Tokenization of Assets and Blockchain

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What is tokenization - a short overview of different tokens

During the rapid development and increased interest in blockchain during the last few years, different processes that benefit from the fact that they are being implemented with blockchain technology have gained attention. Tokenization is one of the processes on which the spotlight of blockchain popularity has landed. This topic is becoming increasingly frequent in the context of financial services, real estate, and other aspects that involve traditional assets. This article presents an overview of the different categories of assets that can be tokenized, the advantages and disadvantages of tokenization and real world examples.

The Blockchain Council defines tokenization as "the process of transforming ownerships and rights of particular assets into a digital form." As pointed out by the council, it is helpful to keep the difference between *fungible* and *non-fungible* assets in mind. Fungible assets are not unique and can therefore be replaced by a similar item, like a 1 Euro coin that cannot be distinguished from any other coin. Examples of fungible assets include gold and money that in most cases, can easily be divided into smaller fractions.

In contrast, non-fungible assets are unique and irreplaceable assets that cannot be divided into fractions in the analog world. One of the most common examples of non-fungible assets is the painting of Mona Lisa. Besides fungible and non-fungible assets, we should also consider *intangible* assets (i.e., assets that lack representation in a physical object), such as patents and copyrights, which can also be tokenized.

Moreover, assets can also refer to sensitive data such as financial, healthcare, and voting records. The purpose of tokenization of such assets is to safeguard confidential information by transferring it into a token.

To have a complete understanding of tokenization, it is also helpful to be aware of the difference between security tokens and utility tokens. On the one hand, security tokens provide the holder with rights like traditional security, for example, the right to a share. However, it is crucial to remember that the definition of security tokens depends on the relevant jurisdiction in each case. Still, most commonly applied, on a global level, is the US-based Howey Test to determine whether a token is considered as a security or not in the US. This test was set out in a U.S. Supreme Court ruling and defines securities as "***an investment of money in a common enterprise with a reasonable expectation of profits to be derived from the efforts of others.***" This definition is also used as a reference with regard to cryptocurrencies that fall under

those characteristics, since April 2022, as a result of a speech given by the US Securities and Exchanges Commission (SEC) Chair Gensler, who said that ***most crypto tokens likely qualify as investment contracts and, therefore, should be registered with SEC***.

On the other hand, utility tokens provide the token holder with access to an existing or prospective product or service. These are usually limited to a single network (that is, the issuer) or a closed network linked to the issuer. For example, a tokenized store card, Disney Dollars or specific gaming tokens could be considered types of utility tokens.

Advantages of tokenization on a blockchain

One of the key advantages of tokenization is that it allows for assets that are non-fungible and hence indivisible in the analog world to be divided into fractionalized digital tokens. Examples could be a real estate property, or artworks. In contrast to traditional processes, multiple people can own an asset through fractional ownership. The value of an asset is broken into fractions representing a certain percentage of the total value, which allows the possibility of having multiple owners of the asset through fractional ownership. Not only does this lower the barrier to investments in this kind of assets - but it also increases global access to investment opportunities, which promotes financial inclusion and contributes to the democratization of investment. Regarding real estate ownership, this offers a potential considerable advantage as it lowers the barrier for people to invest in properties. Tokenization of real estate assets makes it possible for people lacking a large amount of capital required to invest in a whole property to invest in a fraction of the property and enjoy the yields of the investment. Moreover, fractional ownership through tokenization increases liquidity as investors easily and quickly can trade their tokens rather than waiting for years to receive the profits or losses from large and illiquid assets.

Access to financial services in general are another area where blockchain and cryptocurrency applications make it even easier to harness these advantages by eliminating the need for intermediary banks and other financial companies This gains more relevance considering that the World Bank's Global Findex Database 2021 estimated that 30% of all adults worldwide lack access to bank accounts. Moreover, eliminating intermediaries reduces the transaction and process time and the cost of buying and selling assets by lowering fees.

As mentioned, intermediaries such as banks are bypassed with blockchain and decentralized applications, which enable even faster transactions, greater

transparency, access and 24 hour trading of tokens as they do not depend on the opening hours of banks, location, etc.

Another important advantage of tokenization in combination with blockchain is data security. Blockchain tokenization saves sensitive information as a combination of letters and numbers in tokens that pass through a cryptographic function. This process guarantees that each token is unique, but most importantly, it significantly reduces data security risks since the alphanumeric code stored in the token only serves as a reference to the sensitive data and does not reveal the original details or personal information; this is due to data and privacy rights that are materialized into regulation such as the European General Data Protection Regulation- GDPR.

The combination of tokenization and blockchain also benefits from the inherent main advantages of blockchain: transparency, traceability, accuracy, and immutability. With tokenized assets registered on a blockchain, all transactions with regard to each asset are available to anyone that interacts with the blockchain. This establishes trust in the market as the owner's history of an asset can be traced easily. The fact that blockchain does not allow any transactions to be changed, further strengthens this trust. For example, it removes the possibility for sellers to manipulate the history of an asset to make it more appealing and charge more than its actual value.

Furthermore, bringing in blockchain-based smart contracts to tokenization has the potential to deliver significant efficiency benefits. A countless amount of automatic algorithms can be based into smart contracts and thus automate processes to improve accuracy and save time and costs, for example, by reducing the operational overhead. In sum, blockchain offers tokenization, a single - and open - source of truth with reduced risk for human errors.

Challenges to overcome

There are several challenges which the Industry will have to overcome. The process of tokenizing real-world assets is complex and requires a significant amount of legal and technical expertise. This includes the regulatory and legal framework for tokenized assets which is still under development and non-standardized regulations across various jurisdictions. Uncertainty about regulations may deter some investors and developers. Furthermore, blockchain technology is also not immune to cybersecurity risks, and the security of the tokens and underlying assets must be carefully managed to avoid fraud, manipulation and hacking.

Many of the potential disadvantages can be overcome through cooperation with relevant stakeholders including regulatory agencies, which is key in the harmonization of rules across the globe. The focus should be on implementing

standardized sets of rules within the code base of smart contracts and automation of compliance through the transparent nature of blockchains.

An overview on Token economics

According to Kampakis, the use of blockchain-based tokens enables a generation of new types of *(token) economies* that are customizable and tailorable, while ensuring security and transparency without the need for centralization. In the same direction Doe-Bruce understood token economics as *"a set of rules, principles and incentivization mechanisms that govern a token ecosystem, with the goals of sustaining the vision of a blockchain based platform."* With the right incentives and policies in place, tokens can scale their value and an economic model can be created that benefits everyone in the system.

When creating a model for a token economy the focus often lies on building on the one hand incentive based rewards schemes to reinforce a certain behaviour, which does not differ much from the idea of the model of the behavioural token economy, where they can be collected and later exchanged for items of value such as goods, services or usage rights. Therefore, depending on specific design rights and reward structures tied to token ownership, specific behaviours of individual participants can also be encouraged in decentralized structures. When looking at incentive-based schemes, the use of the game-theoretical approach is prominent, as it is practiced in microeconomics. On the other hand, according to Kampakis, token economics can be used to address the macroeconomics level and can function as monetary policy for supply and demand of a token and thus controlling the inflation of a token. As the token economics is customisable via smart contracts it can differ from token to token and be focused on a different purpose such as fundraising and governance. Common tokenomics models include for example the deflationary model or inflationary model.

When looking at the tokenization of assets, token economics play a crucial role as they represent not only the sets of rules that aim to scale the value of its token but also can be used to incentivize specific behaviour of agents that minimizes the risk of harmful crises such as the 2008 financial crisis.

Furthermore, token economies have the potential to positively impact society in a wide variety of areas. For example with incentive-based rewards' schemes, environmentally conscious behaviour could be rewarded in a tokenized carbon market.

How are tokenization and blockchain combined in the real world?

Any asset can be tokenized - both virtual assets and assets existing in the real world - and any tokenized asset can be registered on the blockchain. When an asset is tokenized and registered on a blockchain, digital tokens on the chain represent and store the value, history, rights, etc., of the asset off the chain, which continues existing virtually and in the real world just like it used to, prior to the tokenization.

There are numerous examples of assets that can be tokenized and consequently also tokenized on the blockchain. A few examples of them are presented below.

- Yenna Tech
  Yenna Tech is an initiative focused on tokenizing real farmland that aims to support farmers by facilitating their access to funding. Properties of farm owners are tokenized and divided into fractions representing the business value, such as plants, crops, construction, etc., of a specific unit of land. The farmland is then offered for trading at a marketplace in the form of tokens. This form of tokenization facilitates access to the farmland investment market as it does not require enormous amounts of capital - one can participate by investing in just a fraction of the farmland. Moreover, it enables micro-financing and the possibility for farmers to raise funds from several investors. The investors receive rewards at the end of the harvest, which can also be tracked transparently, thanks to the combination of tokenization and blockchain. Yenna Tech is built on the Shimmer network launched by the IOTA Foundation. Automated processes written into smart contracts ensure that the regulatory needs of farmers and investors participating in the marketplace are covered. For example, clients complete KYC, authorized professionals analyse documents to validate the farmland, and the original land documents are secured in a vault.

- Single.Earth
  This initiative uses the MERIT token to "balance the economy with nature's capacity to sustain life." Ecological values of the environment, such as biodiversity and carbon sequestration, are tokenized to create a real-time representation of nature. The MERIT tokens are issued to landowners according to the ecological value of their lands and their preservation of it. Tokens that demonstrate activities that promote care and protection of nature, such as carbon sequestration, can be sold by the landowners to investors that purchase them to protect nature and potentially trade them in the future. 1 MERIT equals 100 kg of CO_2 captured in biodiverse nature. Hence the factor that determines the amount of MERIT available is the state of health of nature. The MERIT digital twin constantly monitors and evaluates nature to keep an accurate digital value of the token. In addition to the benefits that this initiative brings for

nature and a green, sustainable future, it also has the potential to generate a positive socio-economic impact as communities get paid for taking care of the environment. This provides an excellent opportunity for underprivileged communities to improve their livelihood and for women's empowerment.

- NEXUS
  Project NEXUS was created to tackle the problems of high entry barriers in the real estate and stock markets, limitations to holding these assets, and the cumbersome process of selling them to realize profits. In order to provide a solution to these problems, project NEXUS fractionalizes real estate and stock derivatives into tokens. This removes the need for the high investment capital that traditional finance demands, which expands the market as more people can be included. With this project, $5 is enough to invest in properties in attractive regions such as LA or Tokyo, and as little as $1 can be used to invest in stock derivatives. The fact that such small fractions of real estate or stock assets can be traded brings important benefits with regard to liquidity and the quickness and efficiency with which the tokens can be traded; as the tokens are sold on the NEXUS platform, there is no need for third parties, which makes the trade of the assets even smoother.

Final remarks

The tokenization of traditional assets brings a new universe of possibilities for investment opportunities to enhance and accelerate financial inclusion. Tokenization can generate asset liquidity which increases market movement by creating accessible ways for selling and buying while also expanding the number of people that can participate in the market.

Introducing a token economy at different levels can contribute to making industries more competitive and efficient while enhancing trust and reducing complexity, which can be a crucial factor in supporting regions in the developing world to become competitive in the international market and therefore empowering their local economies. Consider the tokenization and digitalization of processes along the supply chain to accelerate processes and the cross border movement of goods.

Regardless of the intrinsic benefits of tokenization, challenges will need to be addressed. For example, regulators will have a crucial role in developing the token economy, especially in Europe, where stakeholders often demand a suitable regulatory framework and regulatory clarity to have certainty before they even consider investing in new businesses and technologies. Hence, one of the current main challenges is the lack of a harmonized legal framework with high standards of

security and consumer protection that also allows innovation and provides incentives to explore the advantage of tokenization.

Addressing this particular challenge requires a constant dialogue between industry players, innovators, and policymakers that allows the different players to raise and address questions and concerns about where the regulation of the space is and should be heading. To achieve regulatory clarity, it is necessary to have awareness about where the industry is going and what are the challenges and opportunities they face while also understanding what the regulatory concerns are, in terms of consumer protection and guarantee fundamental rights such as privacy.

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Åsa Dahlborn works as a Project Manager at the IOTA Foundation, supporting the implementation of the Trade and Logistics Information Pipeline (TLIP) project. She holds a Bachelor of Arts in Economics, Politics and Social Thought and her focus of interest lies in exploring how DLT (Distributed Ledger Technology) can be used to promote sustainability, equality, and economic empowerment. Her background includes active work with the Social Impact and Sustainability Working Group of INATBA and contributions to key achievements of the working group such as the report “Blockchain for Social Impact.”

Mariana de la Roche is the Senior Regulatory Affairs Expert of the IOTA Foundation. Since 2021, she has been the co-chair of the INABTA Social Impact and Sustainability Working Group. She is a Colombian human rights lawyer with a law degree obtained with academic excellence, a specialization in human rights and humanitarian law, and a master's degree in public administration. She has over nine years of experience as a project manager and legal and regulatory advisor for different NGOs and social businesses in Colombia and Germany. Mariana has been leading the actions of the social impact and climate of INATBA, raising awareness and advocating for blockchain for good at the global level. She spoke and presented blockchain use cases for good in COP27, the EU blockchain week, and the Environment Ministerial For Europe Conference, among other relevant international spaces. Mariana is also part of the leading team coordinating Blockchain 100+, an initiative supported by the UN's General Assembly to create a charter for blockchain and the UN Values. Lastly, since 2023 she is one of the ambassadors of the Global Blockchain Business Council (GBBC).

Laura Kajtazi is working as Project and Regulatory Affairs Manager at the IOTA Foundation and is an active Member of the Identity Working Group of International Association for Trusted Blockchain Applications (INATBA). Before working full time as a Project and Regulatory Affairs Manager for the IOTA Foundation Laura studied and completed her Master Programme in International Economics and Management at the University of Paderborn (Germany). In her studies she discovered her passion for Entrepreneurship and Macroeconomics and began to more closely deal with the crypto area from an entrepreneurial and monetary policy perspective.

During her Master studies she has already started working as a working student for the IOTA Foundation and gained increasing insights on the benefits of Distributed Ledger Technologies for different sectors like health tech, sustainability and global trade and supply chain.

Robert Daykin is a co-founder of Nakama, Nakama is a thesis-driven, long-term focused web3 builder (inclusive of Defi) and venture fund. They partner closely with the projects they invest in or incubate and actively participate in their governance, community-management and adoption. Their mission is to create value for all stakeholders and help crypto move away from value extraction, towards value creation and sustainable token economies. Robert Daykin has 15 years of experience in Fund Finance working across London and Jersey and has been actively involved in Crypto since 2015, becoming interested in Defi as an early investor in ETH Lend in 2017 which later became Aave, he has since advised projects in Defi focusing on creating fairer economic models for all stakeholders. He has also recently started advising the IOTA Foundation in creating a sustainable web3 ecosystem on their upcoming smart contract ecosystem.