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**TOKENOMICS: THE ECONOMY AND UTILITY OF
CRYPTOCURRENCIES**

- Final Thesis -



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Basic subjects:

- 1. The explanation of blockchain principles and cryptocurrencies**
- 2. The comparison of the traditional IPO and ICO/IDO/IEO**
- 3. The utility of cryptocurrencies**

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ABSTRACT:

Basic principles of blockchain and cryptocurrencies, as well as their practical use and real value and utility, are described in this paper. It is explained how new ways of investing and funding projects have been created to follow the blockchain methodology. The blockchain terms like “Web3”, “tokenomics”, “DeFi”, “CeFi”, “ICO”, “IDO”, and “IEO” are also explained and compared to the traditional investing term “IPO” which stands for “Initial Public Offering”. Blockchain resolves a lot of constraints and rules that need to be filled in order to achieve IPO with its own popular ways of funding - ICO (Initial Coin Offering), IDO (Initial DEX Offering), and IEO (Initial Exchange Offering).

It’s also explained how blockchain creates the financial incentive for people to run nodes as part of the system that validates transactions, making it completely decentralized.

Keywords: blockchain, cryptocurrencies, tokenomics, token, web3.

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1. INTRODUCTION

1.1. THE INTRODUCTION OF BLOCKCHAIN TECHNOLOGY

Blockchain technology can be looked at as a protocol, a decentralized system, or a decentralized database, but also in a philosophical sense as a fully decentralized, democratized way of voting or participating to validate the network. Bitcoin introduced the blockchain concept in January 2009. A whitepaper outlining its concept was published in 2008 under the pseudonym “Satoshi Nakamoto”. The actual identity behind the creator of Bitcoin is still a mystery.

1.2. THE HISTORY AND ORIGIN OF BLOCKCHAIN

Bitcoin was not the first piece of technology that introduces the concept of distributed systems, nor was it the first one that attempted to develop a digital currency. Distributed computing existed for a long time before Bitcoin came to be. The first widespread distributed systems were local-area networks such as Ethernet, invented in the 1970s. Another example is the largest distributed system on the planet - the Internet. Its predecessor, “ARPANET”, was introduced in the late 1960s.

The concept of digital cash also existed before Bitcoin. Some of the attempts include:

- “e-Cash” concept by David Chaum in 1983
- “DigiCash”, founded by David Chaum in 1990, attempted to improve the e-Cash concept but met failure
- “Hashcash” by Adam Back in 1997
- “B-money” and “Bit Gold” proposals by Wei Dai and Nick Szabo in 1998

1.2.1. The Bitcoin Whitepaper

The Bitcoin Whitepaper was released in 2008. Some consider it one of the most groundbreaking works of computer science and computer-related literature. It was released with the title “Bitcoin: A Peer-to-Peer Electronic Cash System” under the pseudonym “Satoshi Nakamoto”, although the identity behind the real creator is still unknown(Nakamoto, 2008). It explains the concept of a purely peer-to-peer version of electronic cash that allows participants to send transactions from one party to another, without the involvement of a third party or a financial institution.

A year later, the first version of Bitcoin was created, and with it, the concept of blockchain. Bitcoin was created purely for financial transactions, but other blockchain networks have other uses as well, for example building decentralized applications using smart contracts.

1.2.2. Smart Contracts

Ethereum blockchain popularized the smart contract concept, allowing decentralized applications to be built on top of the network by using the logic and programming of smart contracts.

Although Ethereum popularized it and brought it to mainstream engineers, the concept was first proposed in the early 1990s by Nick Szabo, who coined the term, using it to refer to “a set of promises, specified in digital form, including protocols within which the parties perform on these promises”. This essentially means that a piece of software works as an intermediate between two parties who agree to trust the code and protocol, making it impossible to trick the other party. A simple example would be two parties agreeing to the terms by which one party provides the service, and the other provides the payment for the service. The payment would be locked in the smart contract as an escrow until the smart contract decides that the other party finished the agreed-upon terms. If that is the case, the other party is paid by the contract. If the terms were not met, the payment is returned.

This allows parties to trust the protocol and not a third party for making decisions.

On Ethereum and many other popular blockchain networks, smart contracts can be deployed and saved on the blockchain.

They have their blockchain address and are public, allowing everyone to access and see the code. This allows the contract to be transparent to everyone so that everyone can know what are the rules and terms of the contract.

We can give an example with a decentralized roulette game - parties can access the smart contract and see in the code that the winner of the roulette is indeed chosen randomly, and not by predefined statistics that benefit the casino.

Then they can choose to lock in their funds on the contract - the balance on the contract is also public. Then smart contract can calculate the randomly chosen winner and send him the funds.

Another property of the smart contracts deployed on the blockchain is that they can never be deleted or changed due to the way how blockchain works - this has both good and bad implications. If the contract is badly written and someone transfers their funds to it, there is a possibility that their funds will be forever locked on the contract with no way of retrieving them. The good implication is that if the contract is written well, no one can change it later for their benefit.

2. UTILITY OF CRYPTOCURRENCIES

By using smart contracts, different cryptocurrencies can have many different applications and utilities. The utility is the way that a specific token can be used, giving it its value.

2.1. UTILITY TOKEN

A crypto utility token can serve a different purpose depending on the ecosystem. Some tokens have more utility than others. Utility tokens in general provide access to a specific service or product with a blockchain ecosystem.

For example, a game studio releases a decentralized game built on top of the Ethereum network. They might create their own utility token based on Ethereum that you must use within the game - either pay with it or earn it.

By having utility tokens, companies that issue them have a way of funding. The more utility they give the token, the better experience for the user which means more people will buy it, which increases the value of the token.

In a way, the utility of a token represents its value and how it can be used.

Another important thing is that a utility token is not a synonym for cryptocurrency because they have different properties, but there can exist a native cryptocurrency that also works as a utility token.

2.1.1. Examples of tokens with real utility

We can look at the currently most popular examples of tokens with real utility.

- **Binance Coin (BNB)** - it's both a crypto coin and a token at the same time. BNB is the native currency on the Binance Smart Chain but also has the utility of giving Binance users discounts on trading fees when they pay in BNB. This incentivizes users to pay with BNB, increasing the coin market volume(Frankenfield, 2022)
- **Polygon (MATIC)** - Polygon is the most popular solution for solving Ethereum's problems like high fees and low transaction speeds. MATIC is the utility token used to govern, stake, and pay for gas fees on the Polygon network(Reiff, 2022)
- **Chainlink (LINK)** - Chainlink is a service that provides real-time data to blockchains and decentralized applications. LINK token is mainly used to reward users for providing accurate data(Reiff, 2022)

- **Celsius (CEL)** - Celsius is a lending platform where users use their cryptocurrencies as collateral for the loan. CEL token is used to provide lower interest rates for loans and higher interest rates for rewards

2.1.2. Examples of tokens without or with a very low utility

Tokens that do not have utility can be both scam tokens or those that didn't find their market value yet.

Some of these include:

- **Squid Game Coin** - A token used in a scam scheme where the smart contract was set up so that only the creators can sell the token when it starts having higher volatility, under the premise that it is a way to stabilize the price. By reading the whitepaper, users could see that it was explained there, but only a few users read it and understood the scheme
- **Various NFT-s** - NFT (Non-Fungible Token) is a unique, non-fungible, and non-replaceable token that is stored on the blockchain.(Sharma, 2022) Some of them offer small utility, but most of them don't have any utility at all. One example is "Bored Ape Yacht Club" - some of the utility it offers is the right to buy merchandise from their store using cryptocurrencies, the right to vote where the funds of the project go and unique NFT collections that are rewarded only to the owners of the "BAYC" tokens

3. TOKENOMICS

The term “Tokenomics” is coined by the terms “token” and “economics” and represents everything for a particular cryptocurrency that makes it valuable and interesting to investors.

3.1. CONCEPT OF TOKENOMICS

Tokenomics is an important factor to consider when making investing choice for a specific token or cryptocurrency.

It includes the token data such as token supply, pricing, distribution, market cap, token symbol, allocations, etc.

For example, suppose a team is developing a decentralized application and wants to release their own token as a way of funding. In that case, they can have an ICO which stands for “Initial Coin Offering”, offering their coin/token for an initial price before the market reach.

They can allocate different percentages of that token to different users.

Tokens are usually allocated to funds, private sales, airdrops, liquidity, advisors, the team behind the project, and the foundations that support it.

3.1.1. Staking

Some cryptocurrencies allow staking.

Users can “stake” a part of their holdings and earn a percentage-rate reward over time. Most of the time this happens via a “staking pool” which works similar to an interest-bearing savings account.

Cryptocurrencies that allow staking have the “Proof-of-Stake” consensus mechanism.

A consensus mechanism is a way of reaching consensus on the blockchain via the protocol.

Bitcoin uses a “Proof-of-Work” consensus mechanism, so it doesn’t allow staking.

By staking their cryptocurrency, users provide the validator power to the blockchain, and in return, they are rewarded with rewards over time - they have financial incentives to benefit the system.

In the “Proof-of-Stake” blockchain, stakers are validators of the system. If one validator is acting maliciously, they can be penalized and can be suspended or have their funds removed.

Also, acting maliciously may result in the native token plummeting in price, which would make the perpetrator lose the money.

3.1.2. Funding

In the blockchain, there are different ways for projects to raise funding. They can get investments in traditional ways, like venture capital funds, angel investors, loans, and such, but blockchain technology allows these projects to have more ways of funding via issuing their own tokens. Also, popular ways of funding in the blockchain space include grants or blockchain incubators and accelerators.

DAO (Decentralized Autonomous Organization) is a new organizational structure where participants that have the DAO's token have the voting rights in the plans and steps the organization is going to take. By having the logic in smart contracts, members can participate and vote with equal opportunity.

A DAO-based startup is highly dependent on the community which actually helps run it.

4. CeFi AND DeFi

Financial products built on blockchain introduce two new financial terms related to cryptocurrencies and the level of decentralization - CeFi (Centralized Finance) and DeFi (Decentralized Finance).

These two terms are mainly used in the blockchain ecosystem, although an argument could be made that CeFi has been present for a long time with regular banks and institutions and the centralized way financial assets operate.

4.1. CeFi

CeFi refers to products that are built on blockchain but have an institution that is responsible for the product, and if anything happens, that institution is to be held accountable.

There are different ways that a centralized blockchain product can be built, technically speaking. They can build the platform on a decentralized blockchain, like Ethereum, and then implement smart contracts that let them handle the assets of their users. They might not even implement the smart contracts for logic, and instead, just have users deposit assets into the wallet that they manage. Users then can withdraw their assets, but also the company is able to freeze the accounts.

While this may sound counterintuitive to the blockchain ideology of decentralization, it offers some benefits. Since decentralized financial systems are still an emerging technology, centralized products offer more stability, have firms be accountable for their actions, and are easier in general for the traditional investors and users.

One example of a centralized blockchain product is the company Celsius. Celsius is a lending platform that offers its users a chance to lend fiat money by having their cryptocurrencies as collateral. Since most cryptocurrencies are volatile, platforms like these usually offer up to 100% of the collateral, meaning that you can't take more cash than your collateral. Use-case for this is when a user is holding a specific cryptocurrency and believes it will have even more value in the future, but needs cash at the time. The user then doesn't want to sell his crypto, so he locks it as collateral and gets cash. Celsius then borrows that collateral to other platforms and also returns yield to users that use Celsius wallet to hold their crypto, having a similar business model to traditional banks, while giving more yield percentages.

4.2. DeFi

DeFi refers to the products built on blockchain that use smart contracts and protocols that keep them decentralized. It's a term for peer-to-peer financial services that don't have an organization backing them or being responsible and accountable, but rather everything happens via smart contracts and protocols, meaning the users can achieve "trust without trust" - they can trust the protocol and code without having to trust the other party. Since smart contracts are public, everyone knows how the protocol works and can see the logic behind it.

With DeFi, users can do most of the things that banks support - earn interest, borrow, lend, buy insurance, trade assets, and more, but it's faster and doesn't require paperwork or a third party. Following the crypto ideology in general, DeFi is global, peer-to-peer (meaning directly between people, not through a third-party institution), pseudonymous (meaning you don't need to provide the actual identity, except your wallet address), and open to all.

Users engage with DeFi via platforms called "dapps", which stands for "decentralized applications", that are built on a blockchain that supports smart contracts, the most popular being Ethereum.

Use-cases for DeFi can be lending, getting a loan, trading, saving for the future, buying derivatives, and more.

An example can be a landing platform where users can put their crypto and earn interest rates, while other users can lend crypto and pay fees and loan payments.

The protocol then makes sure that those fees and loan payments are returned to lenders. As smart contracts are forever present on the blockchain when they are deployed, even if the team behind the "dapp" takes down the website, users can still use the smart contract to make transactions, or they can build their own website and product that uses the same smart contract in the back. Usually, teams and firms behind the DeFi projects have a fee for some functionalities so the company can exist, pay its workers, and cover other expenses, but it doesn't always have to be the case.

4.3. ICO, IDO, IEO

As blockchain technology open a whole new ecosystem of companies and projects and disrupted many different industries including not only technology but also finance, economy, and investing, it also opened up new opportunities for companies to raise capital.

ICO(Initial Coin Offering), IDO(Initial Dex Offering), and IEO(Initial Exchange Offering) are different ways for companies to issue their tokens for the first time.

4.3.1. ICO - Initial Coin Offering

ICO or “Initial Coin Offering” is a form of issuing cryptocurrency or electronic money for the first time on the market at a discounted price to raise capital. Investors that believe in the product can invest their money to buy the coin, resembling publicly traded companies and their shares. For a regular company to go public, it has to fill a number of requirements, one of them being that the company already needs to have a large yearly profit.

ICO is very similar to IPO(Initial Public Offering), which raises capital for a new company when it first enters the stock market.

ICO solves this problem for smaller teams. It is one of the most popular crowdfunding methods by far in the blockchain space.

Advantages of funding through an ICO are:

- Setting up an ICO is relatively easy compared to other ways - companies that have ICO projects need to issue a Whitepaper, a website of a related product, and a team that can build it
- The cost of launching an ICO is relatively low, so new investors in the market can participate with small investments
- Currently, the government has less intervention in this form
- More liquidity short term
- Investors have complete control over their money

The disadvantages of an ICO can be security features. The system is easily exploitable by people with malicious intentions, and since there are almost no regulations, investors can be easily tricked if not careful.

Also, for long-term investments, ICOs may not be a good choice.

4.3.2. IDO - Initial Dex Offering

IDO or “Initial Dex Offering” is the first form of token issuance on a decentralized exchange. Initial Dex Offering is a particular case of IEO (Initial Exchange Offering), the main difference being that IDO is executed on a decentralized exchange instead of a centralized one.

Advantages of IDO are:

- No need for anyone’s authorization
- Instant liquidity
- Fast transactions
- Lower costs
- Easy for everyone

Some of the disadvantages might include immediate price movement when conducting a large volume transaction, and no real information about investors other than their wallets.

4.3.3. IEO - Initial Exchange Offering

IEO or “Initial Exchange Offering” is a form of token issuance for the first time on centralized exchanges (Binance, Kraken, Bitfinex, KuCoin ...).

Projects directly issue their tokens on the exchange to individual investors.

Startups that want to offer an IEO on a centralized exchange must pay a listing fee along with a percentage of the number of tokens sold.

In return, the tokens of these companies will be listed on the exchange right after the IEO ends.

Advantages of IEO are:

- All exchanges are verified, so it ensures very high safety for the investors, and the investors’ identities are known
- Investors directly participate in the exchange, unlike ICOs
- Due to centralized exchanges being regulated, the trusted platforms can protect investors from malicious activities
- Investors don’t transfer their funds to or from a smart contract but directly into their account

IEO may resemble IPO more than other types of coin offerings.

Disadvantages may include higher costs of funding - it's also more difficult to set up. Liquidity is low compared to the other two types of offerings.

Investors also have very little control over the operations of the exchange.

5. CONCLUSION

The applications and use-cases of blockchain technology have greatly improved since its conception in 2009.

Whole ecosystems have been built, and many new communities are active. Bitcoin, as the first cryptocurrency, created many technological, financial, economical, political, and philosophical advancements.

It created a more democratic technological environment.

Now even regular startups and companies are starting to look into blockchain technology as a potential way of funding their projects.

This is still a very young technology, and we are still early to see its full potential. Now it is still in the experimental stage and there are a lot of skeptics.

There have been many scams, frauds, and system failures that also add up to the argument that cryptocurrencies and blockchain are just a current trend and a fad, but if we look at the history of the Internet, we can see the similar development.

When technology is young, usually a lot of people will try (and succeed) to hack it or break it by using it in ways it's not intended. This can actually be a good thing, as it is needed for progress and improvement.

In my opinion, blockchain technology has a lot of real-world applications, but it's also a trending "buzzword", so there are a lot of projects that use it just because it's currently popular, so we should always be careful of what we invest into.

We are yet to see how more it can improve, and what new industries it will disrupt.

6. INDEX OF TERMS

A

asset - 9

B

blockchain - 4, 5, 8, 9, 11

bitcoin - 4, 8

C

cryptocurrency - 4, 6, 8

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7. LITERATURE

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SAŽETAK:

U ovom radu su opisani osnovni principi blokčejna i kriptovaluta, kao i njihova praktična primena i stvarna vrednost. Objasnjeno je kako su stvoreni novi načini investiranja i finansiranja projekata tako da prate metodologije blokčejna. Takođe su objašnjeni blokčejn termini poput “Web3”, “tokenomija”, “DeFi”, “CeFi”, “ICO”, “IDO” i “IEO” i objašnjeno je kako oni funkcionišu u poređenju sa tradicionalnim terminom “IPO” koji označava inicijalnu javnu ponudu akcija na berzi.

Blokčejn rešava puno ograničenja i pravila koja IPO postavlja svojim popularnim načinima finansiranja - ICO (inicijalna ponuda coin-a), IDO (inicijalna DEX ponuda) i IEO (inicijalna ponuda na menjačnicama). Takođe je objašnjeno kako blokčejn stvara finansijsku inicijativu za ljude da uključe svoje uređaje u sistem kako bi validirali transakcije, što sistem čini potpuno decentralizovanim.

Ključne reči: blokčejn, kriptovalute, tokenomija, token, web3.