



## The Token Economy: Assets for the Blockchain Era

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### Abstract

The advent of technology and its advance have impacted the world in a radical form. The digital transformation is redefining markets, industries, and making new business, investment models possible and providing opportunities before unthinkable. This article is intended to talk on a technology of blockchain and a token economy in a digital age with robust databases and the dematerialization has proven a reinvention of the financial market that we currently know. In this research we present the blockchain technology and its growing adoption around the world, the current ecosystem of ICOs (initial currency offer) and STOs (security token offer). The blockchain technology, digital currencies and a token economy enables a break from the financial market mainstream because such technologies make the process faster, less costly and allow international investment.

**Keywords:** Security token offering; Initial coin offering; Blockchain

### Introduction

Technological advances have radically impacted our world. The so-called digital transformation is redefining industries, making possible new business models, investments and providing opportunities that were previously impossible. Its impact, according to Burgos and Batavia [1], however, is not limited to business; it is already dramatically changing the way we live, work and relate to one another.

Blockchain technology is attracting attention around the world, and the number of Initial Coin Offerings (ICOs) is increasing

rapidly. The Initial Coin Offering makes it possible to sell newly created Tokens (immutable digital files) intended for the general public. This public sale model is used to raise funds in general. According to Nascimento, ICOs have grown rapidly with a high probability of becoming the main fundraising mechanism for financing Blockchain-based projects. For the author, initially, investors were interested in financing startups based on Blockchain technology. Investors, in addition to the desire to create promising technology startups with the value raised in ICO, also hope, in a next moment, to resell their initial position, tokens or digital currencies, in the secondary market obtaining an additional gain.

Many countries recognize cryptocurrencies as a type of asset and are preparing rules and regulations to adapt to this new trend. At the same time, global companies have joined the ICOs, raising expectations that cryptocurrencies will, in the near future, complement the conventional financial market.

The standard definition followed by the first ICOs was developed through Ethereum by the ERC-20 classification of smart contracts. Buyers of such tokens acquire them through auction. According to the author, the price of the token is based almost exclusively on trust in relation to the development team [3].

This article aims to address the token economy in a digital age with robust databases and decentralization. In section 2, we will present a succinct summary of Blockchain technology, its essential elements and its basic structure. In sections 3 and 4 important aspects are described about the token economy, the creation of a token economy model and how this token economy model has been gaining space in the global financial market and becoming the new asset for the Blockchain era. In section 5, we will introduce the ICO (Initial Coin Offering) and the Brazilian

ecosystem. Finally, in section 6, we will present the conclusion of our research.

## Blockchain

Blockchain can be defined as a book distributed to maintain a permanent and inviolable record of transaction data. A Blockchain works like a large decentralized database that is managed by computers belonging to a peer-to-peer (P2P) network. For Formigoni Filho et al. [4], Blockchain is a distributed database system in log, maintained and managed in a shared and decentralized way (through a peer-to-peer network, P2P), in which all participants are responsible for storing and maintain the database.

According to AMBIMA, peer-to-peer (people to other people) or peer-to-peer business lending (people for business), are services that allow loans to be made outside the banking system. The evolution of these platforms opens up an opportunity for small and medium-sized financial companies and banks to mediate operations.

According to Filho et al. [4], a Blockchain network has three essential elements, these are described in **Table 1** presented below.

For Pires [5] in Blockchain technology, there is no need, nor interest, to provide confidentiality for the information. On the contrary, the essence of Blockchain is to be a chain of public records. On the other hand, authenticity is essential for the functioning of the Blockchain. It is essential that each registration in the block is made only by the persons authorized to do so. For this reason, encryption on the Blockchain is usually applied as a signature and not as message encryption.

The number of Blockchain wallets has been growing since the creation of the virtual currency Bitcoin, reaching more than 45 million Blockchain wallet users in the 3rd quarter of 2020 (Graph 1). For Filho et al., Issler and Issler [4,6] Blockchain technology was developed based on four main characteristics, namely: “security of operations, decentralization of storage/computing, data integrity and immutability of transactions”.

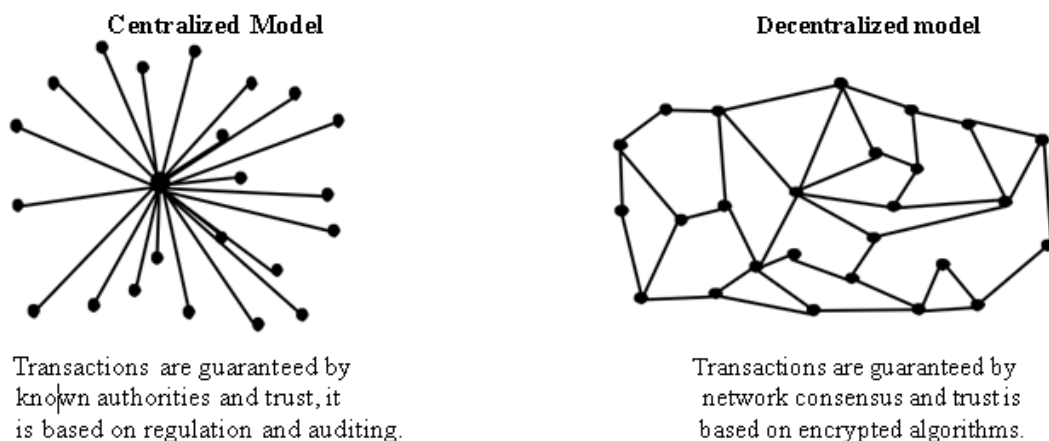
PIRES [5] also highlights the immutability of the Blockchain registry chain. Chain because the records are carefully linked to each other using public keys, inputs and outputs. Immutable because once the record is inserted in the chain, it can no longer be changed. Public because the only necessary condition for a citizen to have access to Blockchain records is that they have access to the internet, and distributed because this record chain is not stored on a single central server, on the contrary, it is replicated on millions of machines distributed worldwide, and no company or individual can claim ownership of these records. **Figure 1** presents a comparison between the traditional model and the Blockchain model. As can be seen, the main feature is decentralization.

As mentioned above, Blockchain is structured in the form of chained blocks. Each block has a transaction area and a header area. **Figure 2** presented below, presents a view of the chaining of the blocks.

In the transactions area are all the transactions collected by that block. In the header area you will find the hash of the previous block header and the root of the Merkle tree of the transactions present in the transactions field. In this way, each block is linked to the previous block, forming a chain of blocks

**Table 1:** Essential elements of a Blockchain network [4].

<b>Fact:</b> it can be a transaction, a digital content or a computer program, the last also can be called smart contract;
<b>Block:</b> it is a set of facts, usually in a predefined fixed number;
<b>Blockchain:</b> set of chained blocks (connected one by one) following a mathematical logic, so they are not independent.



**Figure 1:** Traditional and Blockchain models.

and each transaction is represented in the header by means of the root of the Merkle tree in which it was collected [5].

The process is safe, because in the technology in question after the creation of the first block, each subsequent block uses the hash of the previous block to calculate its own hash. The process is interconnected and decentralized. Before a new block can be added to the chain, its authenticity must be verified by a computational process called validation. This validation is done by a large number of points (nodes) in a decentralized way. Thus, the possibility of fraud and attack by hackers becomes remote, since each point (node) represents a very small fraction of the whole. At this point in the Blockchain process, most nodes in the network must agree that the hash of the new block has been calculated correctly. After a block is added, it can be referenced in subsequent blocks, but it cannot be changed.

Currently BNDES has two projects using Blockchain technology: one in a pilot phase with the National Film Agency (Ancine), and TruBudget, in partnership with the German development bank KfW for testing in operations of the Amazon Fund. These are solutions designed to track the application of public resources, enabling the monitoring of how the resources are being applied. In order to foster the Blockchain ecosystem in Brazil and seek solutions that can be used in our projects, we launched a public consultation in which 19 respondents were qualified to demonstrate their solutions and carried out the ecosystem mapping, registering more than 350 ongoing initiatives in the country.

According to the integrated sustainability report published in 2018 by the BNDES, in 2018 the bank joined the Febraban Blockchain Working Group, in which representatives of financial institutions study ways of adopting the technology in the National Financial System. At the same time, the bank interacts with companies, research centers and financial institutions that are dedicated to the development of this technology, with the objective of getting to know the general panorama of the market, seeking business opportunities and forming partnerships. In conjunction with the Social Technology Institute (ITS), the BNDES promoted the BlockchainGov Forum, which brought together actors from the Brazilian public sector to present and discuss Blockchain initiatives in government services. One of the themes addressed at the event was the relationship between Blockchain and public transparency.

According to FEBRABRAN, the launch of the National Blockchain Network of the National Financial System (an initiative that will allow the sharing of information between partner institutions while preserving the protection of customer data) and trends in payment methods, were some of the highlights of the 29th edition of CIAB, between June 11 and 13, in São Paulo. 26,075 visitors went through the exhibition, a record attendance. The Congress was attended by 182 participants, 52 sponsors, about 300 speakers and 3,786 congressmen knew the main solutions and innovations for the sector, in which the customer is the center of attention.

## Tokens and The Token Economy

Tokens can be understood as an immutable digital file or digital representation of a contract (example: share to the digital bearer), which can be acquired by common currency or cryptocurrency of net value. They can have several functions, allowing different types of benefits to the investor, such as offering access to the services of startups without granting property rights (utility token). Thus, it is possible, for example, that companies are financed, but remain autonomous.

It is possible to use tokens as a store of value, while stored in some non-volatile electronic media, or as an exchange instrument, when transferred between the parties through their system [1]. For Doll et al. [7], tokens can be chips, tickets, coins, counterfeit money, marbles, stickers or stamps [8] They can also come in the form of more abstract items, in the form of dots or check marks.

The token can be seen as a hybrid asset of traditional and new financing methods, allowing new and existing companies to increase their capital and transfer properties in a more integrated manner than ever before. Intended particularly for the SME sector, it allows small companies to “tokenize” their equity, increase their capital and at the same time, be in a position of freedom in relation to their investments in a way that previously was only available to publicly traded companies. Kim and Chung [9] suggest the following eight-step process for creating a token savings model (Tables 2 and 3) (Figure 3).

According to Doll et al. [7], an important part of the token economy is the exchange of tokens for certain backup rewards chosen by the manager or students of economics and in part, by

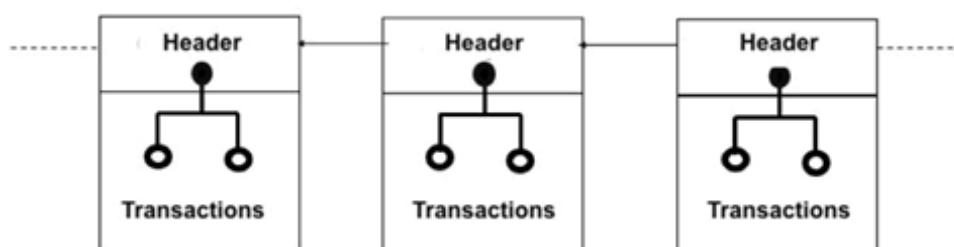


Figure 2: Chaining of the blocks - Blockchain.

the needs and preferences of the participants. The value of the token is a function of the reinforcers capable of backing up its value [10].

According to Franco [11], unlike the cryptocurrency that has its own Blockchain, the Token uses the technology of other cryptocurrencies. The Ethereum platform, for example, is home to most of the Tokens available on the market. The second most popular cryptocurrency in the United States is also traded on the platform (called Ethereum or Ether).

For Kim and Chung [9] the key to the success of an ICO is the design of a token savings model. According to a report published by Tokenise in February 2019, in the last two years alone, the token economy has seen rapid growth. In 2016, among the 29 Token Offers (Coin Initial) (or ICOs) that participated, US \$ 90 million in capital was raised. Over the course of 2017, this led to

the creation of almost 900 token offerings and just over \$ 6 billion in capital raised. This is in sharp contrast to about \$ 2-3 billion in the traditional venture capital space and is an interesting development for investors who monitor the cryptographic space. By the end of May 2018, there were already 854 Token offers that raised about \$ 5 billion in capital, and that is increasing every day.

### Token - The New Asset of the Blockchain Era

According to Malcolm Tan apud Nascimento [2], the essential elements of an ICO are: (a) strategy and roadmap, (b) structuring (which country-domicile the company issues the token, operational company and legal documentation), (c ) commercial aspects, such as the creation of White Papers and tokenomics (token economics), (d) marketing, public relations, fundraising,

**Table 2:** Steps for creating a token savings model [9].

Token economy model	
(1)	Determine the adjustment of the token business,
(2)	determine the chance of success,
(3)	determine the properties of the token,
(4)	providing intrinsic value to tokens,
(5)	establish strategies to increase the value of the token,
(6)	establish operational strategies of the token saving system,
(7)	establish strategies for token settlement
(8)	continue to modify the operational base

**Table 3:** Simplified configuration of a token economy.

Token economy	
1.	Identify target behaviors and rules. Behaviors must be observable and measurable, and the criteria for successful completion of the task (that is, how many tokens must be earned) must be specified for the individual.
2.	Select tokens. Tokens must be tangible symbols that are given immediately to the individual as a result of displaying the target behavior (s). Frequently used tokens include registration marks.
3.	Select a variety of reinforcements. The individual must be provided (supplied) with several possible reinforcements to work to earn. Reinforcers are generally preferred activities, items and events.
4.	Create procedures for earning tokens and exchanging for reinforcers. The contingency to win chips and when they can be the exchange of reinforcements, must be explicitly stated to the individual. If the cost of the response is incorporated into the token system, then the contingency of losses must also be defined.
5.	Establish an exchange relationship. It is suggested that the initial exchange ratio is small to provide the individual with more frequent access to the reinforcer. The proportion change can be adjusted to maintain the individual's involvement in the learning program.



**Figure 3:** Diagram with Token saving steps (simplified configuration).

**Table 4:** Information on ICO Brazilian ecosystem.

Where can I find information about ICO?
Comunicado 31.179 do Banco Central (2017): deals with the risks arising from guard operations and cryptocurrency trading.
Ofício Circular da CVM (2018): the municipality banned investment funds regulated by Instruction 555 from placing cryptocurrencies in their wallets.
FAQ da CVM (2017): basic questions are answered, such as what are ICOs, what are the most common modalities, what is the position of the autarchy, of international regulators and general guidelines.
Nota da CVM de 11/10/17: the autarchy talks about the risks of these operations and clarifies some positions on the subject.
Nota da CVM de 7/3/18: CVM clarified that no ICO had waived or registered a public offer for the distribution of securities and provides other clarifications.

(e) technology - the creation of the utility token and also the ICO platform (initiator token) or token sale page), from which the project's tokens are sold. "

As mentioned above, after defining the strategy (items a and b), the next step would be the preparation of the project, the so-called White Paper, a technical document containing the business plan with relevant information for potential investors.

The elaboration of a White Paper is an important step towards the "tokenization" of a new asset in the Blockchain era. Chen et al., apud Ante et al. [12] investigated the extent to which entrepreneurial passion influences the token purchase decision. The authors found that the success of the funding is not motivated by the passion of the founders, but by their level of preparation. This, according to the authors, suggests that projects from ICO with detailed White Papers will be more successful.

## ICO (Initial Coin Offering), STO (Security Token Offering) and the Ecosystem in Brazil

Initial crypto offerings are like an IPO (initial public offering of shares), that is, a public fundraising, but with the difference of being a decentralized model involving projects with crypto, through the offer of virtual assets known as tokens or coins. The acquisition can be made with bitcoins or other crypto, through bank transfer or credit card. Several regulators in the world and in Brazil are discussing the topic and, in some cases, creating regulations or explaining how the existing rules apply to these operations. **Table 4** presents some starting points for collecting information about the initial coin offering. The main bodies (**Table 4**) are the Central Bank and the CVM.

The Brazilian ICO scenario has been growing a lot, in 2018 we had some cases like: Auctus, Gimmer, Iconic, Lunes Plataforma, Taylor, OriginalMy, among others. And they are projects from different sectors, such as investment assistants, authenticity records and certification.

Among the platforms, that is, the Blockchain that will serve as the basis for the ICO, Ethereum is the most used. If it is a very specific need, it may be necessary for the company to create its own Blockchain. But the vast majority are used Blockchain like Ethereum, EOS, Waves, NEO, NEM and Stellar. Each has a specificity, one faster (in process), another simpler, another more secure. According to ICO Watch List, Brazil has only 0.44% of the ICOs in the world.

This market has the CVM (Brazilian Securities Commission) as

the main regulator in Brazil, even without clear rules on ICOs, the CVM monitors launches. The Central Bank is another big name that has been deepening in the market, with a team focused on Blockchain and tokens, has been implementing the technology and trying to renew itself to follow the sector's revolution.

In a second step, ICOs begin to be replaced by STOs. Security token offering (STOs) are more secure and tend to be projects at a more advanced stage. A major point of STO is to be regulated, unlike ICO. STO is a public offering of tokenized securities, investments are registered in Blockchain, but backed by a tangible asset registered outside it, such as shares of a corporation, works of art, real estate and even debts. But despite the differences the two are methods of raising money.

For Mello et al. security tokens are assets whose legal nature is similar to that of securities in accordance with the provisions of Article 2, item IX of Law No. 6,385/1976 ("Capital Market Law"). According to the authors, Security Tokens (security tokens) are contracts that generate participation, partnership or remuneration rights, including those resulting from the provision of services, whose income comes from the efforts of the entrepreneur or third parties.

In the second half of 2018, the structuring agent Kria via the Ethereum platform offered the first security token (security token) in Brazil under CVM standards. The token is backed by a debt security issued by Kria, according to the White paper. The model of this STO was developed in partnership with OnePercent, a decentralized organization for the development of technological solutions specialized in Blockchain.

In the first half of 2020, the investment bank BTG Pactual launched the token called ReitBZ on the Tezos blockchain. ReitBZ is the first security token (security token) backed by Brazilian real estate with an investment option starting at UR \$ 500.00.

## Conclusion

The advent of technology and its advancement has radically impacted the world. The so-called digital transformation is redefining the global financial market and providing previously unthinkable opportunities. A digital age with huge databases and decentralization, has reinvented the financial market that we know today. In this research we are talking about blockchain technology and its growing adoption around the world, the current ecosystem of ICOs (initial coin offering) and STOs (security token offering).

Blockchain technology, digital currencies and the token economy further disrupt the mainstream of the traditional

financial market worldwide. The investment in this new market takes place more quickly, is less costly and allows the capture of international investors in a more vertiginous and efficient way.

The Brazilian financial market is a reference market for many countries around the world. And as mentioned above, the country is starting the process of breaking and adopting new ways of making and attracting investment. In the second half of 2018, structuring agent Kria via the Ethereum platform offered Brazil's first security token (CVM token) in accordance with CVM standards. The model of this STO was developed in partnership with OnePercent, a decentralized organization for the development of technological solutions specialized in Blockchain. In the first half of 2020, the investment bank BTG Pactual launched the token called ReitBZ, on the blockchain Tezos.

It is worth mentioning that the difficulty in security in general (information and investment itself) is still questioned in the current world literature and in fact needs to be discussed and solutions created to mitigate risk. This is a market that is growing and developing, at the same time that laws and rules are being created for agents. Time is an important variable for the consolidation of the new market.

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