Capabilities of Blockchain Technology in Tokenization of Economy

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ABSTRACT

One of the leading technologies nowadays, which is extremely helpful for the tokenization process is Blockchain. Combining Blockchain technology with the tokenization process creates a digital economy based on values rather than speculative demand. Therefore, we can say that tokenization leads us to a new era of global investment with minimal risks and high volatility. Tokens, which are specific objects that reflect the real values (such as money, stocks, credit card numbers, medical records, etc.), provide new investment opportunities and open up new areas for investment and trading. However, no single token classification system has yet been introduced that would help to clearly differentiate the functionality of each type of token for further use in different areas. The leading by popularity division of all crypto assets can be described within the three main groups: Payment, Utility, and Security tokens. This article offers a more detailed review of each of these groups and highlights the features of each of them.

Keywords: *Blockchain, payment tokens, utility tokens, security tokens, classification of tokens, tokens in digital economy.*

1. INTRODUCTION

Today's digital economy is based on tokenization, which is used by billions of people every day. Tokenization can be defined as the process of replacing real values (such as money, stocks, credit card numbers, medical records, etc.) with tokens that reflect these values, making it easier and safer to trade them. This may seem unreachable, but tokenization has a profound effect on our lives and can transform entire industries. Tokenization is also extremely important for the safety of personal data, for example, credit card privacy can be converted into a digital token, which is safe enough not to be hacked but is used by banks to complete the payment. Therefore, more and more companies are issuing digital substitutes for different types of securities instead of using paper ones due to their increased safety and efficiency.

The appearance of the blockchain not only made it possible to combine the security properties of the token, but also to attach a number of new properties to it, allowing to safely and efficiently tokenize a wide range of real assets and businesses, providing new benefits and applications for a wide variety of industries such as the arts or healthcare. Such blockchain capabilities lead to a huge number of tokens with different functionality and technical features. This article presents and substantiates the classification of blockchain tokens.

Worth noting that there is no common classification of all tokens, but one of the most popular divisions can be described within the three main groups: payment, utility, and security tokens. I would like to go in detail for each class and create a tree of tokens in Figure 1.

2. CLASSIFICATION OF TOKENS

2.1. Payment Tokens

The first class of tokens is payment (or exchange) tokens. Payment tokens have the function of money (means of payment) in digital form. There is a heated debate around the notion of payment tokens because some people believe that cryptocurrencies cannot be distinguished as payment tokens, but are a separate class of tokens. But if we are taking into consideration token's purpose of use, we able to make it clear that cryptocurrencies are a part of payment tokens [1]. These tokens are used for the sole purpose of transferring value, in other words, for buying a different kind of goods or services. Bitcoin, proposed by Nakamoto, was known to be the pioneer among the cryptocurrencies, and in general, the architecture of the Blockchains. Since then, a sufficient number of payment tokens was launched, not only on the as a new blockchain with its own architecture but also based on the existing blockchains, for example, as a consequence of the fork - specific change of protocol which leads to new rules for all the nodes in the system. The main problem of cryptocurrencies is their volatility, which also exists due to the fact that such tokens are collateralized solely by the capabilities of a blockchain [2]. One of the possible solutions to this issue is the usage of stablecoin.
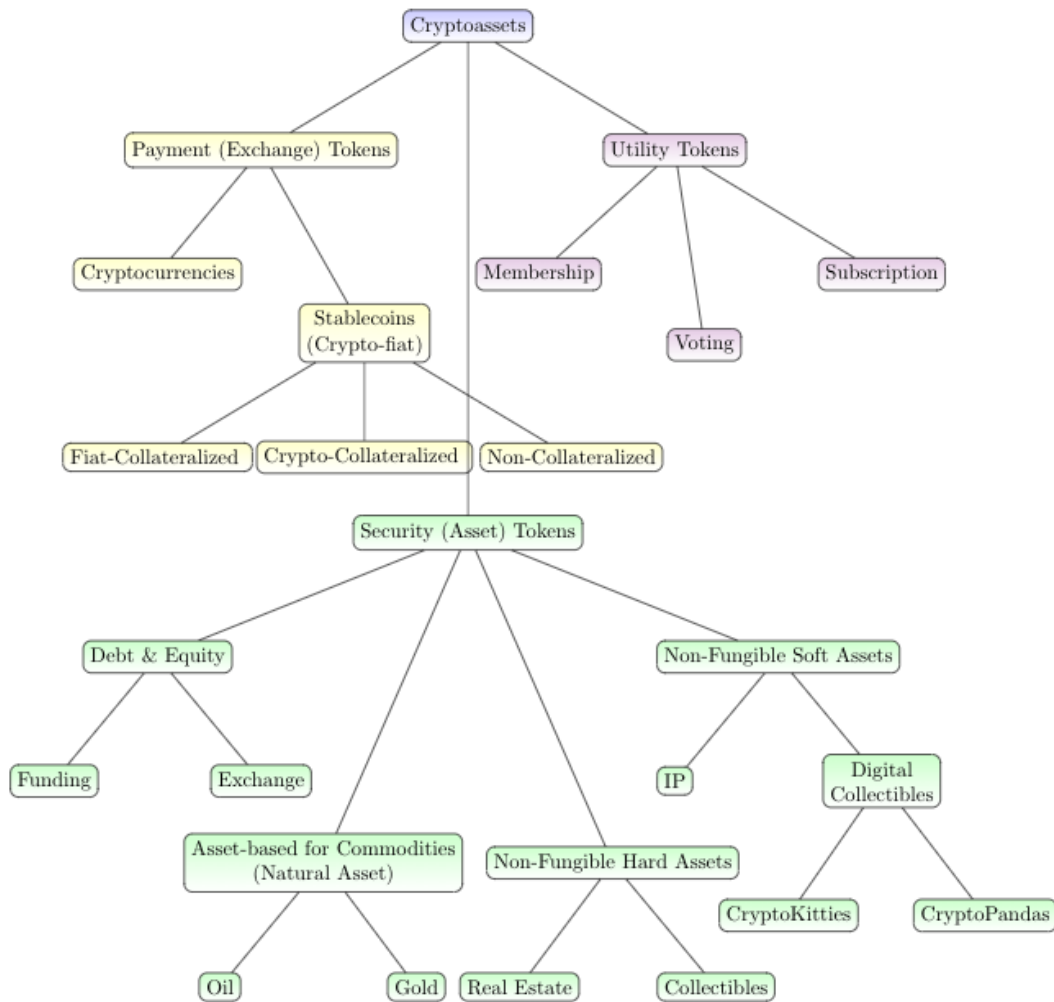
Figure 1 Classification of blockchain tokens

A stablecoin is new class cryptocurrencies that are backed by a reserve asset. The main idea of such coins is that they provide not only instant and secure processing but also stable valuations currencies. According to FINMA, there are three main categories. Fiat-Collateralized stablecoins are backed by a fiat currency reserve in a fixed ratio (1 stablecoin = 2 euro) or by precious metals like silver or gold. When someone transfers fiat currency to the system, new stablecoins are mined and sent to the depositor's wallet. When the stablecoin is exchanged to fiat, the coins are burned, and the fiat currency is returned. As an example, we can provide TrueUSD, USD Tether, and USD Coin, all pegged against the U.S. dollar. At the same time, all these coins are extremely difficult to call truly decentralized. Rather, such a definition as a token with a claim on the fiat currency in a centralized repository applies to them. The next type of stablecoins is Crypto-Collateralized stablecoins. They can also be called fiat-backed ones, although, they are pegged against the limited supply of cryptocurrencies, which are

locked by special smart contracts. Such stablecoins should be backed with a large number of currencies for a smaller number of stablecoins. One more feature of such stablecoins is that they can be collateralized by a basket of crypto assets and fiat currencies, like MakerDAO (backed by Ethereum and, since this year, by USDC). One more specific type of stablecoins is Non-Collateralized (or algorithmic) stablecoins. They are not backed by any reserve assets but include a special algorithm to retain a stable price. The smart contract emitter takes control over the total supply of stablecoins in the market by issuing or burning coins in order to save the token price. Such stablecoins could become a mainstream tool in the retail business. Some stablecoins are backed by the combinations of assets, for example, fiat currency and cryptocurrency, and can be called Hybrid Stablecoins. Thus, payment tokens introduce a huge group of different tokens, such as cryptocurrencies and stablecoins, which can be used as a payment instrument.

2.2. Utility Tokens

The second group of tokens consists of different types of so-called utility tokens [3]. Such tokens guarantee the users the ability to consume some specific products. And here, it is important to understand that as an instrument, it is not supposed to be an investment. There must be a specific use case within the system, in some cases, a discount or bonus on a product or service is possible, but again only within the project. Buyers can gain early access to it or other privileges. This type of tokens has it's a key feature - they are not minable and do not require their own blockchain (can be based on third-party blockchain). To sum up, this type of tokens has an understandable utility and limited use and also gives an opportunity to raise funds for a project without loss of independence. However, utility tokens don't give an opportunity to own a share in the company's profits, and that is why they do not fall under the securities laws, which made it very easy for lots of projects to enter ICO, especially from a legal point of view [4]. Nevertheless, it did not prevent token prices from rising, and companies saw their capitalization. On the other hand, because of the seeming simplicity of such systems, there were a lot of fraudulent projects that did not fulfill their plans and promises, some of them disappeared or abandoned further development. By and large, this state of affairs has led to a certain decline in interest among investors and their increased accuracy in making deposits.

2.3. Security Tokens

One of the possible solutions to increase confidence in the issued tokens is the use of specific tokens, the main function of which is the representation of securities on the blockchain. This is the biggest group of tokens, and it is called security (or asset) tokens. This class is strikingly different from the others. They are offered and traded while ensuring regulatory compliance in their jurisdiction [5]. The main idea of security token is that such type of token may be backed by the company's assets (external tradable assets) such as shares, dividend rights, or voting rights. All this undoubtedly increases the trust of investors who believe in the company, and this is a more transparent and safer type of investment. Security tokens are issued via Security Token Offerings (STOs) on specially designed platforms that transfer the regulatory requirements into the blockchain system on which the token is issued. Like payment tokens, security tokens can be divided into how many groups depending on the collateral.

The first type of security tokens is debt and equity tokens. They are solving, for example, the intermediary problem for startups. New companies that need financing and want to prove their responsibility issue tokens that are analogous to well-known equity capital spenders - stock certificates and mutual funds. However, security tokens offer digital ownership of a liquid and trustless representation of company debt or equity. This is because every user can access a blockchain system on which the token is issued and can verify the ownership of the token as well as the authority of a certain person to trade it. If we are talking about equity tokens, each token is equated to a company share, giving its owners equal rights to vote on its future and pay dividends, and the owners themselves are equated to the actual shareholders. The holder of equity token literally owns a given percent of the company that issued that type of token. Usually, all equity tokens have the same value in case of voting and can be related as "common stock", but sometimes startups decide in favor of creating tokens with different values (10 or 5 votes per token). A company can create as many different stock classes, as it is necessary, including tokens which get no votes. Sometimes a company also assigns shares what is called a "preferred dividend", which receives their part of corporate profits from other investors in the company. All of the holders should be informed of such opportunity because the ownership of a "preferred dividend" leads not only to the greater percentage of corporate profits but also to the early access to the payment of those dividends. Thus, tokens are analogs of securities, but with increased liquidity and trust.

As for debt tokens, unlike equity-based tokens, they are issued as a securitized analog for debt instruments, such as real estate mortgages or corporate bonds, with the promise of subsequent redemption of these tokens from investors [6]. There are two main features of debt tokens that affect the token's behavior: dividend (it is necessary to make regular dividends based on payments of the underlying debt instrument) and risk (each token remains at risk of default by debtors or extreme changes in debt valuation). These two factors play a leading role in the pricing of the security token. If we pay attention to the blockchain system of implementation of smart contracts used for tokens of debt securities, we can see that such contracts must have such operations as repayment terms, which dictate the dividend model and analyze the risk factors. Since risk is significant, one of the possible strategies is to mitigate it or hedge against it. One such principle is the use of the Collateralized Debt Obligations (CDOs) concept. If we apply the concept of CDOs to debt security tokens, we can introduce a token set of security tokens with different risk profiles. These tokenized securities can combine the high-dividend/high-risk model of riskier debt tokens with the medium-dividend/low-risk model of safer debt instruments. Moreover, there exist different Hybrid tokens that are convertible between debt and equity-based on their behavior.

As we have already mentioned, each security token is backed by a specific type of asset. One of the biggest

groups of assets is physical resources, such as oil, natural gas, wheat, or sugar, and many others. All these commodities are extremely important for human development, and it's necessary to control the consumption of such assets. In turn, the blockchain can change and simplify how we clear and settle trade in an underlying physical asset. For the purpose of doing this, asset-based security tokens for commodities (or natural asset tokens) were introduced. It is also possible to trade non-standard products, such as renewable hydroelectric power, wind and solar power. This allows not only governments, but also utility companies, as well as individuals, to participate and conclude transactions on the same platform. On the other hand, natural asset tokens require verification to establish the validity of the token. This can be held by auditors (or so-called "oracles") who check the safety and reliability of storage facilities for storing goods. For example, the gold-backed token represents the whole or part of a gold bar that is stored and verified using "oracles" providers. Therefore, tokenization of gold or other commodities claims the solution of the issues with oracle providers in order to offer large-scale implementation of asset-based tokens. Thus, it's still mostly theoretical, and there are also some real challenges in the form of government policy and regulations, but шt's only a matter of time before natural asset tokens become one of the largest crypto asset types.

Security tokens can also be backed by non-fungible assets. This increases the liquidity of assets with low liquidity, such as vehicles, real estate, jewelry, art, and collectibles, which lack access to high trading volumes, trading opportunities on exchanges, and liquidity. The tokenization of non-fungible assets leads to the reduction of price volatility, and the risk of sudden price crash is asset value. Hard assets are understood as tangible and physical items or objects that can be owned by an individual or company. Two main groups of hard assets that are usually tokenized are real estate and collectability. Real estate tokenization offers a method of creating a portfolio of a single property or group of properties on the blockchain system. Tokenization allows you to break an expensive property into any number of parts, or tokens, which may cost a fraction of a cent. For example, if you tokenize a shopping center for a billion rubles, dividing it into a million tokens, the minimum threshold for investment is only 1000 rubles. This is a great opportunity for small investors to access institutional-level facilities without joining real estate investment funds, as well as allows them to trade their assets potentially quickly and efficiently. However, the moment of registration of the change of ownership has not been properly organized, and the protocol for capital investments is not yet in place [7]. For example, in Russia, the main barrier to the tokenization of real estate is in state registers, or rather the principles of their work. Although making an entry in the state register without supporting documents

does not mean the appearance/change of rights to the property itself, state registers still have a number of important functions. Therefore, assets, the rights to which are fixed in the registers (e.g., the right to real estate in the Unified State Register of Property), cannot be fully tokenized without transfer of the register itself to a blockchain. One other problem occurs due to the securities law, which in many countries contains mandatory procedures for issuing any investment instrument. Accordingly, tokenization, which is carried out for the purpose of investment attraction, automatically falls under the requirements of information disclosure (publication of the prospectus), registration of the issue with the state authorities, and so on. In different countries, specific simplified procedures for blockchain projects, but on the other hand, this can lead to the securities law bypass.

As we have already mentioned, cryptocurrencies, such as Bitcoin, are fungible and constant. In other words, one Bitcoin is indistinguishable from the other. But if we talk about asset-based tokens, they are made to be non-fungible and represent specific assets. One of the possibilities (a specific type of tokens) is to represent collectibles [8]. Every single token represents a unique entity, and each network participant knows about their distinguishing features. Currently, there are different traditional assets that are kept in safe storage and insured by asset management firms (for example, auction houses). Auction houses can take full ownership of a masterpiece, but sometimes it becomes necessary to somehow share the ownership rights, and it can be processed via different smart contracts. Thus, non-fungible hard assets tokens can help to represent the portion of each masterpiece, which is owned by a user [9]. As soon the blockchain system is immutable, tokenization transforms art into a lucrative investment option and leads to the expansion and implementation of this revolutionary medium [10].

Last but not least group of tokens is connected with more abstract items. In contrast to hard assets, soft assets are intangible and hard to evaluate. There are two big examples of this use case: intellectual property tokenization and tokenization of digital asset collectability. For the first time, intellectual property was securitized by David Bowie via the traditional financial instrument. Blockchain offered a new possibility to tokenize intellectual property. One of the current examples of tokenization is GRMTK tokens, issued by an international electronic dance musician and independent producer Gramatik. This is an outstanding example of a solution for underfunded art markets. Blockchain offers not only the possibility to tokenize intellectual property, but also to split the ownership up between multiple users. Moreover, there are different schemes of multiple ownership of copyrights. These are joint ownership (is relevant if the work has more than one contributor on the same level of involvement or there is a co-owner, that have bought

a part of a work; an example of co-ownership would be the situation where two singers recorded a joint single), independent ownership (is also relevant when the final work has multiple contributors, but they contribute to the different parts; the example is when the lyrics and the music are created by different people, so they own their own part independently), multiple ownership in a single work (a specific type of ownership, when each contributor has his own set of rights; for example the right to broadcast the film is separated from all other rights connected with the film) and multiple ownership as per contract (offers an opportunity to divide a right into shares). Thus, the tokenization of intellectual property with the help of smart contracts will simplify the commercialization of copyright and funding of art.

And finally, we move to one of the most interactive and famous types of Non-Fungible Soft Assets tokens - digital collectability. A few years ago, there was an explosion of interest in digital collectability, such as Crypto kitties. We can think about this type of tokens as a new form of art. Each token is generated only once, hence they are unique and can be more or less rare. Thus, digital collectability meets people's need to have something unique in life. Moreover, we need to notice that such tokens are highly personalized, and there is a token that perfectly suits you. To sum up, digital collectability offers all the best features of blockchain: transparency, clarity, and the absence of a third party are all that users need in the modern digital age.

3. CONCLUSION

Overall, as one can see, the benefits of tokens are obvious, as any property or investment can be divided into a huge number of tokens. This opens new opportunities for the investment market, especially for small investors. This allows them to participate in this process without joining investment funds, as well as to trade assets in the secondary market under a simplified scheme, which is also convenient for large investors. As a result, this article presents a structured overview of the main groups of tokens and their comparisons in Russia.

ACKNOWLEDGMENT

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