

AN OVERVIEW ON KEY DIGITAL ASSETS OF DECENTRALIZED FINANCE: CRYPTOCURRENCY AND NFT

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Purpose – The emergence of blockchain and decentralized financial technology have been reshaping various aspects of economies, opening a wider spectrum for research communities. In finance, Blockchain has provided effective applications such as tokens, initial coin offerings, crowdfunding, smart contracts, prediction market systems, and digital currencies such as Bitcoin and Ethereum. This article aims to provide a brief overview of these two types of digital assets (cryptocurrency and NFT) and their potential. It gives brief information about these and on the other hand, tries to convey the prominent concerns of the financial markets.

Methodology - This study reviews digital assets through the literature.

Findings - The growing popularity and prevalence of digital assets such as cryptocurrencies and non-fungible tokens reveals that existing financial ecosystems are in many cases unable to respond to citizens' needs and concerns. The capabilities of digital assets in financial markets are increasing day by day and they are entering the game from simple to complex financial transactions. Cryptocurrencies stand out especially with their ability to handle more efficient online transactions, lower costs and simplified payment processes.

Conclusion – Cryptocurrencies meet an increased level of efficiency in commerce and value exchange over the Internet. Non-fungible tokens, on the other hand, stand out with their ability to acquire a presence in the digital world, to be unique, and to be easily transferred. In particular, the financial indicators cited in this article give the impression that the interest in decentralized finance technologies will continue to increase, based on the potential of these two digital assets.

Keywords: Digital finance, blockchain, decentralized finance, information systems**JEL Codes:** F00, F30, M00, O10**1. INTRODUCTION**

Decentralized Finance emerges from three important models in technological evolution: Moore's law, Kryder's law, and another model, which as far as we know is a yet unspecified term. Moore's law refers to the assumption that the amount of data processing power grows exponentially. Kryder's law assumes the same for data storage capacity. The combination of ever-increasing processing power and ever-increasing data storage capacity results in increasingly lower costs for both. The third factor that makes Decentralized Finance possible is the enormous growth and declining costs we've seen in communication bandwidth – a phenomenon that has been discussed since the late 1990s, if not earlier. The underlying assumption of bandwidth growth with reduced costs is supported by increased network efficiencies that lead to more bandwidth per dollar invested. This could be due, among others, to lower manufacturing costs of network components, denser and faster ports, higher utilization and integrated photonics, or the use of higher frequency microwaves, which require smaller cells using multiple frequency bands (with 5G for example) (Zetsche, Arner, & Buckley, 2020).

These three evolutionary models enable hardware virtualization: software is hosted, updated, and run-on decentralized servers instead of on each workstation. Data that should only be processed locally (under conditions of instantaneous online connectivity and ample bandwidth) tends to continue to be processed locally. Hardware virtualization allows the creation and deployment of a service-oriented architecture ("software as a service"). At the heart of Decentralized Finance. Interestingly, at the same time, Moore's law, Kryder's law, and bandwidth increase with decreasing costs continue to apply, providing the potential for the further development of 'edge' based systems alongside machine learning and other forms of artificial intelligence (Zetsche, Arner, & Buckley, 2020).

At the core of Decentralized Finance is a range of emerging technologies, best summarized by the acronym "ABCD" and representing four technologies: AI, Blockchain (including distributed ledgers and smart contracts), Cloud and Data (large and small); or AI, Big Data, Cloud and DLT (Distributed Ledger Technology - including blockchain and smart contracts) in another iteration (Zetsche, Arner, & Buckley, 2020).

2. OUTSTANDING DIGITAL ASSETS

Cryptocurrencies

In recent years Crypto assets have grown exponentially as a new form of innovation in payments, investments and wealth management. Cryptocurrencies are built on a blockchain, an open, distributed ledger technology that can record transactions between two parties in an efficient, verifiable and permanent way. There are three main types of blockchains:

- ✓ private blockchain (one gatekeeper);
- ✓ permissioned blockchain (multiple gatekeepers);
- ✓ and public blockchain (needs a consensus mechanism).

A cryptocurrency, commonly known as crypto, is a digital currency protected by encryption. Individual property records are recorded in a computerized database and are intended to function as a medium of exchange. Cryptocurrency is a digital asset distributed over a computer network. Due to its decentralized character, this network is free from government regulatory oversight. The word "cryptocurrency" comes from encryption techniques used to keep the network secure. A cryptocurrency, also called crypto, is an encrypted digital currency. Individual property records are stored in a computerized database designed for use as a trading platform. A digital asset spread over a computer network is known as a cryptocurrency (Hui, 2022).

Bitcoin (and many other digital currencies) are based on a public blockchain with a consensus mechanism where a difficult task of calculating proof-of-work requires solving before obtaining the right to update the ledger (Allen, Gu, & Jagtiani, 2022).

Probably even more important than cryptocurrencies is the underlying technology – blockchain. The World Economic Forum (WEF) includes this technology in its list of six Megatrends that will shape the world over the next decade (Sebastião, da Cunha, & Godinho, 2021).

Bitcoin stands out as the most popular cryptocurrency. Satoshi Nakamoto created the open-source software-based Bitcoin network, commonly known as the blockchain, that maintains a private decentralized public ledger that creates (mined) the first block in the chain (the genesis block) (Sebastião, da Cunha, & Godinho, 2021).

Table 1: Public Finance and Grants

| Feature | Description |
|----------------|---|
| Immaterial | Electronic system based on cryptographic entities without any physical representation or intrinsic value |
| Decentralized | Designed to be a peer-to-peer (P2P) payment system without the need for a trusted third party |
| Accessible | Open source, so anyone with Internet access may download the software, connect through it to the network and begin mining and transacting Bitcoins. |
| Transparent | Information on all transactions on Bitcoins are public knowledge |
| Integrity | Solves the double-spending problem |
| Consensual | All the network manages the balances and transfers of Bitcoins |
| Global | There are no geographic or fundamental economic barriers to its use |
| Portable | Practically any sum of Bitcoins can be carried on a flash drive or even stored online |
| Fast | It takes less time to confirm a Bitcoin trade (30 minutes to 16 hours) than it usually takes to do a normal bank transfer |
| Cheap | Transfer costs are relatively low |
| Irreversible | Bitcoin transactions cannot be reversed |
| Immutable | Once recorded into the blockchain the trade cannot be modified |
| Divisible | The smallest unit of a Bitcoin is called a satoshi |
| Resilient | The network has been proven to be robust to attacks |
| Pseudonymous | The system does not identify users, but discloses the addresses of their wallets |
| Limited supply | Bitcoin offer is capped at 21 million units |

Stable Coins -The extreme price volatility of cryptocurrencies has led to the development of stable coins. A key feature of these is that they are designed to be pegged to another asset or pool of assets such as cryptocurrencies, fiat, or exchange-traded commodities. Stable coins are backed by assets held by the stable coin issuer. As a result, stable coins may be more capable of serving as a means of payment and store of value, potentially improving global payment regulations in terms of speed and cost. In principle, stable coin issuers can use more than one method to stabilize the price. The easiest way is to tie the value of a stable coin to a single currency or a basket of reference assets. Another approach to support a stable value is to leverage the financial strength and stability of the bidding institutions. Commercial banks can issue stable coins as an alternative to deposits, notes or other financial instruments (Allen, Gu, & Jagtiani, 2022).

Price volatility for all currently existing stable coins, though not always "stable," has been much lower than for Bitcoin, Ether, and other common cryptocurrencies. Stable coins have played an important role in providing liquidity in real-time payments and cross-border payments over the past year. Since the outbreak of the COVID 19 epidemic, the market value of stable coins has increased significantly (Allen, Gu, & Jagtiani, 2022).

Figure 1: Total Cryptocurrency Market Cap (coinmarketcap.com, 2022)

We see the total market capitalization for 04.12.2022 Sunday from Figure 1 as almost 859 billion USD. Also, in this figure, we can see that approximately 3 trillion USD market capitalization occurred in November 2021.

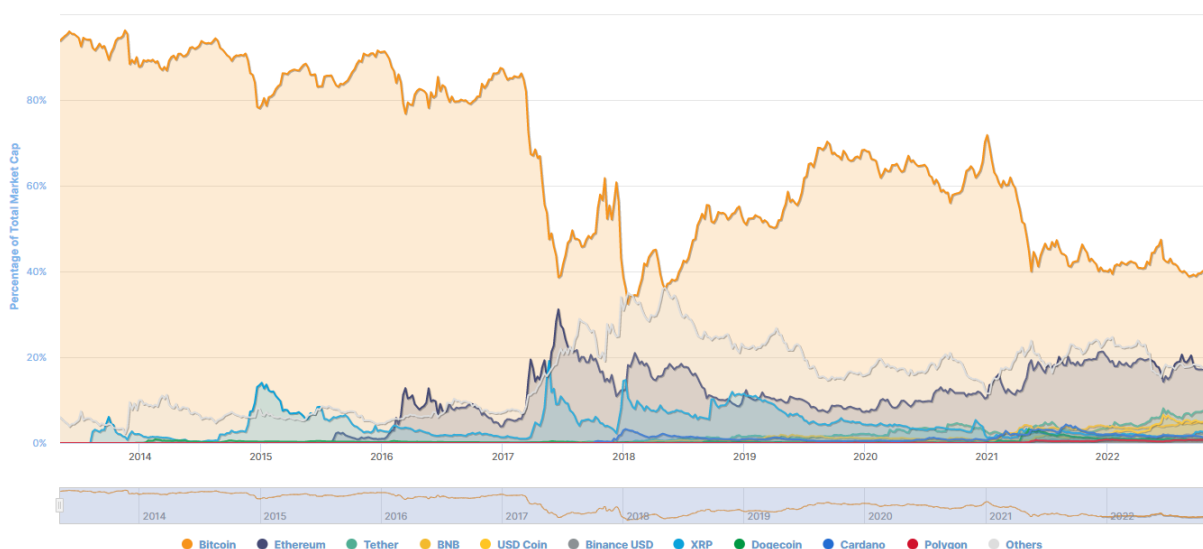
Figure 2: Major Cryptoassets by Percentage of Total Market Capitalization (Bitcoin Dominance Chart) (coinmarketcap.com, 2022)

Figure 2 highlights the dominance of Bitcoin in the market.

Major Concerns Regarding to Cryptocurrencies - The increasing momentum of cryptocurrencies and FinTech raises certain risks that raise various questions and concerns regarding the viability of future integration of virtual currencies into the monetary and financial system, especially in the absence of legislation and regulatory standards.

- There is exponential growth in the development of online black markets. The emergence of Bitcoin has already stimulated black markets and provided numerous opportunities due to its semi-anonymity, which makes it difficult to trace the identities of operators and users.
- Cryptocurrencies are associated with illegal activities due to their ability to challenge government monetary policy oversight and bypass existing regulatory schemes.
- As cryptocurrencies gain more recognition and popularity, they are likely to expand into other areas and influence other industries.
- While many countries cooperate to curb tax evasion, cryptocurrencies can act as tax haven, thereby defeating countries' ability to track and prosecute tax evaders.
- Although cryptocurrencies rely on the strong security features provided by blockchain technology, users are not immune to hacking, fraud, theft and privacy breaches. Cybercriminals can already target exchanges and successfully steal thousands of Bitcoins.

- Unlike government-issued currencies, cryptocurrencies are neither physically represented nor controlled by a regulatory authority. They derive their value only from the expectation of society and the trust of those involved in the relevant system (Rejeb, Rejeb, & Keogh, 2021).

Non-Fungible Tokens (NFT)

NFTs are tokens for representing ownership of unique properties. They allow us to symbolize things like art, collectibles, and real estate. Thanks to NFTs, the attrition data is secured by the Ethereum blockchain, and no one can change the unhidden enclosures or modify it by copying and pasting a new NFT.

NFT means token that is not double. It cannot be changed. It's an economical term for storing things like furniture, song files, or computers. These things are not interchangeable with other enclosure as they have unique expansion.

Fungible items, on the other hand, can be changed because their value defines them rather than their unique properties. For example, ETH or dollar are fungible because 1 ETH / 1 USD can be exchanged for another 1 ETH / 1 USD (ethereum.org, 2022).

NFTs represent a new and unique way for blockchain technology to confirm ownership and tradable rights of digital assets. NFTs represent an emerging digital phenomenon that includes innovative ways to connect content creation to blockchain applications, creating a new way of authentication. NFTs are blockchain-enabled applications that encode unique content in smart contracts, on-chain or off-chain, for secure verification of origin. NFTs have identity and ownership backed and verified by distributed ledger technology. They are based on a highly secure system in a peer-to-peer network and use mathematical cryptography. As digital technologies change the way content is structured, recorded, used, transferred, shared and consumed, NFTs are making further progress for physical and intangible assets or the digitization of property chains in a more transparent, secure and tangible manner (Wilson, Karg, & Ghaderi, 2022).

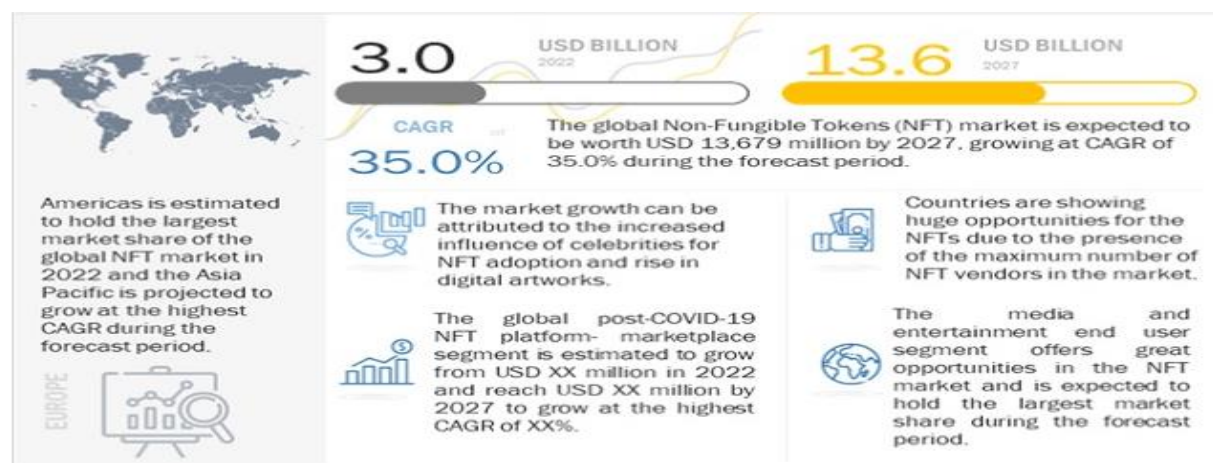
Representing a highly emerging application, NFTs are compatible with organizational discovery and usage frameworks. A working organizational discovery framework can be seen in the field of new technological applications such as NFTs, including the creation of products with unknown demand, future uncertainty, and distant benefits. NFTs introduce new knowledge and processes for storing, embedding, encoding and validating unique digital content and assets. It also preserves the utility and origin of the digital assets they represent, allowing them to be traded, exchanged, verified and transferred more easily than in previous systems (Wilson, Karg, & Ghaderi, 2022).

There is no doubt that the implementation of NFTs has caused certain changes in the Internet world. We met with the concept of NFT Internet. The table below summarizes the comparison between traditional internet and NFT internet.

Table 2: Traditional Internet vs NFT internet (ethereum.org, 2022)

| An NFT Internet | The Internet Today |
|---|--|
| NFTs are digitally unique, no two NFTs are the same. | A copy of a file, like an .mp3 or .jpg, is the same as the original. |
| Every NFT must have an owner and this is of public record and easy for anyone to verify. | Ownership records of digital items are stored on servers controlled by institutions – you must take their word for it. |
| NFTs are compatible with anything built using Ethereum. An NFT ticket for an event can be traded on every Ethereum marketplace, for an entirely different NFT. You could trade a piece of art for a ticket! | Companies with digital items must build their own infrastructure. For example an app that issues digital tickets for events would have to build their own ticket exchange. |
| Content creators can sell their work anywhere and can access a global market. | Creators rely on the infrastructure and distribution of the platforms they use. These are often subject to terms of use and geographical restrictions. |
| Creators can retain ownership rights over their own work and claim resale royalties directly. | Platforms, such as music streaming services, retain the majority of profits from sales. |
| Items can be used in surprising ways. For example, you can use digital artwork as collateral in a decentralized loan. | |

Figure 3: Global NFT Market Trends (www.marketsandmarkets.com, 2022)



The NFT market size is expected to grow from USD 3 billion in 2022 to USD 13.6 billion by 2027, at a Compound Annual Growth Rate (CAGR) of 35% from 2022 to 2027 (www.marketsandmarkets.com, 2022).

The outstanding attributes and characteristics in the ecosystem of NFTs are:

- ✓ Limited Supply – NFTs are issued in a limited number of units, so you cannot have an NFT issuance stream with the same value proposition.
- ✓ Non-interoperable – This attribute refers to the attribute by which any asset is identified and represents a unique element within its ecosystem. It cannot have the same representation in a similar environment. An analogy of this feature is that an in-game character or item is treated as in that game and cannot be used in the same way in any other game or environment. It applies equally to collectibles, souvenirs or trading cards.
- ✓ Indivisible – It is important to recognize that an NFT is represented as a whole and cannot be divided into smaller units.
- ✓ Indestructible – The technology driving NFTs is always improving these assets. All metadata stored on the blockchain via smart contracts cannot be copied, removed or destroyed, giving ownership of the NFT to the wallet or the owning peer.
- ✓ Verifiable – The authentication process is also provided by the key features of blockchain technology. This provides traceability within the ledger as all transactions are historically recorded and stored in data blocks. This feature allows any NFT attached to a work of art to be traced back to the original creator, eliminating the need for a third-party authentication method (Popescu, 2021).

Major Concerns Regarding to Non-fungible Tokens

- ✓ Copyright – When you buy an NFT, you are not buying the digital work itself. Copyright in the work is not automatically transferred with the sale of NFT. The creator of the image or the third-party vendor may reserve the right to copy, distribute, modify and publicly display or perform the work.
- ✓ Privacy and data protection laws – Some data protection laws give individuals the right to delete their data. The immutable nature of blockchain technology may make exercising this right functionally impossible. As a result, NFTs containing personal information may violate data protection laws.
- ✓ Property law – It is important to consider which legal system governs your ability to sell or secure an NFT. The location of the asset often determines the property law. However, NFTs represent a unique copy of the asset rather than the underlying asset itself.
- ✓ Money laundering – The value of NFT transactions and the widespread use of cryptocurrency inevitably raises concerns about whether these transactions are being used to circumvent anti-money laundering regulations.
- ✓ Regulator – NFTs are not multiple. Unlike cryptocurrencies, they cannot be exchanged or exchanged. These are not securities and are not subject to securities regulations in many countries. In traditional investment markets such as equities, unregulated NFT transactions, including "wash trading", will be prohibited, as they give the appearance of artificial demand for an asset.
- ✓ Taxation issues – As with cryptocurrencies, the law has been slow to catch up with NFTs and taxation – there have been difficulties in determining where NFTs are located for tax purposes.
- ✓ Security – Investors should be wary of security threats posed by cyberattacks and other online threats. An NFT and the asset it represents are usually stored separately. While the blockchain ledger is immutable, the digital drawing itself may not be as secure – for example, if hosted on the servers of an unsecured third-party website.
- ✓ Estate and heritage planning – As with other digital assets, an increasingly important question is how the UK's legal framework can deal with NFTs in the event of the owner's death. Leaving digitally stored assets to the next generation can present challenges for practitioners (<https://wessexfairchild.com>, 2022).

3. CONCLUSIONS

The growing popularity and prevalence of digital assets such as cryptocurrencies and non-fungible tokens reveals that existing financial ecosystems are in many cases unable to respond to citizens' needs and concerns. The capabilities of digital assets in financial markets are increasing day by day and they are entering the game from simple to complex financial transactions. Cryptocurrencies stand out especially with their ability to handle more efficient online transactions, lower costs and simplified payment processes. They also meet an increased level of efficiency in commerce and value exchange over the Internet. Non-fungible tokens, on the other hand, stand out with their ability to acquire a presence in the digital world, to be unique, and to be easily transferred. In particular, the financial indicators cited in this article give the impression that the interest in decentralized finance technologies will continue to increase, based on the potential of these two digital assets.

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