of digital tokens for which a relevant licence from the Bank of Albania is mandatory [6]. Yet, to date, no such licensed entities are operating in Albania [7]. However, seven trusted exchanges including Bitpanda, Binance, and Kraken, are available to Albanian users. The most popular cryptocurrency wallets in Albania are Coinbase, Ledger Nano X, and Electrum [8].

The 2020 law was criticised notably for some shortcomings in Anti-Money Laundering Measures and the Financing of Terrorism, paramount for Albania on her path to EU membership. The Council of Europe notes, however, that Albania has "improved measures to combat money laundering and terrorist financing, demonstrating good progress in the level of compliance with the Financial Action Task Force standards, the Council of Europe's anti-money laundering body" [9].

2020 also marked an important year for the Albanian payments market. On 30 April, the Law "On Payment Services" was approved by the Parliament. The adoption of this Law, a transposition of the European Union's Second Payment Services Directive (PSD2), was a multidimensional achievement for the Bank of Albania with significant progress accomplished in the process of EU integration, within the Single Euro Payment Area (SEPA). Albania becomes the first Western Balkan country to transpose PSD2 into their national legislation. Newly enacted rules aim to improve financial inclusion, reduce the costs of payment services by fostering competition, and encourage the use of digital payment instruments [4].

In June 2022, the Parliament drafted a resolution asking the Albanian Financial Supervisory Authority (AFSA) to approve new regulatory acts on DLT before the end of the year. The draft law provides a definition of a virtual asset: "a digital representation of a value that can be deposited, traded or transferred in digital form, and that can be used for payment or investment purposes or as a medium of exchange, including but not limited to cryptocurrencies" [10].

3. A blockchain roadmap for Albania

The absence of licensed entities per se in Albania notwithstanding the existence of trusted currency exchanges [8] and a full-fledged regulatory framework [6] denotes either the existence of an untapped market or a lack of responsiveness of the economy to recent regulatory changes. **Progress in this domain should help attract more DLT investment in the future.**

In 2019, Natasha Ahmetaj, the Second Deputy Governor of the Bank of Albania, issued a press release [5] wherein she praised the foundations upon which the DLT Albanian ecosystem was built: "we have [in 2019] 112% mobile phone subscriptions and 66% internet access" [2]. Whereas the latter figure is on par with the UK the former is far behind with a mobile internet user penetration of 88.71% the same year [11].

Our recommendation is to reduce the digital divide and keep increasing the mobile internet user penetration rate in rural areas. In 2019, 90% of the total fixed broadband connections in Albania were in urban areas, whereas 10% were in rural areas [12].

We also need to look at the potential of digital payments to reduce the dependence of the economy on cash, used for 90% of small payments, and its corollary, fiscal evasion that hampers the Albanian GDP by approximately 1.5% every year [2].

Another blockchain use case is foreign remittances [13] [14], defined as "the transfer of monetary or in-kind "income and wealth" from workers in one country to their country of origin" [15]. As Ahmetaj explains, "around 1.2 million Albanians are emigrants, or 40% of those living in Albania, and the remittance flows are estimated at around USD 1.15 billion per year, or 12% of the GDP" [2]. **A central pillar of the national blockchain roadmap for Albania thus ought to encompass the digitisation of foreign remittances.**

It is well known that in the global fiat payments system, cross-border settlement, and payment services are accommodated by correspondent banks that impose monetary and time-related costs. FinTech innovations in general, and DLT in particular, have a significant cost-reducing potential. However, one impediment to mass scale adoption in cross-border payments remains the insufficient scalability of existing blockchain technology not yet mature enough to handle the tens of millions of payments required on a daily basis [16]. Another major challenge for the Albanian Blockchain Roadmap is to **capitalise on the recent innovations such as Ethereum 2.0 and similar technologies** [17].

The Albanian DLT ecosystem is in its infancy. However, the country is presently attracting substantial blockchain cross border investment. For instance, Tenset has set out to revolutionise cryptopayment investments by offering investment exposure to a wide range of assets by holding the Tenset token in an ETF 2.0 portfolio. Tenset operates as a legal and officially registered entity in the United Arab Emirates ; but it opened its Albanian offices in March 2021 . (https://www.tenset.io/en). Our final recommendation is for local authorities to **explore the conditions of enhanced attractiveness for inward foreign direct blockchain investment in Albania.**

The consolidation of the rule of Law in Albania is a key requirement in the context of its candidacy for accession to the European Union. [18]. E-Voting on the blockchain is now a well understood use case in blockchain research, thanks to pioneering works published in JBBA [19]. In this respect, Chris Holmes, Member of The House of Lords in the UK, shows how blockchain-powered e-voting solutions could help support democracy [20]. Given the massive issue of trust in politics in general, and of integrity in countries plagued by corruption phenomena, a reflection to which Albania is alas not alien to [21], we recommend **research on e-voting and e-elections to be at the forefront of the Albanian blockchain roadmap.**

Going beyond the existing triple-helix model (Government, Business Academia) adopted by Albania [22], we recommend **an incremental progression with a blockchain roadmap based on quadruple-helix innovation systems (policymakers, academia, industry, and public services / infrastructures)** [23].

These transformations ought to be accompanied by **opening up Albania to "'extended knowledge Networks' (such as the Centre for Evidence-Based Blockchain) that will advance holistic, multi-disciplinary benchmarks in blockchain" [24].**

Concluding remarks

Albania is a fast-growing economy located in South-East Europe currently lacking a national DLT roadmap mirroring the pioneering UK National Blockchain Roadmap (NBR) [24]. Our approach in this research note was to begin by examining the state of the existing cryptocurrency regulatory framework. Based on some recent and wide-ranging legal and socio-economic evolutions, we have then issued a set of recommendations. The latter include increasing the number of licensed entities, reducing the digital divide by increasing the mobile internet user penetration rate in rural areas. They also require the digitisation of foreign remittances and capitalising on blockchain scalability breakthroughs. Further, the attractiveness of inward Foreign Direct Investment needs to be enhanced. A full-fledged research agenda on DLT shall holistically investigate the booming Albanian start-up ecosystem [25] including the role of business angels [26] whereby a more specific focus on DLT projects shall be adopted. The rule of law in Albania would be strengthened by the implementation of new blockchain e-voting solutions, thereby helping generate progress in the country's bid to access the EU. Finally, the blockchain roadmap should see the realisation of incremental progress from the triple-helix to the quadruple-helix system.

Further research and efforts will also be needed to construct adequate metrics and design new research methodologies to measure the current progress of the national roadmap.

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INTERVIEW

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Open Access Blockchain and Cryptoasset Research: Why it matters now more than ever before

An Interview with Professor Naseem Naqvi, Editor in Chief of The JBBA

Correspondence: editorial@thejbba.com
Published: 06 August 2022

Professor Naseem Naqvi FBBA at LOGIN to the Future Summit, Portugal 2022

Q1: Why should policymakers care about Open Access?

Approximately $2.3 trillion is spent each year funding 8 million scientists to produce 2 million research papers. $10 billion a year is then spent globally by universities to access scientific research which is published in subscription journals - that is approximately $5000 per article. UC Berkley alone spends approximately $30 million each year to access paywall, subscription journals. The vast majority of this is public research, which was already funded by taxpayers, who must then pay again to access the research outcomes. Einstein once said that, if he was able to see far it was because he was standing on the shoulders of giants; We cannot stand on the shoulders of giants if the giants are behind a paywall!

Having said that, economics-based access arguments have not (yet) helped us to gain access to an open and equitable knowledge exchange. For policymakers to make timely, evidence-based, and contemporaneous decisions, we need full and immediate open access to quality research.

Q2: Why should researchers care about Open Access?

Science is currently 50% open access and is on track for 70% - but researchers still do not necessarily care about openness and have missed an opportunity to align scholarly activities with larger goals and values [1]. What is the number one priority for a researcher after his or her research is published? – it is to make an IMPACT. The London School of Economics defines impact as "a recorded or otherwise auditable occasion of influence from academic research on an actor, organisation or social process taking place outside the university sector itself – whether in business, government, civil society or elsewhere." [2]. Now imagine the research is behind a paywall and only accessible to those with the ability to pay – will that research ever achieve true global impact?

The open access mantra is a mentality researchers and universities need to embed in their philosophy when upskilling young researchers. Open Access research receives greater exposure which means the practitioners around the globe can immediately start applying findings into action and the public can access these findings. This allows research to be debated by policymakers, taxpayers get value for money, and practitioners worldwide can access ground-breaking research outputs without having to worry about paywalls. In most countries, it is now a mandatory funding requirement for research to be made available open access to comply with the grant rules and funder policies. Open access articles also have a 62% citation rates worldwide compared to 38% with subscription articles.

Q3: Is Open Science the same as Open Access?

Open science is so much more than just open access to data. We need to recognise that research outcomes are not just publications - if we want to bring about culture change, we need to focus on transforming scholarly/research processes, not just the products. We must ensure that scholarly networks are inter-connected, and access to knowledge is open, borderless, and readily available. We need to craft open scholarship policies that place universities and scholarship directly in the service for society.

We need a cohesive global approach to Open Science. It is not enough to open the information; Open Science requires the infrastructure to be opened too. In some areas of Blockchain and Crypto research, access to research opportunities, open labs and pastoral support is far more important than access to research papers. Science is the discovery of universal truths, so it makes sense to have the results universally available. Where the system needs resources and funding to facilitate an open access environment, we must avoid preaching to the choir, but rather equip the choir.

Q4: What is the role of enterprises in supporting Open Access blockchain and cryptoasset research?

Enterprises are an essential component of a quadruple helix

innovation ecosystem (with the government, academia and public being the other 3 pillars). Enterprises have the technology, but do they have the courage?

A USAID (US Agency for International Development) study looked at 43 Blockchain projects and companies claiming to have solved various problems using distributed ledgers. The study found that almost no company was willing to share their results and MERL (Monitoring, Evaluation, Research and Learning) processes [3]. Open access industry research is vital in supporting the mission of unlocking knowledge.

All science will soon be data science and Open Access industry research will play a major role in translating lab data into pragmatic real-world applications for the society. All DLT enterprises and consortia should develop their own shared open-source research-base and have the courage to walk away from closed legacy systems.

Q5: Are we putting too much emphasis on metrics, such as Impact Factor?

We have an epistemological discrimination in academia. That discrimination is also deeply rooted in notions of prestige, power, and impact. While I am a big fan of alternative metrics, such as attention and impact scores, these metrics must not be interpreted in isolation. For example, an Impact Factor tells us the number of citations received by the journal – it tells us nothing about the quality of the author or the research paper under consideration.

Q6: How does Open Access to research benefit the developing economies?

We cannot just dress up Open Access and call it equity. We need to see power. We need to give it over to the communities that would participate in the research, benefit from it and affected by it. More than 50% of JBBA readers come from developing countries – with the journal being fully Open Access, all they need is an access to internet to read and download cutting-edge content from anywhere in the world [4]. We need to engage and create a scholarly communication cycle relevant for local communities. A useful guide to doing and sharing science is thinking in terms of 5 R's:

Respect, Reciprocity, Responsibility, Relevance and Relationships.

Q7: Have we done enough to prioritise Open Access and Open Science? Are incentives aligned?

One of the biggest challenges for next decade is knitting together a cohesive global policy environment for open science. Latin America has a model of Open science (government and universities subsidise research dissemination) for a broader reach. It is a model that we should aspire to, instead of 'wins' elsewhere that extract resources. Creating a common, new way of incentivising outside of impact factor has been a challenge because without indicators we don't have policy. We have adopted Open Access without changing the scholars' behaviour and reward system and may have missed a big opportunity. In Science, particularly Blockchain science, we need to focus on what we need, what we have, what we can use, who is going to use it and for what purpose. These are the fundamental questions to ask for an Open Access advocate.

Q8: With wide variations in regional and local policies, how do we make tangible progress with the Open Access movement?

Sadly, we never use the moral argument for Open Science, instead use the ROI argument. This must change. We have made considerable progress with Plan-S and that should be applauded. We have the technology, tools, and resources, but do we have the courage? - 'Open' is not the end goal, but is, or should be, an enabling strategy to achieve equity for humanity. We keep that at centre of all interventions. The term "open" applies to access, discoverability, citability, visibility, archiving and preservation.

It is true that traditionally our policies tend to be country-based but it's time we shift this paradigm and position our policies in the global context. It is not about being on the right side of the border - what we do at local level must be translated to a global level. This is particularly paramount for technologies such as Blockchain which transcends national borders and promises to underpin the future of global digital economy.

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Professor Dr Naseem Naqvi FBBA is the founding Editor in Chief of The Journal of The British Blockchain Association (The JBBA), the world's first fully open access scientific Blockchain research journal available in print and online. He is the founding Chair of the Centre for Evidence Based Blockchain (CEBB), and the founding President of the British Blockchain Association (BBA). He is an Honorary Professor of Blockchain at the Epoka University, Albania. Professor Naqvi is also the author of the UK's National Blockchain Roadmap (NBR).

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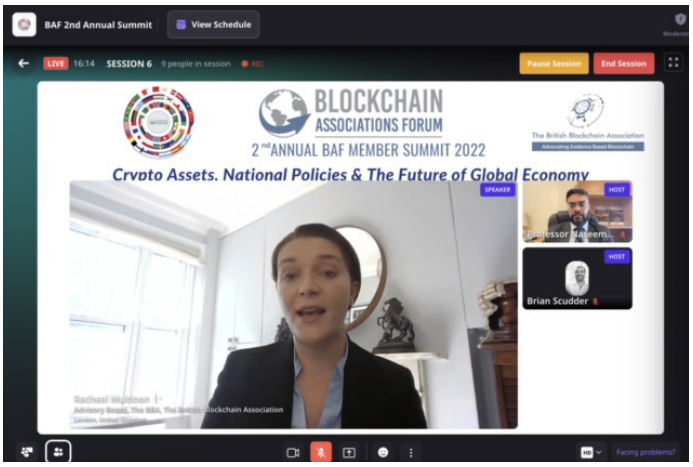

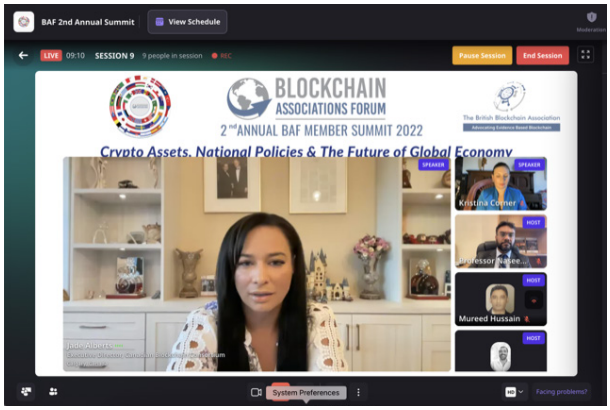
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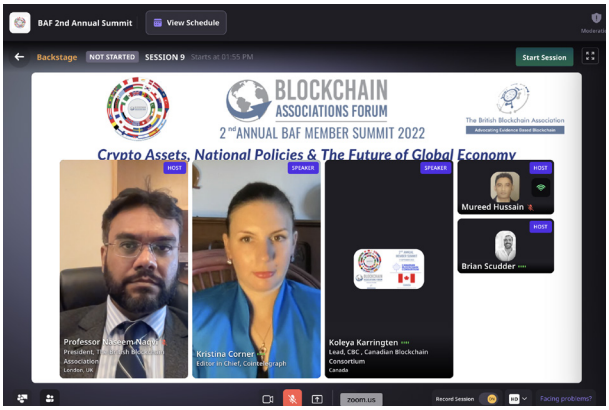
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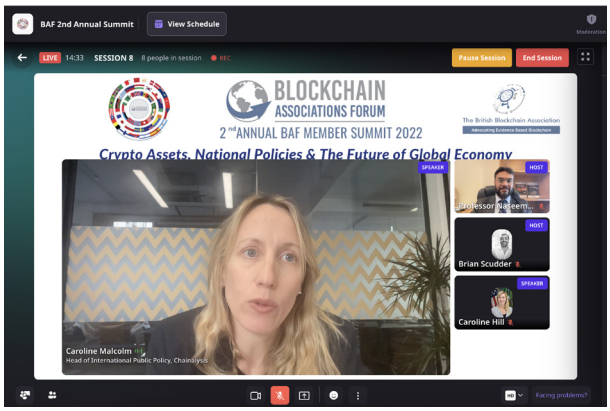
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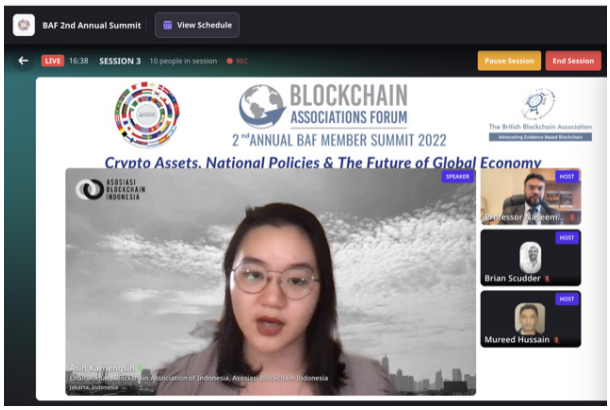
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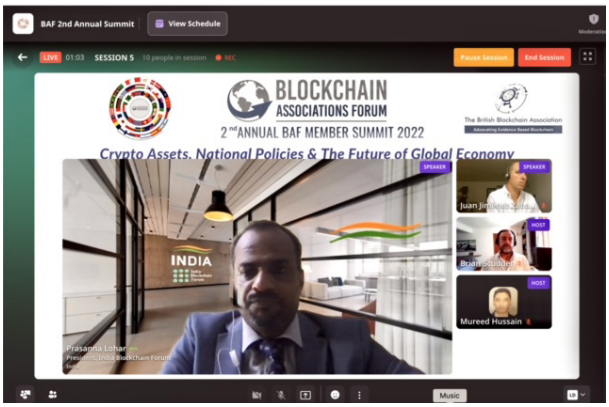
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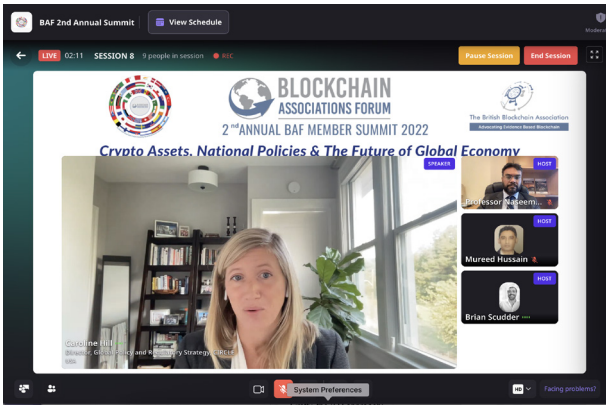
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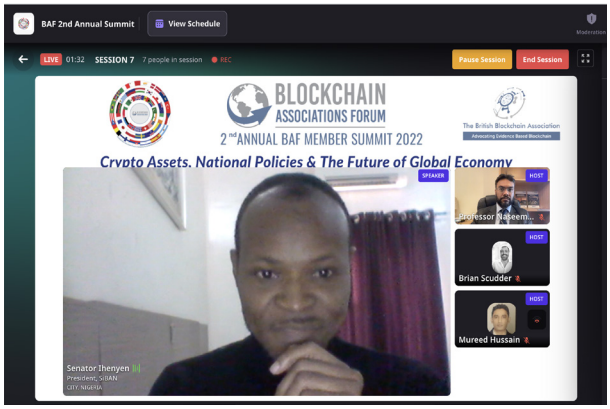
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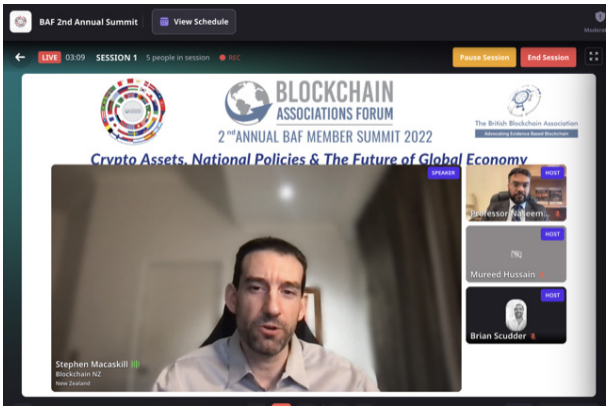
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SUMMIT PROCEEDINGS

Proceedings of 2nd Annual Member Summit of Blockchain Associations Forum (BAF)

17 September 2022

The theme of the BAF virtual summit was **Cryptoassets, National Policies & The Future of Global Economy**: What countries have been doing to regulate our still nascent industry well, and equally badly. Heavy-hitting panellists came from government, regulators, the private sector – as well as BAF-member associations – to describe a tumultuous year.

Introduction and Opening Remarks from Summit Chair, Professor Naseem Naqvi FBBA, President of The British Blockchain Association

"Regulators in some countries believe they must opt for either some form of reckless innovation that is, regulation without sufficient evidence and facts, or just complete paralysis. Inevitably in most of these scenarios, caution tends to trump risk. But such caution merely reinforces the status quo and makes it very hard for crypto assets to benefit the public in a timely or efficient manner."

This was the opening salvo from Prof. Dr Naseem Naqvi FRCP FBBA, President of The BBA at the second BAF summit.

"Crypto asset ecosystems are unique because they operate globally in a decentralised peer-to-peer fashion with the teams and individuals who are building these systems often operating in multiple teams and hubs dispersed around the globe. There is fierce demand for crypto skills, both in terms of coders and developers and programmers, as well as strategic leadership and educationalists, lawyers and so on. Countries often find themselves bidding for the same scarce global talent pool.

"So a country must devise a national crypto strategy that offers flexibility, clarity, inspiration and guidance to build its crypto economy foundations. These ecosystems should consist of the following three components I believe. The first is the three C approach: Clarity on regulation with the unambiguous communication and no mixed messages. Secondly, constructive engagement with stakeholders. And the third is consumer protection, giving people opportunity to be involved and invest in the crypto asset space, but also at the same time making sure that it is done with the right safeguards.

"Secondly, the crypto policymakers of a country must devise a national strategy that has a focus on a quadruple helix innovation model, described in the UK's national blockchain roadmap, and this model must be evidence based and take government, academia, industry and society and public services into account for a more holistic approach to cryptoasset policy making.

"Finally, we are at an inflection point where technology is moving faster than regulation and hence international collaboration is vital. Platforms like this one Blockchain Association's Forum help to provide such opportunities and for transnational cooperation."

The speakers quoted below are in order of appearance. Speeches are verbatim and edited for space:

Stephen Macaskill of BlockchainNZ

We're never going to be a leader creating crypto policy, but I think New Zealand is for the most part going in the right direction in that a lot of the rules over the last few years have looked at how crypto rules can fit within the current regulatory regime.

It's harder to say what hasn't gone well in New Zealand versus what we've observed in the rest of the world. And what's not doing well in the rest of the world is the Travel Rule, which is a potential privacy and data disaster waiting to happen.

When the legislation started passing in other countries, VASPS in those countries didn't have the ability to comply when that legislation was passed. The technology didn't even exist for companies to comply with the [G7's Financial Action Task Force] Travel Rule. Different countries are trying to cobble these together in different ways, and there's really no good standard, particularly considering that crypto assets are global and international and policies in one country might not make sense in another country, particularly around privacy and data rules.

Do we want policies that are enabling a global surveillance state or are we trying to create good rule of law and protect people's property rights and consumer choice? You have to wonder if you look at the Travel Rule. Consumers are waking up to their data rights and I think people are starting to realise that they don't want entities owning or having access to all their data. I think there's going to be quite a bit of backlash.

Right Honourable Senator Andrew Bragg, Liberal Senator from New South Wales, Australia

Last year, the race to regulate digital assets in Australia really hit the straps. We became a leading jurisdiction because of the 2021 Senate inquiry into financial technology and as part of that review we recommended 12 changes in Australian policy and law, 11 of which were adopted by the former government.

The former government committed to a complete consultation on the licensing of digital currency exchanges or markets, and a finalised consultation on a custody system for digital assets by the middle of 2022.

We wanted to make sure that the debate remained sophisticated but at the national elections on 21st May 2022, our government was defeated, as is the

judgement of the people. As a result of that, the country has now lost significant traction on positioning Australia as a leader on digital assets.

If the government will not act, then Parliament must act. I have taken it upon myself to propose and develop a private member's bill, which I call the Digital Services Financial Markets Bill 2022. It will be released shortly. I may no longer be on the Government benches, but I maintain an interest as the Chair of the committee that made these very important recommendations.

As foreshadowed by the Treasury Consultation Paper, this bill includes a licensing regime which covers crypto asset secondary service providers which is divided into three categories: A digital asset exchange license, a digital asset custody license, and a stablecoin issuance license.

The rationale for these licenses is twofold. Firstly, by providing a rules and standards based regime, we give confidence to the consumer that their risk exposure is to be managed and on par with other financial services and products.

Secondly, by providing regulatory certainty, this regime opens the door to greater investment and growth in Australia's crypto ecosystem and virtual economy in a way which allows the industry to evolve and innovate without short sighted constraints.

We achieve this with the licence provisions, developed through consultation with industry, and they are: Minimum capital requirements, conduct regulation, segregation of customer funds, tailored and appropriate plans to protect consumer assets, requirements for key personnel to be based in Australia, disclosure requirements to the market and to government agencies, and record keeping and reporting.

For a custody license, requirements also include designation of key persons to be based in Australia and for proper auditing and disclosure arrangements.

In terms of stablecoins, the bill details an issuing license for firms. Considering the recent collapse of algorithmic stablecoin Terra in the US, minimum reserve standards must be introduced to ensure the stablecoin issuers provide consumers with at least the minimum standard of consumer protection.

It is with this in mind that the bill contains provisions which mandate that licensees hold in reserve the full amount of the face value of liabilities on issue in the form of Australian legal tender. There would be a demand deposit made with a bank, which could be used in the event that there was a problem.

In the final report last October, the Committee recommended that the Treasury lead a policy review into the viability of a retail CBDC. On reflection, given the scale of the policy reform recommendations that we made, the CBDC recommendation was undercooked. I was wrong to recommend a retail CBDC without deeply considering the privacy and big state implications.

The e-Yuan is currently in its pilot phase and cross-border payments are being trialled with the UAE, Hong Kong and Thailand. It is not currently available in Australia, but under its two-tiered approach, Chinese state-owned banks are primary disseminators of the e-Yuan via digital wallets.

If the e-Yuan were to be introduced into Australia, these Chinese state-owned banks would be the main payment facilitators. Accordingly, in the bill, we have therefore deemed it necessary to have provisions requiring that these e-Yuan facilitators or Chinese state-owned banks disclose data to APRA, our prudential regulator, and to the Central Bank regarding its use in Australia. In doing so, we are following a similar approach to the US, but expanding it.

These government agencies are obliged to then provide a report on these data to the Parliamentary Joint Committee on Corporations and Financial Services and to the Joint Committee on Intelligence and Security.

The reason this Act specifically targets the e-Yuan, is because it is the first CBDC to be issued by a major economy, and China's financial influence is particularly relevant in the Asia-Pacific region.

Markus Lehtonen, Chief Executive Officer of Helsinki Blockchain Center, Blockchain Forum Finland

It's very hostile environment [in Finland] because the regulation is unclear. To get to the market, we need rules, but they take so long that innovations are old before they arrive. All the bad news and criminality colours political opinion, and it doesn't matter what blockchain specialists say.

Our old regulatory frameworks are the problem. Most decision-makers' knowledge is fairly limited. We have the first signs from the first quarter this year that after five or six years here in the front line with the Finnish authorities they have started to recognise that regulation needs to get better.

In Telegram groups there are thousands of people, and minute-by-minute you can see the conversations saying that the reporting regime is quite impossible here. We have five licensed crypto exchanges and we have good knowledge of anti-money laundering projects specifically with Sweden. The Finnish and Swedish police have found out that there are a very limited number of crimes if taken from the total amount of money laundering happening here.

This has become better as the Russian impact on business has quietened because we don't have as many oligarchs as we did before February this year.

What we want is a clear understanding of the differences between custodial and non-custodial solutions. What are decentralised applications? How to record products that don't have counterparty risks? Stablecoin development interests us a lot too, but there are the same difficulties such as KYC.

We have some hope that European regulation pushes more through and that we get the opportunities to work in the markets more. As far as Finnish blockchain companies are concerned, 90% of the work we do is in the export market.

But there are the dangers in that as well. For borderless technology to be understood by policy maker isn't a piece of cake. The example from Denmark

with programmers and coders just coding and not knowing what's legal and what's not legal and then being sent to jail that's the last thing anyone would wish.

Professor David Lee Kuo Chuen, Head of the Global FinTech Institute and Professor of Economics at Singapore University of Social Sciences

What did not go well regarding crypto asset adoption and crypto policy making in Singapore? The market in Singapore is small due to the size of the population, so it is not easy to develop a robust local community. Yet Singapore has done so with innovative token regulation, clear guidelines, consistency and transparency. More importantly, the crypto pioneers emphasise doing good with cryptocurrencies and blockchains rather than over speculation.

That spirit has somewhat been overthrown by rent seeking behaviour in the past two years, leading to the failures of many good social projects. Even projects that won awards from the monetary authority of Singapore have failed to take off with enough funding.

Operating costs in Singapore are relatively high. Financial sustainability is an issue if the treasury of start ups is not well endowed or lacks financial management skills. Singapore may continue encouraging shared working space, cloud computing and AI-services services to improve efficiency and save costs for Web3 companies, but so far, few indigenous projects have flourished because of the lack of liquidity and low valuation.

A few have done well enough with licenses issued to them to expand beyond Singapore. But there is a shortage of technical talent in Singapore so Web3 companies have to seek talent overseas or outsource, which may slow down the development process. The Employment Pass scheme is being enhanced for global talent to relocate to Singapore.

The main advantage of Singapore is that a group of civil servants deeply understand cryptocurrency. They can make good policies in time to guide the industry in the right direction and maintain a flexible policy environment.

In the earliest stages of product development, the Monetary Authority of Singapore will not interfere much, but will give enterprises the space for innovation. When the product is ready for market mass adoption, MAS will focus on supervision to ensure customer's suitability with minimum systemic market risk.

Asih Karnengsih, Chairwoman of Asosiasi Blockchain Indonesia

The use of decentralised virtual assets is growing expeditiously in Indonesia - Southeast Asia's largest economy has the highest crypto adoption rate in the world, along with Brazil.

The current data that we have shows that crypto asset transactions in Indonesia reached ₹232 trillion, or nearly $15.6 billion, with 15.6 million registered traders by the end of July 2022.

The Indonesian government already sees crypto assets as a legitimate asset class with the specific classification of a futures commodity. Indonesian Commodity Futures Trading Regulatory Agency's (CoFTRA) regulation number eight of 2021 provides a thorough regulatory framework for crypto asset trading in a futures exchange. The regulation sets out specific market mechanism in accordance with international standards, with bodies that will move our trading ecosystem to a secure and fast state. The clearinghouse, custodian, and virtual assets service provider or VASP will all be under CoFTRA supervision.

To secure the local investor, every crypto asset that can be traded in a registered VASP must be on the list that have been published by CoFTRA. The Ministry of Trade officially classified crypto assets as commodities in 2018, and CoFTRA published the first ever list of which crypto assets could be traded in 2020, with only 229 of 1,000 crypto assets listed globally. Two years later, they have finally published the updated list with 383 entries.

This brings us to conclude that with the growing nature of crypto asset transactions, these mechanisms are not entirely effective, even with proper methods to evaluate crypto assets. Not only that, but Travel Rule implementation, although worth complementing, will need more adjustment considering the cross-border nature of the transactions and risks in money laundering and terrorism funding.

Current standards will require more data and more information shared by VASPs conducting the Travel Rule. But different Travel Rule implementation with higher requirements might not be possible for the receiving VASPs in a transaction.

The government has officially designated crypto assets as objects of VAT and begun the taxation of crypto asset purchases at 0.1%. Transactions, earnings and capital gains will be subject to a 0.1% final income tax. Not to mention the different rates the government set to unregistered VASPs.

Roeland Van der Stappen, Vice President of Policy and Engagement at Crypto.com

There are three key building blocks for us. The first is know your customer and anti-money laundering policies, which have been the first focus area for regulators worldwide, because without those, crypto technology cannot successfully be the foundation for a new and modern financial system.

And that's why we support a global and consistent implementation of the FATF Travel Rule, which essentially requires trading platforms like us to share relevant information on sender and recipient for transactions with other platforms.

What we have seen is that certain jurisdictions have gone beyond the FATF Travel Rule, essentially gold plating it by, for example, removing the thousand-euro threshold for reporting, which is there for cash transactions or credit transfers, or extending it to transactions between a trading platform and a

self-hosted wallet - a self-hosted wallet being essentially an interface that provides access to an address on the blockchain.

And that often comes from a misperception that transactions between trading platforms and self-hosted wallets or between self-hosted wallets are not traceable because the verification of the owner of a self-hosted wallet is technically impossible.

The second one is stablecoin regulation, which we see is now the new priority for regulators across the globe, because stablecoins are the bridge between crypto and fiat currency.

The Terra collapse has made clear that not all stablecoins are stable nor the same. So looking at stablecoin regulation across the globe, we see there's a common requirement for them to have a legal entity in each market in which they operate to have effective supervision. We believe there will be differences in the composition of reserve requirements for issuers of those stablecoins, but they will and should be strict and most importantly, transparent and auditable.

What I've also found interesting is that the Bank of England is now looking into a backstop for systemic stablecoins, which will further increase consumer protection and trust in the uptake of this innovation.

We see some philosophical differences between jurisdictions in the role and prospect of stablecoins as a means of retail payments. It's our own view that there should not be limits if stablecoins are well regulated.

Third, but not least, we believe that regulation of players like us, the so called CASPs [Crypto Asset Service Providers], is key to set a high standard in terms of consumer protection, security, resilience and market integrity. And here we believe that MiCA [the European Commission's Regulation of Markets in Crypto assets] will act as a global reference point and will likely inform the work from IOSCO, which will set the minimum standards globally.

Tasos Oureilidis, Founding Partner Hellenic Blockchain Association

I would like to focus on MiCA, which is currently handcuffing most of the projects within the EU. Greece is part of the European Union and the eurozone in general. We expect some more advanced and practical thought to this.

In 2021 and this year also, the main reason is the overleveraged economy in the blockchain, we know that. It didn't come out all of a sudden. We were all expecting that this bubble would burst at some point.

But we were really not prepared for the collapse of Stablecoins. And I don't know if the best approach for regulators is to start by regulating stablecoins, when practically the main essence is they do not understand the technology. Now we are rushing into regulating Web3 It didn't go well with regulating Google, Facebook, Amazon and so on.

When you don't learn from your own mistakes we didn't learn our lessons in regulating Web2, so what's the precedent to go and claim that successfully are going to regulate Web3? We need more thorough arguments.

How you can regulate in one country, and another country it is completely deregulated. Blockchain doesn't know borders. I'm not sure how this anthropocentric technology can be regulated, in accordance and synchronisation between countries. Blockchain really has the capacity to accelerate economic and growth due to the fact that ESG is now the back context of the financial sector and will be for the next decade or so.

Prasanna Lohar, President India Blockchain Forum

Recently the Indian Government announced they are going to come with the digital rupee, which is a code name for a CBDC where four banks are doing pilots. But globally there are gaps. There are crypto setbacks, primarily around regulation.

There are too many cryptocurrencies. In the Indian context, there are hardly 100 banks. You can't open a bank unless you have the right regulation. I think that kind of ecosystem is really lacking in the crypto world.

While there are some setbacks, there are some positives. There is a lot of technology improvement with Bitcoin and the Merge Protocol for Ethereum, which is the start of a new ecosystem which Ethereum will bring on.

If you see the kind of investment typically in India, I can name five companies who are unicorns and backed by cryptocurrencies. There's a big boom around metaverse and NFT – this is now a reality. Or you can talk about a blockchain technology tokenization - another reality. Banks are also now looking at how they can tokenise KYC records or loan records and so on.

The larger question is how do we really take care of our end user with the robust guidelines and practices that we have in banks?

The OECD for example is coming up with ideas on taxation. They have recently opened up papers for suggestions. The FSB has been talking about recommendations for regulations. The ECB is talking about how to have a balanced approach for the regulation for crypto assets.

The G20 countries has come together and are talking about how we can really adopt crypto assets. FATF, G7 countries, you name it, they really looking in the right direction.

The Royal Bank of India says 'no', but at the same time they have formalised a fintech unit which will take care of a blockchain ecosystem.

We need to create an international classification, and to coordinate with other countries to reduce the negative economic impact of choices made in developed economies. We recommend including crypto and stablecoins in your policies.

Juan (JJ) Jiménez Zaballos, CEO Alastria Blockchain Ecosystem

We're happy with what we are seeing from the different co-legislators and regulators in Europe - the Council, the Parliament and the Commission are pretty aligned when it comes to promoting the usage of digital assets all across Europe.

This is the so-called pilot regime that we were part of in the consultation process. The good news as well is that the Spanish regulator, the Spanish SEC, adopted all the stock broking regulation in Spain just this week to accommodate this opportunity that brings the pilot regime to the dealers, to the issuers, and also to the investors and to the market, to the multilateral trading facilities in Spain to enjoy this new regime, to test the waters when it comes to applying blockchain in financial markets, in fundraising, and in putting together traditional mechanisms as fixed income and equities into this new world of digital assets.

Meanwhile, we've the Spanish regulation and regulators were right when it came to publishing a book for registry for the CASPs. They put together a new regulation when it comes to advertisements. That is important for bringing trust to the ecosystem. And now with the SEC accommodating their processes to allow the usage of blockchain as a legit way of issuing financial instruments, we really think that this is the way to go and I think this is the way to be competitive in the European landscape and more broadly worldwide.

Racheal Muldoon, Advisory Board Member, British Blockchain Association

Fortunately, here in the UK, we also have a body of expert judges who are well versed in DLT and crypto assets. Leading the charge is Sir Geoffrey Vos, who is our Master of the Rolls. A senior judge, Sir Geoffrey is a champion of DLT and crypto asset policy and legal developments here.

As a result, I'm in no doubt that England and Wales is the best jurisdiction in the world to own, trade and recover crypto assets. In November of 2019, the UK Jurisdictions Taskforce published its legal statement on the status of crypto assets and smart contracts. As a result of that, the statement called for crypto assets to be regarded as property in English law and also said that smart legal contracts should be considered binding contracts in English law rather than simply code.

These two overarching policy principles were subsequently adopted by the High Court of England and Wales in the leading cryptocurrency case of AA and Persons Unknown in 2019 and again in 2020 in the case of Ion Science and persons unknown. It then went on with the judgements and the principles in the statement receiving approval by judges as far afield as New Zealand and Singapore.

Earlier this year, before the head of the Commercial Court His Honour Judge Pelling KC, a decision was handed down by his lordship in Lavinia Osborne and persons unknown. This judgement set down for the first time in the world that NFTs are legal property which can be frozen by way of an injunction where they are unlawfully taken.

I was fortunate enough to address His Lordship as counsel in the case acting for Miss Osborne. The law was therefore clear. In this jurisdiction crypto assets are property. Now that includes NFTs, namely the token distinct from the thing that it represents, for instance a digital artwork, and there is a potential significant change on the horizon in the form of the Law Commission's Digital Asset Consultations paper published in July of this year.

Amongst these proposals in the consultation is the creation of an entirely new category of personal property called data objects, which would encompass crypto assets. The objective of this new category is to cater for the unique features of crypto assets, which don't quite fit within either of the two existing legal categories of personal property.

Throughout the world, many jurisdictions are in the early stages of classifying types of crypto assets and assessing consumer harms, and asking those questions of where, when and how to impose regulatory oversight.

Here in the UK, the foundations were set down some four years ago through a series of policy documents which have been published to incrementally refine the regulatory framework here. The result is that we have, in my view, one of, if not the most comprehensive crypto asset regulatory frameworks in the world, which is capable of responding to real time changes in technology.

The start came in 2018 with the Crypto Asset Task Force, established in March of 2018. It brought together those key players Dr Naqvi mentioned: Her Majesty's Treasury, the UK financial regulator known as the Financial Conduct Authority or FCA and the Bank of England.

The task force published its final report in October of 2018, which advocated for a framework made up of three categories of crypto assets. The first big exchange tokens, for example cryptocurrencies, which are not issued by central banks or central bodies and which utilise DLT platforms. This category is unregulated.

The second are security tokens. These provide rights to the holder, such as a share in future profits, and these are regulated by the FCA. And the final category is utility tokens. Now these grant access to goods and services in the same sense as a conventional membership scheme would, and these are unregulated.

The framework was refined again in July of 2019 when the FCA published its policy statement titled Guidance on Crypto Assets. The guidance details further features of the categories of crypto assets and advocates, an approach based on looking at the structure and the substantive characteristics of the

token, rather than what a white paper may say the token does or does not achieve.

Truly significant change came in January of 2020, when all new businesses carrying out crypto asset activity in the United Kingdom became legally required to apply for crypto asset firm registration with the FCA.
In doing so, these firms became obligated to comply with anti-money laundering and counter-terrorist financing regimes, including the carrying out of customer due diligence checks on users for their platform. And to this end, we see the terms crypto asset, crypto asset exchange provider and custodian wallet provider all defined within legislation at regulation 48 of the Information on the 2017 Money Laundering Regulations.

Finally, further evidence of the UK's ever evolving crypto asset regulatory framework actually came in April of this year when the government announced that it intended to regulate stablecoins. This is something we're going to see more and more of in the coming months.

Senator Ihenyen, President of Nigeria's blockchain association, SIBAN

In Nigeria, it was the National Information Technology Development Agency, supported by the Federal Ministry of Communications and the Digital Economy that drove the idea of having a national blockchain adoption strategy. And I'm happy to say that SIBAN, the stakeholders in Blockchain Technology Association of Nigeria, which is Nigeria's Blockchain Association, is one of the stakeholders recognised under the adoption strategy.

Secondly, what went well has been the Securities and Exchange Commission, which is Nigeria's capital markets regulator. Back in 2017, the SEC recognised very early that some crypto assets should be seen as some kind of financial technology innovation - fintech innovation - which should be regulated, but they should be uniquely regulated because of how unique they are in terms of their features.

So in 2017, they set up the FinTech Roadmap Committee with some industry players in the blockchain space. In 2019, the SEC came up with the idea of recognising and regulating crypto assets: One, as a security, two, as a utility, and three as derivatives as well when used for investment and securities purposes.

In May 2022, the SEC recognised virtual asset service providers as players in Nigeria's capital markets. This essentially builds crypto asset players within the framework of the Investment and Securities Act, which has been governing the Nigerian investment and securities markets.

I speak, we have a licensing regime for crypto asset service providers or virtual asset service providers, to play in. Currently, we have four major classifications of virtual assets service providers in Nigeria within the framework of the capital markets.

Another big one for Nigeria was in March of 2022, when the regulators came together, the SEC, the Central Bank of Nigeria, the Nigerian Financial Intelligence Agency units (NFIU), as well as all the law enforcement agencies came together to say, 'it's time we started looking at a regulatory framework that would be compliant with the FATF standards as far as AML CFT compliance was concerned.

And so they came up with this national virtual asset workstream, where some of the industry players were also asked to get involved in. I was particularly privileged to have represented industry players in that space by virtue of my office as the President of Blockchain Technology Association of Nigeria.

And then lastly, talking about how well we had for the first time the National Assembly - Nigeria's legislative home in Abuja - come up with a new money laundering act 2022 to ensure that it reflects the inclusion of virtual assets within the AML and CFT compliance structure.

For the first time in the country, we now have a legislation - not any directive by any regulator - we have with legislation saying that virtual assets should also comply with AML and CFT regulations, meaning that improved transaction reporting and improved monitoring of transactions just got better.

Although Nigeria has a national blockchain adoption strategy, what we have noticed is that there is still the obvious lack of collaboration amongst regulators, including public agencies. So although if you look at the national blockchain adoption strategy, it has a list of over 15 key players, both regulators as well as public agencies and some private sector, including SIBAN.

There is no coordination going on. So while the idea of the adoption strategy is for every regulator and stakeholder in the space to be on one page, what we are seeing is that while the Central Bank of Nigeria is going this way, as far as crypto asset is concerned, the SEC is going the other way.

Secondly is the issue regarding where the CBN stands. In 2017,2018, the central bank took a risk approach towards cryptocurrencies, saying although they are not regulated by the central bank, although they are not legal tender, please banks and other financial institutions, when you facilitate crypto related transactions, ensure that you conduct your KYC so that it is compliance with Nigeria's AML CFT laws.

That's changed effectively in 2021, when in February the CBN said we can't take this anymore. Shut down the entire banking and financial system against any cryptocurrency related transactions. And any bank that facilitates crypto related transactions would be fined.

Caroline Hill, Director of Global Policy and Regulatory Strategy at Circle

We have issued policy principles that reflect Circle's real-world experience operating USDC. We believe that any regulatory framework should encompass these aspects first, and fundamentally, the use of money should be free, irrespective of its form factor when used in a lawful manner consistent with democratic values.

A Stablecoin should be a digital bearer instrument entitling the holder to redemption at par for one unit of fiat currency even in the event of the issuer's bankruptcy.

Furthermore, as digital bearer instruments stablecoin should at all times remain backed one to one by equivalent high quality liquid assets in the care, custody and control of well-regulated financial institutions and banks in a bankruptcy remote manner.

Regulations designed to mandate the implementation of safety, soundness and risk adjusted prudential standards should be adopted, including as it relates to asset composition, maturity weighting, liquidity and custody. Issuers should also have transparent risk disclosures in order to bolster market trust and consumer protection.

Circle has also found that when backed by fiat, stablecoins are responsive to monetary policy and its transmission, which supports financial stability objectives in a country.

Circle commends the work that the Financial Stability Board has done in coordination with G20 countries to develop prudential regulatory standards. The US dollar has naturally experienced a first mover advantage in the stablecoin space. Even though the crypto economy is global, 99% of payments stablecoins are dollar denominated. Now these same benefits could accrue to other countries in jurisdictions like the UK and EU if more stablecoin supply was denominated in pounds or euros. Circle has expanded its portfolio of fully reserved fiat backed Stablecoins and launched Euro Coin in June of this year.

Euro coin and any additional future fiat backed stablecoins that we launch will continue to build on the trust, transparency, accountability and pro regulation approach that has made USDC one of the largest digital assets in circulation today.

Policy and lawmakers in the US have introduced or called for legislation that would create a bespoke regulatory model for the issuance of payment stablecoins. Treasury Secretary Yellen recently convened a special session of the Financial Stability Oversight Council to underscore the urgent need to regulate stablecoins.

Several bills have been introduced in Congress, and frameworks include the creation of a new federal license for payment stablecoins, bringing registered issuers under the supervision and regulation of federal financial regulators.

In the UK the Financial Services Markets Bill, currently working its way through committee and Parliament, provides for the use of payment stablecoins for day-to-day payments following the announcement from the government in April.

The UK is actively assessing how stablecoins and other digital assets can unlock opportunities for British businesses and consumers and strengthen UK's global competitiveness. The window of opportunity is now for the UK to maintain its position as a leading jurisdiction for global finance and innovation.

However, the mixed messages from regulators and apparent misalignment between the government and regulators impedes progress towards a stable business environment in which digital asset firms can make a long-term investment.

Finally, I would be remiss if I did not touch upon the future of crypto assets in the EU, the third largest economic zone in the world. While no comprehensive body of rules is perfect, especially not one as far reaching as MiCA, it nonetheless provides practical solution to issues that other jurisdictions are beginning to grapple with. Namely, a harmonised, comprehensive framework across an entire region that gives market participants regulatory clarity and crypto end users key protections and market wide assurances.

All of this will improve Europe's attractiveness to companies and individuals. Circle, for instance, plans to continue to invest and grow its presence in Europe to help build this responsible MiCA conforming crypto asset economy. The UK should review it carefully. There are areas in which the UK should harmonise its standards with those of MiCA, for instance, standards for certain types of digital asset activities such as custody.

Caroline Malcolm, Head of International Policy at Chainalysis

From individual country examples, I think there's a couple of things that I just want to highlight. I'll just start by listing them out and then coming back and thinking about them more.

One is around anti-money laundering and countering the financing of terrorism. No surprises there. It continues to be something. The standard was first developed by the Financial Action Task Force in 2019 with some updated important guidance in 2021. Notwithstanding that, FATF has been working on it since 2014, 2015. You can see the kind of sort trajectory and how much time it takes to move from ideation of regulation to establishing a standard and allowing countries to move into implementation. It's got implications for countries. It's got implications for the industry as well.

The second is consumer protection. To date, there's been a lot of focus in particular with regards to advertising and promotion of crypto assets and crypto asset services. Increasingly, what we're going to see is around product disclosure. Moving first step in consumer protection has historically been advertising and promotion rules: who you can advertise to; what you can advertise to them.

And we're beginning to see more product disclosure requirements. If we look to the next 6 to 12 months, that's what we can expect to see.

Third is market conduct and integrity. We're talking about things like market manipulation - whether that be insider trading or front running or different forms of wash trading - or market abuse.

These concepts we're very familiar from the traditional financial space, but we really haven't necessarily seen specific rules when comes to crypto. Governments will say our existing rules apply into this space just as they do for the traditional financial system. But we're really yet to see concrete

guidance on that transition and how rules apply to crypto.

The fourth issue is really around financial stability and market oversight. So that really macro level view of what's actually going on in this sector: the recent market turbulence that has really focussed minds from a policymaker's perspective back in February this year. Terra Luna was on three hours capital even before those events took place. That governments had really started to pay a lot more attention to that macro picture is reflected in the report from the Financial Stability Board in February this year, which marked a very important shift in tone up.

Crypto assets, the crypto asset ecosystem is something that the FSB has been monitoring for five or six years now very closely. Up until then, it's really been a case of 'this is still a relatively small industry. Nothing much to see here. A Thing like contagion risk is nothing we have to worry about'.

That's until we get to February this year. And then we see the FSB really show a marked change in tone. They turned around and said, "this industry is growing and things are happening: the complexity within the industry is growing, the intersections between this industry and the traditional financial sector are growing, and the intersections between this industry and the real economy are growing".

As those intersections grow, the contagion risk of something that might happen in the crypto space spilling over into some of these broader financial systems or the real economy are increasing. That's something that we need to get a better understanding of the data on and begin to think a little bit more about: what are the guardrails that we could put in place to be able to prevent those spill-over impacts should something of quite significant magnitude happen in the crypto ecosystem.

Two things to watch out for. There is the February report - if you haven't had a look at it – and the one in October. Early signalling about what we might expect from government. These are things that are happening at that supranational level - about guidance or recommendations to countries. Those do filter down as we've seen with the FATF recommendations, so getting advanced notice about where policy may be developing is really important.

You'll be familiar with FATCA [Foreign Account Tax Compliance Act], the foreign account reporting requirements from the US and the Common Reporting Standard, which is the international standard for reporting of foreign account holdings by tax administrations.

Essentially those same rules are coming to the crypto space. Crypto asset service providers are going to be required to report information to their local tax administration about the holdings of their clients, and that information will be shared between tax authorities all over the world.

This is a huge step forward in terms of reporting and disclosure requirements on exchanges, on people like custodians and brokers, in terms of the sort of information that will be made available to tax authorities. That means not only do they have to make it available, but they have to make sure that they have that information up to date at the moment.

The final piece that hasn't had the attention that it might have, is the new prudential requirements for financial institutions when it comes to their exposures to crypto assets.

The BCBS [Basel Committee on Banking Supervision] part of the Bank for International Settlements has issued some new guidance on this and is closing its public consultation on this at the end [of September]. This is not about stablecoin issuers, it's about traditional financial institutions. But I think it also gives some good hints about what might be expected from stablecoin issuers themselves in the future.

It really is about how the BIS views risk when it comes to crypto assets, whether stablecoins in particular, or crypto assets more generally. We will then see countries move to actually implement those rules at the national level. And we expect that guidance to be finalised by the BIS in January 2023.

Kristina Cornèr, Editor-in-Chief at Cointelegraph

In many countries, crypto has an ambiguous status. In Ethiopia, for example, the central bank banned crypto in June this year, apparently after ignoring it for years. It then announced a regulatory programme less than three months later.

Crypto is legal in Indonesia and the government itself is planning to invest in a new crypto asset exchange next year. Crypto is legal in the United States and European Union, but regulation is in an elementary state.

The UK has proposed making crypto assets a form of property and an investment like any other. El Salvador famously adopted Bitcoin as its national currency last year.

The state of crypto assets regulation is not good or bad. Rather, it is history in the making. It reflects the state of crypto and the culture and aspirations of nations.

The regulatory decisions that are slowly being made will shape the future. Regulation is unavoidable and desirable. We want to preserve crypto's freethinking, independent, even rebellious heritage. But we also want a safe, predictable market that encourages and protects users.

That is the only way crypto and its users will flourish. What we need for good regulation is education. We need to teach regulators and legislators what they are dealing with, because a lot of them clearly do not know. Everybody needs to know what crypto assets can do for them.

Crypto means different things to different people. And the countries with limited infrastructure need every bit as much as the so-called crypto bros. We, the industry, the community, need to teach people how to use crypto safely to avoid the embarrassing situations they call rockfalls.

And we need to buckle up for much more regulation to come. Blockchain technology will be adopted in more and more situations because the technology has so much of it to offer to humanity, and that will inevitably lead to a lot more regulation.

Koleya Karringten, Executive Director of the Canadian Blockchain Consortium and Board Member of the Canadian Blockchain Association for Women

The Canadian securities administrators have issued new interim guidance as of mid-August this year that will divide crypto assets into high and moderate risk categories that will limit exposure and require new reporting by banks and regulated financial institutions and result in increased security for companies that provide a perceived high risk secure activity.

The new interim rules built on regulations by the CSA from March and June of 2021 that require exchanges to either register as investment dealers or seek exempt of relief to register as money service businesses were the only jurisdiction in the world to regard any exchange trading where the asset isn't instantly delivered to the purchaser as a crypto contract that qualifies as a derivative security, which puts us in a really strict category when it comes to securities status of exchange traded crypto assets.

A key way we can support innovation, even within these strict regulatory frameworks, is through the use of regulatory sandboxes that permit crypto assets to provide or service providers and product developers to build their businesses and offerings in a monitored environment prior to gaining full regulatory approvals.

With the fast-paced nature of the crypto industry and lengthy process for approvals, this is essential for a competitive advantage. The Alberta Sandbox has been successful. Many companies have applied, but they have multiple streams to the sandbox, where multiple custodians have been approved through it.

A landmark bill for crypto asset regulation was introduced by a member of Parliament, Michelle Rempel, earlier this year, and the new leader of the Conservative Party has also been rather vocal supporter of the industry.

Another major success is the integration of our industry with traditional markets, especially through ETFs. In February 2021, after very lengthy regulatory education and collaboration, the TSX listed the world's first ETF, backed by physically settling Bitcoin, creating opportunities for investment by regulated industries, corporations and a wider pool of investors.

The Honourable Caroline D. Pham, Commissioner at the United States Commodity Futures Trading Commission

I'd like to identify fundamentals for responsible digital asset markets. Then I'll outline a pragmatic approach to next steps. I'll go ahead and say now that these are my views and do not reflect those of the CFTC [Commodity Futures Trading Commission] or any other commissioner. Some of you may not be familiar with the CFTC, so I'd like to tell you more about our agency.

The CFTC already has a ready-made regulatory framework for many digital assets. We are a market regulator over commodity derivatives, futures, options and swaps, and we oversee exchanges, clearinghouses, dealers and other market participants and market professionals.

We oversee exchanges that list and trade crypto derivatives and clearinghouses that clear crypto derivatives. As you know, Congress is considering several crypto legislative proposals. It's very encouraging that Congress is undertaking such a comprehensive effort to create a clearer and more holistic regulatory framework around digital assets in the United States.

It's not too late to inform international standards to minimise market fragmentation and partner with non-US regulatory counterparties on global coordination and cooperation. That important work is urgent and ongoing and indeed the U.S. Treasury Department released the next in a series of reports under the President's Executive Order to create a whole of government approach to digital assets.

I'm pleased to read these reports and to continue to see over the next month what the next steps will be under that. But in the meantime, as a critical mass continues to build with Congress market participants and public interest groups. I believe we'll see the benefit of having the CFTC principles-based frameworks that is more flexible and more adaptable to new changes and new risks. While we are waiting on the efforts in Congress, as well as under the executive order, the CFTC has important tools in its toolbox.

From my perspective, the SEC regulates the securities markets, and the CFTC has regulatory touchpoints with virtually everything else. It's well known that the CFTC has strong anti-fraud and anti-manipulation enforcement authority over spot commodity markets, which we have used over and over.

We've successfully brought over 50 crypto enforcement actions since 2015 with hundreds of millions of dollars in penalties. The CFTC also has oversight over certain spot retail effects and spot retail leveraged commodity transactions.

There could be good places to start, while Congress thoughtfully works through tasking us with additional authority. So key takeaways are that the CFTC's regulatory framework is relatively assets and technology neutral. Our focus on principles-based regulation, customer protection, market integrity, risk management, price discovery and transparency has worked well for our markets for decades through all manner of market volatility, market stresses and other market dislocations.

Digital assets and DLT could change our financial markets. But they're also familiar and in some ways predictable risks that could impact consumers, investors and business protections, financial stability and financial system integrity.

Combating and preventing crime and illicit finance, national security, the ability to exercise human rights, financial inclusion and equity - and of course, climate change and pollution. There are also the inevitable scammers and fraudsters. So this is why I've proposed heading fundamentals for responsible digital asset markets.

These may sound familiar because this is a common-sense approach. First, we need to identify the particular product or service. This means knowing whether a product is a security, it means knowing whether it is a novel, native-crypto or traditional financial instrument - cleverly rebranded but still subject to existing laws and regulations.

Second, the product or service must be within the regulatory perimeter. If there are areas of the financial system that are apparently outside and unregulated, such as a shadow crypto financial system or shadow banking 3.0, and the appropriate response is to bring them inside.

This is what the CFTC did in large part for the OTC swaps market after Dodd-Frank. And while Congress continues its work on developing legislation, there may be other ways as well to make sure the CFTC and others are exercising the full extent of their existing market oversight supervisory and Enforcement Authority.

Indeed, in one of the reports that was released yesterday under the president's executive order, it encourages the regulatory authorities to continue using their existing powers to provide guidance rules and to work collaboratively. Third, we must mitigate systemic risk. We've seen disruption spread from the collapse of projects such as Terra and Luna to other crypto firms revealing potentially undisclosed connections, exposures and interdependence among large crypto participants. That increases the risk of spread amongst and beyond crypto. We need to address this.

Fourth, we must combat illicit finance and the national security risks. Our markets need to be safe from exploitative money laundering, cyber crime, ransomware, narcotics and human trafficking and the financing of terrorism. We must appropriately use activity-based and entity-based regulation.

Five, market regulators oversee product activity and who engages in it. Prudential supervisors oversee entities and the activities they engage in. Same but different.

Six, we must protect customers and the retail public. There should be requirements for disclosure, suitability and education at a minimum. People should know what they're getting into.

Recent news reports about potential lack of protections in the event of bankruptcy for customers holding digital assets on platform rates. Real concerns.

Seven, we must ensure transparency. DLT presents great opportunities in this regard for market data, but also we must have transparency into the different operations of these firms that are in the crypto sector.

Eight. We must vigorously enforce market conduct rules. If you are lying, cheating or stealing. If you break the rules, then you should face the consequences.

Nine, we must address conflicts of interest. There should be requirements for appropriate governance and oversight prevention or management of conflicts of interest, such as prohibition disclosure or information barriers and alignment of incentives amongst market participants.

And of course, as a US government official, we must promote free markets that will unlock American innovation. I believe that markets work best when there are clear and simple rules that common standards regulation shouldn't unnecessarily increase operational complexity or costs, especially costs that then get passed down. And lack of regulatory coherence impedes the ability of regulated institutions who have the experience and the resources to actively participate in digital asset activities and responsible innovation. So here are the next steps for how we get to the right regulatory future.

One, we need to get all the information we can here in the United States. FCC Commissioner Hester Person and I have called for Joint CFTC SEC Public Roundtable to evaluate recent crypto market events and risks and to discuss how to regulate crypto responsibly and with greater clarity globally.

I am sponsoring the CFTC's Global Markets Advisory Committee, which is about having a level playing field and will focus on firms, global business strategy and operations and the markets that are needed to support growth and effective risk management. The G Max is an international forum for executive leaders from both the public and private sectors to come together and create a shared vision for the future of markets. One potential subcommittee could be on digital asset markets.

Two, we need to learn as much as we can. We should remember the hard learned lessons from the financial crisis and Dodd-Frank and other G20 reforms. Let's be careful about big bang changes that could lead to market fragmentation and unintended consequences.

Three, we need to find pragmatic solutions. We should start with what we have. I believe it's usually faster, easier and more reliable to use what's existing and tried and true than to stand up something that's entirely new.

When it comes to the CFTC, we have ready made regulatory frameworks for derivatives markets that have stood the test of time. We have our core principles and business conduct standards, broad anti-fraud and anti-manipulation authority, and we should also harmonise the laws and rules we have.

Lord Holmes of Richmond MBE FBBA, Member UK House of Lords and Fellow of The British Blockchain Association

(Member of the upper house of UK Parliament with a policy focus on innovation and inclusion, talent and technology. Unable to present at the BAF summit due to the passing of Her Late Majesty and the official mourning period.)

I was sorry not to be a part of the BAF Summit this year and had intended to open my comments with a sincere thanks to the community for all that you do on promoting this important agenda. I also planned to tell you a little about my work in this area, what the government are doing, what I think they should be doing, and why it all matters. My particular involvement in crypto and other emerging technologies was always a bit to do with an interest in the technology itself, but more than that, I've always been absolutely captivated by the technologies potential to be put to public good and private good. Most importantly to get behind some of the most tricky issues that have dogged our nation for decades and some of the issues that are now starting to emerge and really cause difficulties in individual nation states and across the globe.

In 2017 it seemed extremely important to me that we in Parliament, and in leadership roles generally had to say something about the potential of distributed ledger technology (DLT). I was concerned at that point that blockchain and bitcoin were seen as interchangeable. My fear then was that all the (in many cases valid) fears about bitcoin, the volatility, the environmental impact, the use by bad actors would prevent policy makers from seeing the opportunity inherent in underpinning technology. I convened a group of 50-60 experts to put together a report, Distributed Ledger Technology for Public Good: leadership, collaboration, innovation. The use for public good and the call for leadership, collaboration and innovation remain core to my message to this day. That is what I believed it would take then. That is what I know it will take now - if we are to make a success of the opportunity. If we mess this up it will not be a failure of the technology, it will be a failure of humanity.

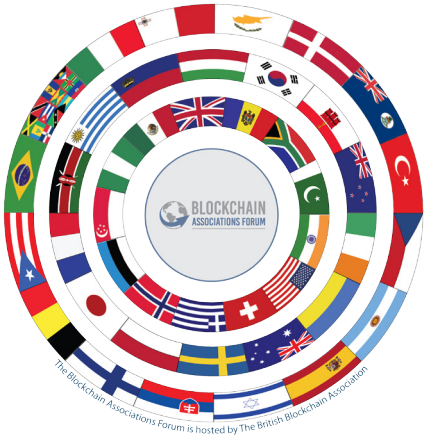
So what has the UK Govt. done so far? There have been some interesting examples - obviously I would have liked them to do more and at a greater pace – but there has been some good work on supply chain and border systems. This is really the important point, crypto is not just about currency, the breadth of applications could be profound. I also worked with HMRC on a proof of concept in the UK Australia wine trade. The project was called 'Reducing Friction in International Trade' and used a combination of IoT and blockchain technology throughout the entire process and benefitted from the involvement of academics, both UK and Australian governments, trade bodies, regulators and a tech company. These two, tiny but important, examples do successfully illustrate the vast potential here.

What I now hope government will do with this technology is a complete re-drafting of the social contract between citizen and state for the betterment of both. I am excited this autumn by the Financial Services and Markets Bill going through Parliament. There are a number of important elements already in the bill – for example bringing stablecoins into the regulatory environment – and further elements that I intend to bring into the bill. The last time we had a major Financial Services and Markets Bill in the UK was 22 years ago. The current draft is 330 pages, there is a lot in there, but this is the opportunity to get the right regulatory framework for crypto in the UK. Forward thinking, outward facing, understanding the potential, the economic opportunity, the benefit of competition and also the need for consumer protection without seeing any of that as pulling against one another. They are all positive bases on which to build an effective regulatory environment for crypto in the UK.

It has been good to see the work the government and the Bank of England have done around a CBDC, again I would like to see more pace, but there has been some good, technical work. There is a real question about at what point a state should move on a CBDC. Where is the first mover advantage? When, at what point, should more developed and larger economies get involved? When should others join the CBDC race? It is key that we properly understand the wholesale and retail elements and to see where each jurisdiction has the optimal point of entry and how to collaborate internationally.

For me the most meaningful opportunities are around financial inclusion. If we enable financial inclusion that doesn't just benefit those on the sharp end of financial exclusion it benefits all of us. Not just economically but socially - in that we are all able to say we are part of a civilised society. Several years ago there was an excellent proof of concept done by one of our government departments that enabled tokenised benefits on a smartphone device, using a blockchain platform. The most exciting element was that the recipients were enabled and empowered by the system. But sadly it was not developed beyond that initial small scale pilot. In order to truly see the benefits of this technology we must get to scale but this brings us to what's been called the blockchain impossibility triangle. The idea is that blockchain can achieve only two out of the three objectives: consensus, decentralization and scalability. Ironically, as DeFi redefines financial services. of those three objectives, decentralization might be the one you might forgo. But this is an important question. Which two do we choose? We need to have these discussions.

Ultimately this is a human endeavour. A human endeavour of enablement, empowerment, of citizens, community, city, country and a connected global community. Crypto can play such a positive role in that endeavour, but it is can - not will. Nothing is inevitable here, it's down to me and its down to you, to lead, to collaborate, to innovate, to educate and inform. It must all be rooted in the right values and we must all do all that we can for the economic, social, psychological benefit of us all.



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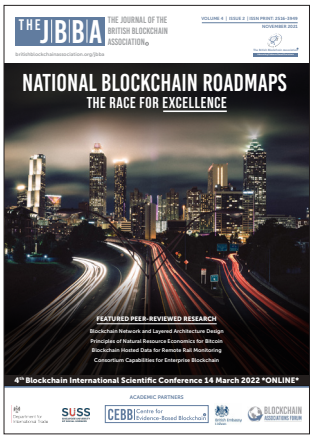

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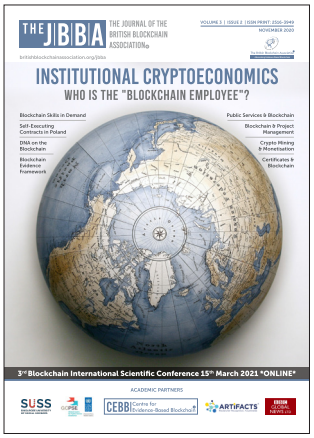

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The British Blockchain Association
Advocating Evidence Based Blockchain

BBA FORUM | MARCH 2022

SUNDAY, 27 MARCH 2022 (5 PM BST)

Registration Link: https://bit.ly/375Tsc2

5:00 PM | Welcome
BBA Secretariat

JOURNAL CLUB

5:05 PM | Non Fungible Tokens & Crypto-Punks
Luisa Schaar, University of Law, UK
Author of the 2022 JBBA Paper:
NFT's as an Alternative Investment: Evidence from Crypto Punks

5:20 PM | Blockchain, Contact Tracing and Pandemics
Oritsebawo Paul Ikpobe, The University of Birmingham, UK
Author of the 2022 JBBA paper:
Can Blockchain Take Smartphones Out of Contact Tracing?

5:35 PM | Crypto Governance and Cryptocurrency Exchanges
Sabino Correa, London Business School, UK
Author of the 2020 JBBA Paper:
Crypto Governance: Analysing Platforms for Crypto Assets Trading

5:50 PM - 6:00 PM: Open Forum AMA & Close

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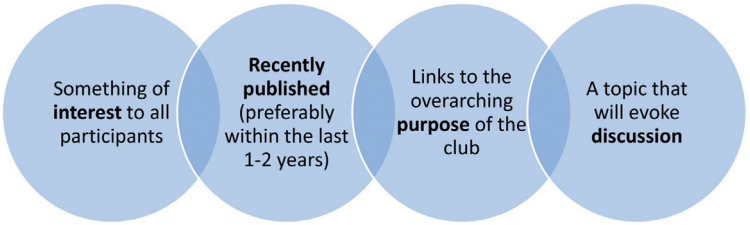
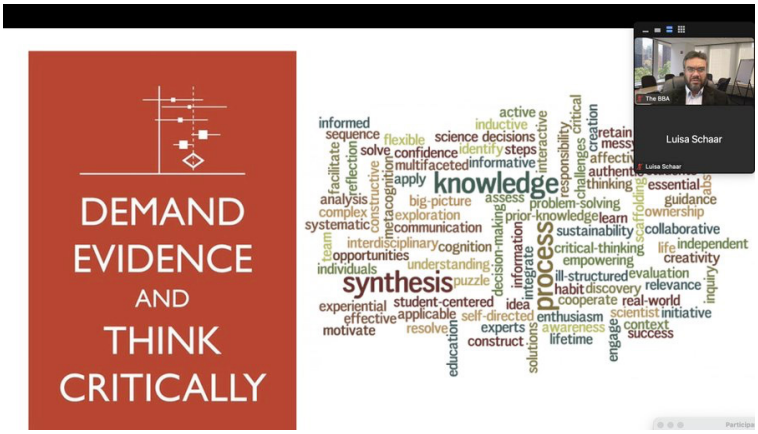
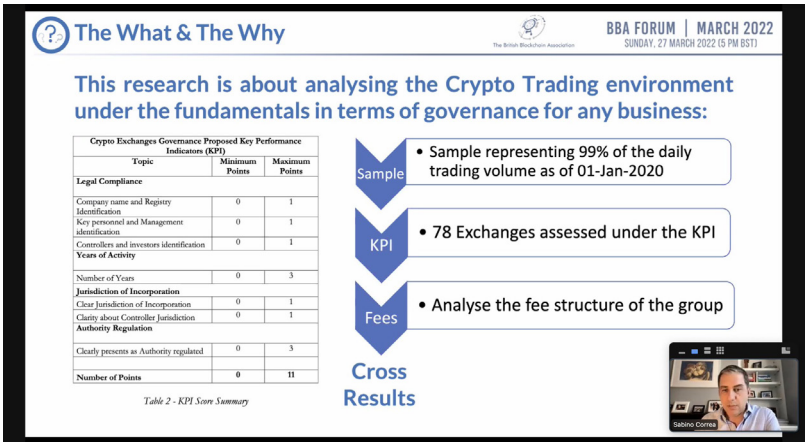


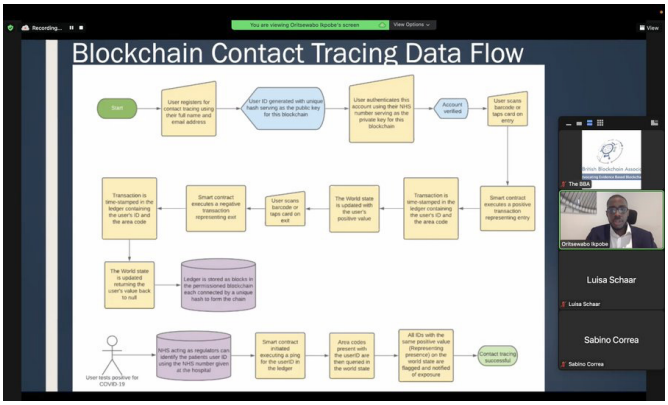


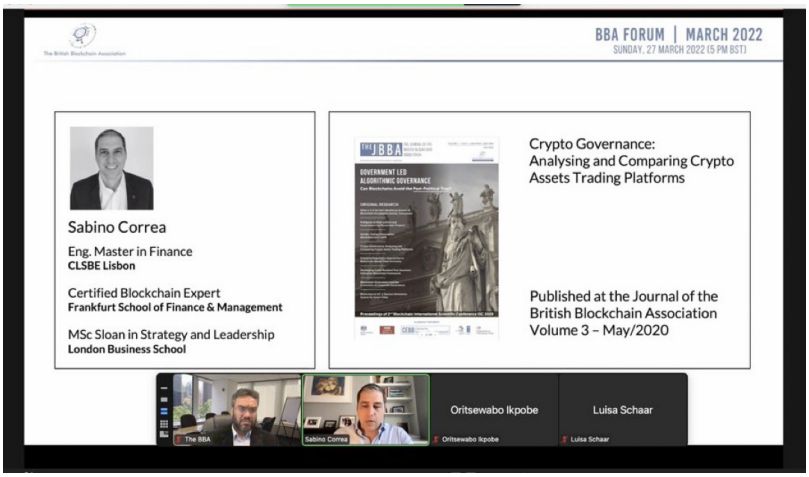


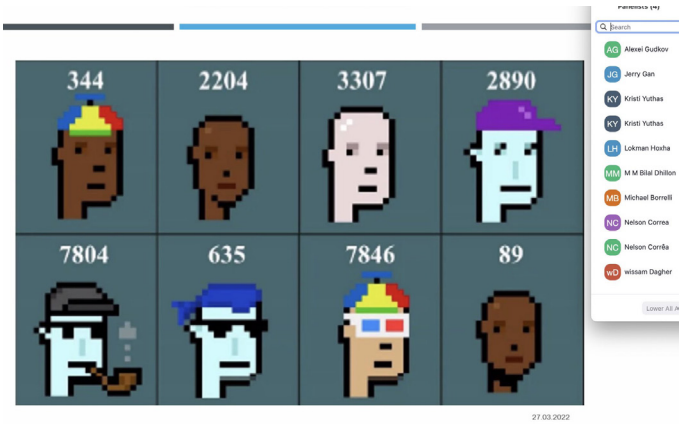
Crypto Exchanges Governance Proposed Key Performance Indicators (KPI)

Topic	Minimum Points	Maximum Points
Legal Compliance		
Company name and Registry Identification	0	1
Key personnel and Management identification	0	1
Controllers and investors identification	0	1
Years of Activity		
Number of Years	0	3
Jurisdiction of Incorporation		
Clear Jurisdiction of Incorporation	0	1
Clarity about Controller Jurisdiction	0	1
Authority Regulation		
Clearly presents as Authority regulated	0	3
Number of Points	**0**	**11**

Table 2 - KPI Score Summary







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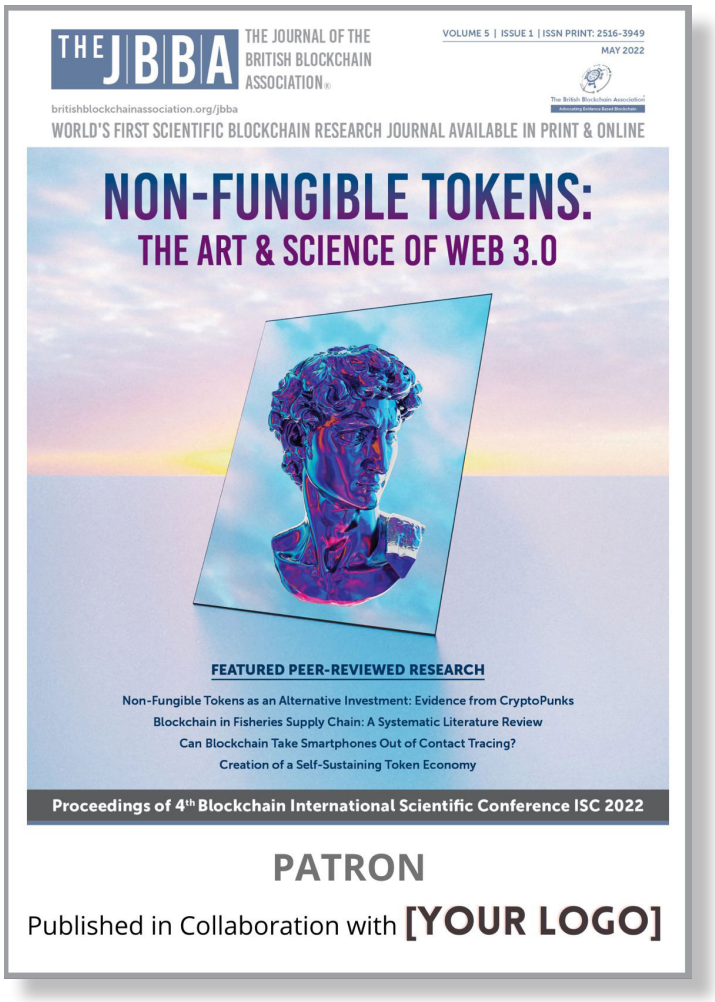

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