SaNa: Journal of Blockchain, NFTs and Metaverse Technology
Vol 1, Issue 1, August 2023, Page 1-9
ISSN: 3030-9832 (Media Online)
DOI: https://doi.org/10.58905/sana.v1i1.32

Non-Fungible Token (NFT): A Literature Review

Hugo Fostin Hokianto

Faculty of Management, Economics and Business, Widya Dharma Pontianak University, Pontianak, Indonesia

Corresponding Email: hugofostin12@gmail.com

Orcid: https://orcid.org/0000-0002-5000-0338

Abstract. Non-Fungible Tokens (NFTs) were a popular crypto asset in the year 2021-2022, where viral news involving an NFT with a huge price being sold created an interest in NFTs and OpenSea, one of the biggest NFT marketplace, creating supply and demand for buying and selling NFTs, especially people who saw the success of NFT as a crypto asset. Although NFTs are popular, the scarcity of NFT-related topics has become a barrier for people who wants to get started in NFT, and research involving NFTs has since been lowered. This research is aimed to review current literature involving NFTs, using the literature review method with "NFTs" or "Non-Fungible Tokens" as keywords to search for relevant literature and searching research articles, with Google Search Engine and Google Scholar to facilitate the search. The result of the research gave a definitive definition of NFTs compiled from many authors, the method people use to create NFTs and ways to invest NFTs safely, opportunities and risks in investing NFTs and the technological aspect, and what the future has for NFTs, investing and technologically wise.

Keywords: Non-Fungible Tokens, NFT, cryptocurrency, literature review

1 Introduction

Since the first creation of cryptocurrency back in 2008, „Bitcoin" was created by the anonymous Satoshi Nakamoto, digital finance has taken to a new step towards digitizing assets and creating an environment to conduct a transaction without any interference from the government. As of November 2022, there are 20,000 cryptocurrencies in circulation, with 528 exchanges operating to connect users to buy and sell cryptocurrencies, with Asia as the most users with cryptocurrency usage of approximately 160 million existing users [1]. This number will only rise slowly, as more people are getting interested in cryptocurrency, and many platforms are taking an approach to use their exchange with deals such as low transaction fees, the safety of the cryptocurrency, and referrals.

When Bitcoin was first released by Nakamoto himself, some people are involved along with him in developing the cryptocurrency he first made. Many people have taken interest in developing the such cryptocurrency, at first creating Bitcoin copycats to test the new technology or even trying to create profit from such technology. But as time progresses, many people want to create something other than Bitcoin, a similar kind of cryptocurrency that has differences in how the cryptocurrency works. One of those is Ethereum, founded by Vitalik Buterin in 2011, which compared to Bitcoin, differs in methods of exchange such as Smart Contract, security protocols where the transaction takes place, and quicker block time that creates more Ethereum payout [2]. This makes breakthrough progress towards a new, better cryptocurrency with many features which Bitcoin didn't have before.

Ethereum differentiates itself from Bitcoin by first introducing smart contract, which later on become fundamental for creating decentralized finance (DeFi) and Non-fungible Tokens (NFT). In 2021, NFT has become the most sought crypto asset, with OpenSea as its main exchange trading with Ethereum as the currency [3]. Many people who are curious about cryptocurrency or those who already invest or perform trades regularly are buying and searching for NFTs that they can keep or sell for profit. In 2022, however, most of the hype in NFTs is gone, with the trading volumes in September 2022 down by 97% compared to January 2022, from a $17 billion market worth to a $466 million market [4]. This makes NFTs become one of the short-lived crypto assets, and nowadays although people are still buying and selling NFTs, it's not as it used to be when it peaked in popularity.

Because NFTs are short-lived crypto assets, an interest was taken to approach NFTs as an asset once wanted by many people. Back when the NFTs are booming, a lack of knowledge of NFTs hindered people from investing or trading in NFTs, and the literature on NFTs is scarce [3]. To solve this problem, this paper will discuss four main topics about NFTs. These are (1) What is the background and Definition of NFTs? (2) How to invest in NFTs? (3) What are the opportunities and risks in NFTs? And (4) What is the Future of NFTs?

2 Methodology

This paper uses a descriptive Literature Review as a methodology of research. Descriptive research Ramdhani, Ramdhani, and Amin [5] describe literature review as a method of surveying literature, research articles, and other sources relevant to a particular issue by providing a description, summary, and critical evaluation. The data taken into research are secondary data consisting of books, research articles, and web pages related to the topic researched. The search of the books and research articles both uses the keyword „Non-fungible Tokens“ or „NFTs“ to find relevant topics, including the keyword „Cryptocurrency“, but excludes topics or keywords such as „DeFi“, „Bitcoin“, or any subject related to cryptocurrency but not focused on NFTs. Books and web pages are searched using the Google Search engine, while research articles are searched using Google Scholar to facilitate the search of NFT-related articles. The search also includes This paper uses 15 books, 13 research articles, and 9 web pages to construct the article as a whole.

3 Results and Discussion

3.1 NFTs Background and Definition

Before NFTs are introduced into the crypto asset market and popularized, the first NFT were dated back in 2014 by the name of Quantum NFT [6], but the earliest so-called NFT was made back in 2012 by the name of Bitcoin2X, also well-known as Colored Coins, utilized to signify several assets, but because of Bitcoin's scripting language was never intended to use in such way, the „NFT“ has few limitations such as the cryptocurrency only worked in a permission system, requires everybody else to settle their worth by signifying specific values, resulting in the cryptocurrency itself not moving into the mainstream, lasting in relevance only until 2013 [6] [7] [8] [9] [10] [11] [12]. Earlier „NFTs“ are forced to use Bitcoin as their main network, and this makes most of earlier NFT projects forgotten. The creation of Colored Coins, however, is not a project that will be in vain, as in the future, this cryptocurrency will be an innovation into a clearer future and inspire many people in the process.

After Coloured Coins were forgotten, in the year of 2014, Counterparty, a P2P financial platform, and Marketplace, an open-source Internet protocol [7] [11], were created as an attempt to establish NFT on top of the Bitcoin network [7]. This means Counterparty facilitates a transaction between item projects within the market, in which users can buy and sell it with Bitcoin as its currency. Assets that are traded regularly in Counterparty consists of memes and digital trading cards, but the marketplace expands as Counterparty partnered with Spell of Genesis in April 2014, the first game which uses cryptocurrency to spend game called BitCrystal, enables its players to conduct the transaction by using Counterparty to buy and sell cards in Spell of Genesis [7] [11] [13]. This expansion is only the beginning, as in 2016, Force of Will and Rare Pepes, a trading card game, and a meme respectfully, also conducts transactions in Counterparty, which creates a mainstream establishment in digital games and cultural information [10] [11] [12]. As a result, more people are using Counterparty as a way to transact digital assets, with more games and meme projects released in the year 2015-2016, before eventually the NFT projects were switched to Ethereum's smart contract [7].

In 2017, projects are starting to use the Ethereum blockchain, leaving the Bitcoin network behind. The popularity of NFT is shown in 2017-2018, caused by increased attention and usage of cryptocurrency [13]. The first marketplace that used Ethereum, Peperium, was published with a token called „RARE“ that are used to create memes and pay listing fees [7] [11]. This replaces Counterparty which previously used bitcoin, and instead conducted their transaction through Ethereum. However, the project that popularized NFT as a crypto asset was Cryptopunks, made within the same year, comprising 10,000 collectible „punks“, with each one having a distinct feature from one other [7] [9] [11] [12]. As a result, Cryptopunks inspired the digital art market, specifically NFT Artworks, in which the category is the most popular in future NFT projects.

SaNa: Journal of Blockchain, NFTs and Metaverse Technology
Vol 1, Issue 1, August 2023, Page 1-9
ISSN: 3030-9832 (Media Online)
DOI: https://doi.org/10.58905/sana.v1i1.32

Subsequently, between 2017 and 2018, another NFT project by the name of Cryptokitties, made NFT mainstream by creating a blockchain-based game in which a person can adopt, grow, and trade virtual cats [8] [11] [12]. Fortnow and Terry described that one of the reasons why Cryptokitties are an unexpected success is because of the relationship between users who use the Internet and cats, whereas in earlier internet days, people often watch YouTube to watch cat videos [14]. Other factors described by Collins and Hayworth that further gave Cryptokitties advantages are its speculative mechanics that contributed to breeding and trading in-game cats and viral story that attracts new users getting into Cryptokitties [10] [11]. The popularity of Cryptokitties made rare cats resulted from breeding cats being sold for over $100,000 (1,5 Billion Rupiahs in 2023) [8] [11] [12] [13] [15]. This is a breakthrough for NFT because at this point, people are now aware of cryptocurrency and blockchain-based games, and in the same year, OpenSea, one of the biggest NFT marketplaces today, opened its business to serve people who wanted to buy and sell NFTs. White, Mahanti, and Passi [16] analyzed the OpenSea NFT marketplace sales data, in which 5,25 million sales were conducted between 1 January 2019 and 31 December 2021, peaking at 2021 with artwork as the most sold NFT category.

So what is NFT? NFT has many definitions described by many authors:

1) A digital collectible asset that holds value as a form of cryptocurrency [8].
2) Digital assets that contain identifying information recorded in smart contracts represent a wide range of unique tangible and intangible items [10].
3) An abbreviation for Non-Fungible Tokens; they are Cryptocurrency assets that act as a rare and unique project, whether virtual or physical [13].
4) A combination of the word „Non-fungible“, which is defined as not easily exchangeable or replaceable; unique and one of its kind, and „Token“, defined as a collectible. The result is a (digital) collectible that is unique to one another and not easily replaceable [14].
5) A digital asset that represents real-world objects such as art, music, and video game items [15].
6) A unique digital identifier that's secured and stored on a public blockchain, where one token is not interchangeable with another and a token cannot be further divided [17].
7) Unique collectible digital assets exist on a blockchain, which is characterized by the inability to describe the worth of any of them, the inability to be traded as if one is the same as another, and the inability to be divided as separate parts [18].
8) Cryptographic ownership certificates that represent intangible assets, such as an image, an online feature, or a digital object are not interchangeable [19].
9) Cryptographic assets on the blockchain with unique identification codes and information that distinguish them from one another [20].
10) Digital items are often linked to one-of-a-kind digital material [21].
11) A way to record, verify, and track the ownership of a unique asset, either physical or digital [22].
12) A provably scarce unique digital asset that can be used to represent ownership [23].
13) A certificate of ownership is; a digital asset that records the ownership of intangible, digital objects or tangible items using blockchain technology [24].

Based on many definitions, NFTs can be summarized as a unique digital collectible asset that exists in a blockchain that acts as an owner of a physical or virtual object. Because there can't be two same NFTs, their value was determined by the demand or the uniqueness of the collectible, hence the interest of people who wanted to have NFTs.

Many types of NFTs exist, besides online collectibles, such as artwork, where digital arts such as GIFs, videos, and photographs are sold as NFTs with artists creating limited-edition artworks for sale; Event tickets, which uses NFT technology to validate the identification of tickets; Media & Music, which includes instrumental music, help the ownership of someone who creates the music or media; Gaming, in this case, in-game items that serve to give benefits for players in-game, virtual avatars and game skins that give the flair in cosmetics; Identity, such as proof of identity, can give a safe place to keep without losing it; Digital real estate that can be transacted using NFT; memes, connected with popular internet culture, engages meme-maker to sell memes using NFT; Domain names for websites; and real-world assets, like fashion clothing, designer sneakers, and others [7] [11] [13] [17] [18] [20]. This makes almost everything digital can be converted into NFTs, and many are useful for people who want to secure their digital assets.

3.2 Creating and Investing in NFTs

When it comes to observing NFTs for creation, one must consider either participating in creating an NFT or investing in NFT. NFTs cannot exist without preparation to create one, and a supply for an NFT project combined with the demand creates value for an NFT. There are steps to follow to create NFTs that can be summarized in Figure 1.

SaNa: Journal of Blockchain, NFTs and Metaverse Technology
Vol 1, Issue 1, August 2023, Page 1-9
ISSN: 3030-9832 (Media Online)
DOI: https://doi.org/10.58905/sana.v1i1.32

The explanation of each step in Figure 1 are:

1. Choosing a blockchain to issue an NFT; NFTs are created using a blockchain, and the most used blockchain is Ethereum. Although popular, the disadvantage of Ethereum lies in high transaction fees, so some opt to use other blockchains like Solana, Cardano, Polkadot, etc. that have fewer transaction fees but are less incompatible in some NFT markets and less known [7] [13] [14] [20].

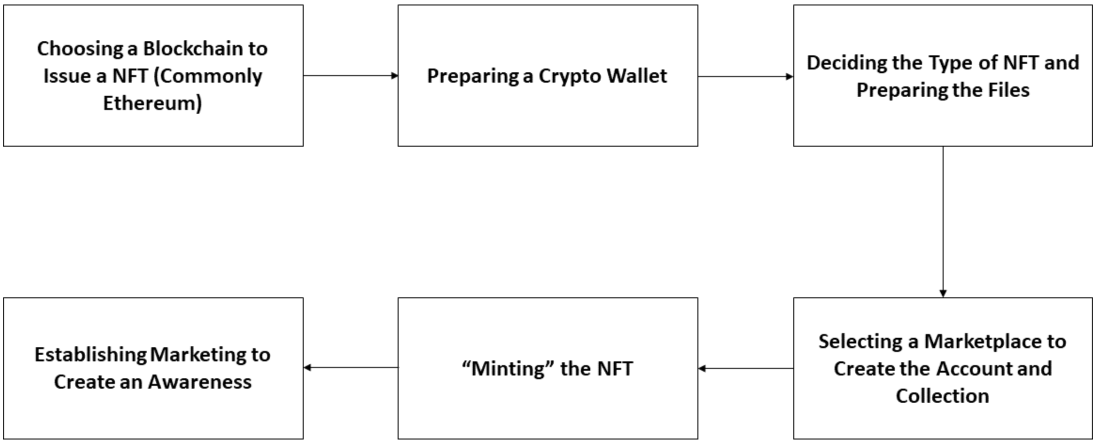

Figure 1. Steps of Creating a NFT

2. Preparing a crypto wallet; crypto wallet is a digital wallet used to store cryptocurrencies, and usually, a crypto wallet must be able to support those cryptocurrencies that will be traded [12]. In this case, crypto wallets are not only used to keep cryptocurrencies but also to support minting and trading NFT that will be created later on [14] [20]. The popular crypto wallets people use are MetaMask, with other options including Coinbase Wallet, Gemini, etc.
3. Deciding the type of NFT and preparing the files; the most common type of NFTs are artworks that are either JPEG or GIF files, in which when deciding to create an NFT, one must be prepared to have some files that need to be converted into an NFT collection [7] [11] [18]. Besides artwork, 3D wiles, Music, and text files are also popular to be converted into an NFT [18].
4. Selecting a marketplace to create the account and collection; usually, collections of NFTs are listed in the NFT marketplace. OpenSea is one of the most popular marketplaces to sell NFTs and to sell in OpenSea, one must create an account, mint the NFTs in that marketplace, list the collection, and be ready to sell the NFT with bid and ask price [9] [7] [11] [13] [14] [18].
5. „Minting“ the NFT; the word „Minting“ in this context relates to conversion from a digital file into a digital token. After the creation of the account, to make a collection of NFTs, one must mint the files into NFTs first before selling them. It is also important to determine the rarity or scarcity of an NFT, which determines the value of the NFT itself [6] [7] [14] [20].
6. Establishing marketing to create awareness; one of the less-mentioned steps by previous authors is the need to establish marketing to create awareness for potential buyers. A new listing in any marketplace might be overlooked by other well-known popular projects, but to differentiate between an NFT listing to another, one must spread awareness about the NFT project that one just made to gain interest. Using social media such as Twitter, Facebook, Telegram, Instagram, and Discord to create a community can help people to get to know better about the NFT project.

People who are interested in NFTs opt to invest in one. Yet, with many types of NFTs, combined with marketplaces that conduct on buying and selling NFTs, it's getting confusing to buy one, let alone invest in it. NFTs create opportunities for people such as aspiring artists or professional artists to create an artwork project dedicated to becoming a digital art tokenized in NFTs; others like game developers have the opportunity to create a game that uses either in-game currency or in-game items in NFTs. Before deciding on which NFTs should one buy, why do NFTs have value? Collins [11] argues that NFTs have value because it is related to the psychology of collecting as if a collectible is a treasured item. Collins further argued that what makes an asset value, which also applied to a digital asset, is contributed by factors such as rarity, because the difficulty to obtain triggers the supply and demand pricing; provenance, by the value of the item’s foundation or reputation;

SaNa: Journal of Blockchain, NFTs and Metaverse Technology
Vol 1, Issue 1, August 2023, Page 1-9
ISSN: 3030-9832 (Media Online)
DOI: https://doi.org/10.58905/sana.v1i1.32

and quality, in which involves objective forms such as quality and functionality, and subjective forms such as aesthetics and beauty of the item [11]. This motivates people to spend on NFTs, and either keep them as a precious asset or trade them for something much better, in value or aesthetic.

But is an NFT worth purchasing? Stock [8] debates that while NFTs are not going anywhere along with blockchain, digital assets, and digital files, there are five considerations before buying an NFT. Those are:

1. Global Warming: The work of miners who are in charge of checking, confirming transactions, and adding them to the blockchain, consumes energy that creates tons of greenhouse gas emissions. Buying and selling NFTs is one of the contributions towards gas emissions.
2. Electronic Ware: Videos, images, and GIFs, that are sold as an NFT can experience wear or pixelation, fading images, skipping content, and other problems that could affect their condition in the long future.
3. Changing Trends: NFTs have grown in popularity at the time, and it's difficult to tell if NFT is going to stay or eventually become just a fad. If it does become a fad, NFTs that once sold at a high price would go down in a few years by the declining demand.
4. Digital Art Theft: Impersonated artwork, stealing artwork, is one of the acts of digital art theft that uses other people's artwork to sell NFT without giving the artists a credit and revenue, which creates a distrust for artists to share their artwork with the public.
5. Other considerations, such as NFTs being a hobby instead of money-making asset, using simple blockchain systems to avoid confusion, and using an environmentally friendly NFT marketplace to buy and sell NFTs.

Dukedom [9] explained that investing in NFT involves four reasons, those are the notoriety of the NFT creator, the first edition of the NFT, tangible, and scarcity. The notoriety of the NFT creator means the person or those who cooperated in the creation of NFTs like big brands create value for the NFT. The first edition of NFT means that a reason to buy NFT is to make it as if it was an „antique“ to create value. Tangible means that it has a digital property and has an asset tied to it. The scarcity of NFT implies that the rarer the NFT the more valuable it is. Similarly, Laurence and Kim [17] also explain that there are three considerations in determining a value of an NFT, which are the person or who is related to creating this asset (Brand), The number of copies released (Scarcity), and the sales and appraisal of an NFT (Market). Fortnow and Terry [14] further explained reasons such as Meaning (Does the NFT relate to you or have a pleasant meaning), Utility (What the NFT can give aside from being a digitized file), Investment (What are the investing goals needed to achieve?), Prestige (What status does an NFT have when others acquire and display it), and Collecting (The need to collect as if it is a valuable item). These reasons are proved by research conducted by Kong and Lin [25], which finds that NFT prices are dependent on the token's scarceness and personal preference for aesthetics. Mekacher *et al.* [26] also found similar findings that rarer NFTs are more often sold at higher prices, traded less frequently, guarantee a higher return on investment, and are less risky.

There are three routes in investing NFTs, each has different things to invest in yet related to NFTs. Those are
[27]:

1. Purchasing the NFTs itself, where things such as personal appreciation, investment risk tolerance, knowledge of art, liquidity, the role of institutions involving art, and overall timing in the marketplace.
2. Investing in businesses that facilitate NFTs, meaning investing in places that support NFTs in ways of creating and conducting transactions on the platform marketplace, and helping aspiring artists or professional artists to create an NFT in the marketplace.
3. Investing in businesses that will adopt NFTs, means investing in potential businesses that will accept, and use NFTs in the future. Types of businesses who will adopt NFTs can be separated into pioneers (those who know the technology and will implement it before anyone else), early adopters (those who see the advantage of the technology and incorporate the new technology as soon as possible), general adoption (those who have implemented the technology when its safe, reliable, and necessary), and „Feet draggers“ (struggling businesses that cannot implement new technology).

When Purchasing the NFT itself, make sure to start the investment with a preferred genre of NFT, with a small number of NFTs in a trusted marketplace. Setting investment goals, and looking at trading volume as a metric to rely on, while also being aware of scams that inflate the value of an asset, is a way to have safe investing in the NFT market [17].

3.3 Opportunities and Risks in NFT

NFTs are just like other types of cryptocurrencies and crypto assets; it has opportunities and risks. The reason people would buy an NFT also comes with the fact that there is a benefit besides making a profit and having a personal collection. The opportunity that NFT has to offer are as follow:

SaNa: Journal of Blockchain, NFTs and Metaverse Technology
Vol 1, Issue 1, August 2023, Page 1-9
ISSN: 3030-9832 (Media Online)
DOI: https://doi.org/10.58905/sana.v1i1.32

- NFTs are easy to transfer. This extends to having market proficiency, which restructures procedures and eliminates intermediaries [10] [11] [13].
- The authenticity of the NFT is undoubted [10] [13].
- NFTs hold property rights, in which once committed, the owner cannot change the data. This also involves identity management, which helps to reorganize entry and exit jurisdiction [10] [11].
- Creating a new way to invest. NFTs can be used in the metaverse, which supports the usefulness of owning an NFT [11].
- Easier to democratize financing by segmenting physical assets [11].
- Supporting the development of the metaverse that extends digital application that helps people in daily life [20].
- Potential for a larger market in the future, with many sectors digitizing in a new rapid movement [20].

However, NFTs also come with risks. Dukedom [9] explains that NFTs, like other crypto assets and cryptocurrency in general, contributed to gas emissions that could harm the earth. Lewis [20] also explained that the challenges in NFTs involve a very long transformation because the concept of digitizing everything is still too early, and require massive investments to be capable of facilitating such transformation. Edelman [15] also adds a few concerns about investing in NFTs, such as scams, market manipulation, commercial failure, technological obsolescence, low demands causing a project to fail and be forgotten, and interventions from the government. Scams like fake NFTs, phishing sites, and fake wallet apps, are ways to lose an NFT [18]; Laurence and Kim [17] explained that one of the tricks scammer uses to create a „good potential NFT“ are purposefully selling an asset repeatedly between accounts to inflate the price and creating false volume signals, hence research towards NFT is needed before purchasing. One of the examples of an NFT scam is Frosties NFTs, one of the trending NFTs back in 2022, where the creators of NFTs promised its investors many benefits of the NFT, but shut down the website when the NFTs sold out, while also stealing investors' money who bought the NFT in the first place, causing $1,1 million loss in total (Approx. 17 Million Rupiah) [28]. Another example of an NFT scam is Big Daddy Ape Club, a Solana NFT Project that is similar to Bored Ape Yacht Club, run off investors' money as much as $1,3 million (Approx. 200 million Rupiah) on January 11, 2022, even though the NFT project itself has been verified by Civic, a decentralized identity verification company, the ones who are supposed to detect NFT scam projects [29]. Wang, Li, Wang, and Chen [30] explained the risks of NFT from security issues, summarized in figure 2.

STRIDE	Security Issues	Solutions
Spoofing *(Authenticity)*	• An attacker may exploit authentication vulnerabilities • An attacker may steal a user's private key.	• A formal verification on the smart contract. • Using the cold wallet to prevent the private key leakage.
Tampering *(Integrity)*	• The data stored outside the blockchain may be manipulated.	• Sending both the original data and hash data to the NFT buyer when trading NFTs.
Repudiation *(Non-repudiability)*	• The hash data may bind with an attacker's address.	• Using a multi-signature contract partly.
Information disclosure *(Confidentiality)*	• An attacker can easily exploit the hash and transaction to link a particular NFT buyer or seller.	• Using privacy-preserving smart contracts instead of smart contracts to protect the user's privacy.
Denial of service *(Availability)*	• The NFT data may become unavailable if the asset is stored outside the blockchain.	• Using the hybrid blockchain architecture with weak consensus algorithm.
Elevation of privilege *(Authorization)*	• A poorly designed smart contract may make NFTs lose such properties.	• A formal verification on the smart contracts.

Figure 2. Security Issues in NFT

SaNa: Journal of Blockchain, NFTs and Metaverse Technology
Vol 1, Issue 1, August 2023, Page 1-9
ISSN: 3030-9832 (Media Online)
DOI: https://doi.org/10.58905/sana.v1i1.32

3.4 The Future of NFTs

Before the Covid-19 pandemic, most people didn't know anything about NFTs. NFTs in people's eyes, if there are people who know prior, may be limited to only the same level as a cryptocurrency. Nowadays, NFTs are well known as a way to make sure that what they own is theirs. Blockchain technology makes it impossible for anyone to change the ownership of an asset by force unless the owner transfers its ownership to someone else. In the future, there might be more NFTs than before, even if the market were not as popular as before, it still is a piece of technology that can be used for a better purpose, and the contents of NFTs will not disappear all of sudden, as there will be a niche of people who are still into NFTs to become a collector or find profit from buying and selling NFTs. Organizations are also starting to look at the potential of NFT, and the possibility of using the technology for the benefit of the company.

NFTCulture [31] predicts that NFTs will be facing continued growth, increased mainstream adoption, greater regulatory clarity, emerging new technologies, and digital wallets becoming the game-changer of the digital space. NFTs would also be used to link the virtual and real-world as the metaverse emerges and companies also joined together in technological development [32]. Future businesses could potentially benefit from ownership authentication and facilitating transaction that is not feasible in traditional transactions [33].

Looking at the other aspects, NFT can be used aside for keeping arts and creating profit. Collins [11] explained that NFT can be used for asset tracking to differentiate between genuine and fake luxuries items using identifications like issuing QR codes; creating a data economy to illustrate a data set; converting NFTs into Re-Fungible tokens (RFTs) to add flexibility; and converting important documents into NFTs that cannot be faked or replaced its own without the owner itself to change ownership. Moore [18] also explained that NFTs can be used to solve data management problems, in which the blockchain secures the information contained from being stolen, attacked, and deleted. However, storing information for blockchain must use a larger amount of electricity, a disadvantage that must be considered. Rafli [34] argues that NFT technology could be a solution for copyright solutions, in other words, intellectual properties owned by creators who created the works. This has been an issue with the fact that some if not many of the works created by artists, researchers, and others are often used without being credited. NFTs in this aspect can help people to validate a person's ownership of their creation, whether it be art, patent, paper, and others. Similarly, Barakat, Yaghi, and Al-Zagheer [35] stated that the use of blockchain and NFT would be useful for patent protection. Noor [36] also explained that NFT could be used for managing digital archives. Geroni [37] also expanded the use of NFTs to support paperless transactions, which don't require verification documents to conduct transactions. Besides the practical aspect, NFTs are not going to be the sole crypto asset. NFT is tied with a few areas such as Metaverse, an expanded internet with boundless possibilities in augmented and virtual reality technology; Non-bankable assets such as fine art, antiques, jewelry, and the like to be converted into NFT; and Digital wallet which becomes the future of online and offline payment [14].

A foreseeable future that people can see is that NFTs will not stop being created so long as people are still involved in creating art and minting new files into NFTs, and many risk-takers are developing NFTs towards better technology. Although the NFT market is not regulated, it still has the potential to benefit people who invest in NFT early. Due to the NFT market being still considered to be young and under development into something better, the future of NFTs is uncertain, but maybe towards something better.

4 Conclusion

The literature on NFTs is scarce. NFTs were popular due to many stories telling about the success of people involving selling a digital crypto asset with a high price, hence creating opportunities for people to create, invest, and be involved in NFTs, whether it be investing NFTs, or creating NFTs, or even developing the technology behind NFTs. This paper's purpose is to review mainly books and research articles to conduct a literature review, with a few web pages helping to explain a few problems of NFTs. Based on the discussion before, the conclusions are:

1. NFTs are defined by many authors, summarized as a unique digital collectible asset that exist in a blockchain that acts as an owner of a physical or virtual object.
2. To create an NFT, one must follow six steps, consisting of Choosing a blockchain to issue an NFT, Preparing a crypto wallet, Deciding the type of NFT and preparing the files, Selecting a marketplace to create the account and collection, "Minting" the NFT and Establishing marketing to create awareness.

To Invest in NFTs, the value of NFTs is decided by personal value (subjective perspective about the aesthetics of NFT), utility (the benefit of having the NFT, whether comes from the price or the prestige of having it), and scarcity (the rarity of NFTs in the market). It is recommended to choose a trusted marketplace, a genre of preferred NFT, and set an investment goal.

3. NFTs create opportunities, such as ease to transfer, authenticity, holding property rights, creating new ways to invest, easier democratizing finance, supporting metaverse development, and potential for a larger market in the future. NFTs have risks, such as creating a big gas emission, requiring massive investment to digitize everything, and scams that exist in the NFT market.
4. NFTs, besides for keeping collection and creating profits, can also be used to help companies to solve data management problems, as a solution for copyright and patent protection, and to archive digital assets. The future of NFTs remains skeptical, but so long as people still create NFTs and develop the technology, NFTs may be towards something better.

5 Conflict of Interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

[1] J. Howarth, „How Many Cryptocurrencies are There In 2023?," 25 November 2022. [Online]. Available: https://explodingtopics.com/blog/number-of-cryptocurrencies. [Cit. 09 March 2023].

[2] B. Marr, „Blockchain: A Very Short History Of Ethereum Everyone Should Read," 2 February 2018. [Online]. Available: https://www.forbes.com/sites/bernardmarr/2018/02/02/blockchain-a-very-short-history-of-ethereum-everyone-should-read/?sh=33a8d7501e89. [Cit. 10 March 2023].

[3] C. Pinto-Gutiérrez, S. Gaitán, D. Jaramillo a S. Velasquez, „The NFT Hype: What Draws Attention to Non-Fungible Tokens?," Mathematics, vol. 10, no..3, p. 335, 2022.

[4] T. Durden, „NFT Trading Volumes Have Collapsed 97% Since January Peak," 29 September 2022. [Online]. Available: https://www.zerohedge.com/markets/nft-trading-volumes-have-collapsed-97-january-peak. [Cit. 09 March 2023].

[5] A. Ramdhani, M. A. Ramdhani a A. S. Amin, „Writing a Literature Review Research Paper: A Step-by-step Approach," International Journal of Basic and Applied Science, vol. 3, no .1, pp. 47-56, 2014.

[6] B. Hor, K. W. Win, S. P. Lee, D. Yap a C. Y. Hong, How to NFT, Singapore: CoinGecko, 2022.

[7] A. Levy, Complete NFT Handbook: Crash Course to Learn All About Non-Fungible Token and How to Make a Thousands of Dollars with it, s.l.: Adam Levy, 2022.

[8] B. Stock, NFT: The Ultimate Guide to Invest in Non-Fungible Tokens and Create Your Digital Assets with Crypto Collectibles Art + NFT Virtual Real Estate, s.l.: Brendon Stock, 2021.

[9] C. Dukedom, The NFT Revolution Real Estate Edition: 2 in 1 Practical Guide for Beginners to Create, Buy and Sell Non-Fungible Tokens & Disruptive Projects of Virtual Land, Properties, and Worlds, s.l.: Crypto Dukedom, 2021.

[10] E. M. Hayworth, The Ultimate Non-Fungible Token (NFT) Guidebook: A Practiclal Guide to Everything NFT in everyday Language, s.l.: Michael E. Hayworth, 2021.

[11] C. Collins, NFT Art and Collectables for Beginners: The Must Have Guide for Understanding Non-Fungible Tokens (NFTs), Park Ridge: Marketing Forte LLC, 2021.

[12] Freedom Economics Publications, NFT Blueprint- Cryptocurrency Investing For Beginners: Non Fungible Tokens Explained, The Blockchain Technology Behind Them & How NFTs Work With Bitcoin, Ethereum & Altcoins, s.l.: Anthony Lloyd, 2021.

[13] C. Griffin, NFT for Beginners, s.l.: Clark Griffin, 2021.

[14] M. Fortnow a Q. Terry, The NFT Handbook: How to Create, Sell, and Buy Non-Fungible Tokens, Hoboken: Wiley, 2021.

[15] R. Edelman, The Truth About Crypto: A Practical, Easy to Understand Guide to Bitcoin, Blockchain, NFTs, and Other Digital Assets, New York: Simon & Schuster, 2022.

SaNa: Journal of Blockchain, NFTs and Metaverse Technology
Vol 1, Issue 1, August 2023, Page 1-9
ISSN: 3030-9832 (Media Online)
DOI: https://doi.org/10.58905/sana.v1i1.32

[16] B. White, A. Mahanti a K. Passi, „Characterizing the OpenSea NFT Marketplace," rev. Companion Proceedings of the Web Conference 2022, Lyon, 2022, pp. 488-496.

[17] T. Laurence a S. Kim, NFTs for Dummies, Hoboken: Wiley, 2021.

[18] A. O. Moore, How to Invest in Non-Fungible Tokens: An Essential and Practical Guide for Beginners on How to Invest, Sell, Create, and Make A Profit with Non-Fungible Tokens, s.l.: Aaron Oliver Moore, 2021.

[19] A. Sestino, G. Guido a A. M. Peluso, Non-Fungible Tokens (NFTs): Examining the Impact on Consumers and Marketing Strategies, Cham: Palgrave Macmillan, 2022.

[20] D. A. Lewis, The NFT and Metaverse Investing: Beginners Guide To Making Money In Virtual Real Estate, Digital Art, Video Games, and Blockchain, Garland: DTX Publishing Co, 2022.

[21] D. Ghelani, „What is Non-fungible token (NFT)? A short discussion about NFT Terms used in NFT," 04 October 2022. [Online]. [Cit. 11 March 2023].

[22] M. Mazur, „Non-Fungible Tokens (NFT). The Analysis of Risk and Return," 31 October 2021. [Online]. Available: https://ssrn.com/abstract=3953535. [Cit. 11 March 2023].

[23] D. Piyadigama a G. Poravi, „An Analysis of the Features Considerable for NFT Recommendations," rev. 15th International Conference on Human System Interaction (HSI), Melbourne, 2022, pp. 1-7.

[24] R. Chohan a J. Paschen, „NFT marketing: How marketers can use nonfungible tokens in their campaign," Business Horizons, vol. 66, no.1, pp. 43-50, 2023.

[25] D.-R. Kong a T.-C. Lin, „Alternative Investments in the Fintech Era: The Risk and Return of Non-fungible Token (NFT)," 1 September 2021. [Online]. Available: https://dx.doi.org/10.2139/ssrn.3914085. [Cit. 14 March 2023].

[26] A. Mekacher, A. Bracci, M. Nadini, M. Martino, L. Alessandretti, L. M. Aiello a A. Baronchelli, „Heterogeneous Rarity Patterns Drive Price Dynamics," Cientific Reports, vol. 12, no.1, pp. 1-9, 2022.

[27] M. Beckman, NFTs Digital Artwork Blockchain Technology: The Comprehensive Guide, New York: Skyhorse Publishing, 2021.

[28] E. Brady, „Frosties NFT Scheme Leads to Fraud, Conspiracy Charges for 2 Men: DOJ," 24 March 2022. [Online]. Available: https://www.newsweek.com/frosties-nft-creators-charged-fraud-conspiracy-1691622. [Cit. 16 March 2023].

[29] J. Nelson, „Solana NFT Project Rug Pulls Investors for $1.3M—Despite Civic 'Verification'," 21 January 2022. [Online]. Available: https://decrypt.co/90833/solana-nft-project-rug-pull-big-daddy-ape-civic. [Cit. 16 March 2023].

[30] Q. Wang, R. Li, Q. Wang a S. Chen, „Non-Fungible Token (NFT): Overview, Evaluation, Opportunities and Challenges," 25 October 2021. [Online]. Available: https://arxiv.org/abs/2105.07447. [Cit. 14 March 2023].

[31] NFTCulture, „The Future of NFTs: Predictions and Possibilities," 05 January 2023. [Online]. Available: https://www.nftculture.com/nft-news/the-future-of-nfts-predictions-and-possibilities/. [Cit. 16 March 2023].

[32] K. Mastrucci, „The Future of NFTs in the Metaverse: Utility and Liability," 07 November 2022. [Online]. Available: https://www.jdsupra.com/legalnews/the-future-of-nfts-in-the-metaverse-9846280/. [Cit. 16 March 2023].

[33] M. Ozair, „Now the NFT scams are over, here's how the tech will become a big part of your life," 08 January 2023. [Online]. Available: https://www.sciencefocus.com/future-technology/now-the-nft-scams-are-over-heres-how-the-tech-will-become-a-big-part-of-your-life/. [Cit. 17 March 2023].

[34] D. P. A. D. Rafli, „NFT Become a Copyright Solution," Journal of Digital Law and Policy, vol. 1, no. 2, pp. 85-94, 2022.

[35] S. Barakat, K. Yaghi a H. Al-Zagheer, „The Use of NFT for Patent Protection," Advances in Dynamical Systems and Applications, vol. 17, no.1, pp. 107-113, 2022.

[36] M. U. Noor, „NFT (Non-Fungible Token): Masa Depan Arsip Digital? Atau Hanya Sekedar Bubble?," Pustakaloka: Jurnal Kajian Informasi dan Perpustakaan, vol. 13, no..2, pp. 223-234, 2021.

[37] D. Geroni, „Future Applications and Challenges of NFT," 01 July 2021. [Online]. Available: https://101blockchains.com/nft-future-applications-and-challenges/. [Cit. 16 March 2023].