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PROSPECTS OF INVESTMENT IN DIGITAL ART: THE CASE OF ETHEREUM AND NON-FUNGIBLE TOKEN (NFT)

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Abstract

This paper focuses on the technology impact via Blockchain to change consumer behavior in the digital art industry. The paper objectives are three folds: first, analyze the impact of Ethereum in selling digital artwork and on the bank world. Second, investigate the effects of Non-Fungible Token on the art industry. Third, highlight how people can sell their artworks, tweets, or even memes for thousands of dollars. Fourth, explain the effect of Ethereum in creating value for artwork and why a meme that includes nothing unique to be sold for an unbelievable price?

The paper provides insights on the future of the digital arts industry and the rational behavior of the developers, artists, and even customers, as the three parties shape the business of the NFL's success. It reflects on the investment behavior in digital arts and the importance of a secure long-term investment for a niche segment that seeks to satisfy their need of acquiring unique products. The paper serves as a guide for digital art and focuses on how AI applications create profitable markets.

Keywords: Blockchain, Ethereum, NFT, Crypto art, mining

JEL Codes: L17, L22, L86, L82, O31

Introduction

The objective of this paper is to analyze the impact of Ethereum on the bank world, and to know the effect of Non-Fungible Token on the art industry, to investigate how people can sell their artworks, tweets, or even memes by thousands of dollars, to explain the effect of NFT on the environment.

Sending money is a simple process that can be done by using any application like PayPal, Apple Pay, or Venmo, these applications are useful and a great option as they keep your money safe and all transactions are secured, even though in the capitalist world they are expensive, as they always try to maximize their profit by applying fees on any transaction. Unlike these apps, Blockchain allows any person to send money safely without using a third party, so no one must pay extra money to cover the transactions fees. Before 2009, Blockchain technology was unknown, it became widely known by launching its first cryptocurrency “the Bitcoin network” and become even more widely known by launching Ethereum cryptocurrency. The core of Blockchain technology was to create a modern cryptocurrency to create secured electronic cash (Nofer, Gomber, Hinz, & Schiereck, 2017).

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Blockchain is a distributed database of a public ledger of all transactions that happened among the participating parties. It is also simply defined as a decentralized ledger. Ledgers are essentially lists that contain who owns what. In Blockchain, they take a copy of the private ledger and make it public –for only the participating parties- then make many copies of these ledgers, and all participating parties maintain their copy, to make sure that all transactions are verified, and nothing is suspicious. No third party is included, so it is decentralized (Gupta, 2017). Blockchain Contains a large database that needs to be hosted on servers made of powerful computers, those servers are built of thousands of computers to have the power and capacity to make it easy and possible to let users access the database. In simple words Blockchain sort data into groups and we can call those groups “blocks”, every block has a specific storage capacity when filled the block is chained onto the previous filled block, so they create the “Blockchain”, so blockchain is as the name suggest it is a chain of blocks (Filippi, Shimony, & Fornés, 2021).

The rest of the paper is organized into nine sections: the first section is the introduction in which it introduces the topic and the aim of the paper, Section 2 is the literature review in which it will discuss the history of Ethereum and new trends in the digital art. The third section focuses mainly on the impact of Ethereum on digital art, and how artists double their profit by using Non-Fungible Token. The fourth section will discuss the future of NFTs. The fifth section will summarize the main points in this paper and suggestion of some recommendations.

Literature Review

Although Ethereum is decentralized digital money, it has failed to achieve its primary goal of real decentralization, as Ethereum has been classified as an oligopoly business. Even though Ethereum's structure does not need to be centralized, it has a track record of limited participation. It's not easy to get Ethereum; you'll need entities known as miners. Miners' primary goal is to record and verify transactions. The Ethereum community is concerned about the concentration of power. Ethereum's developer, Vitalik Buterin, designed it to be decentralized. Unfortunately, the Proof of Work mechanism - which is used to mine Ethereum - provides incentives, and these incentives lead to a system of centralization, which is the polar opposite of what Buterin desired (Vujičić, Jagodić & Randić, 2018).

Mining power is very concentrated, as the cost for mining is not symmetric. Therefore, market share is determined by a simple equation, the one who has a higher ability to pay and get more mining power is the one who has a higher market share. The major reason behind why no one predicted that Ethereum would become not fully decentralized is that there are many studies prove that the more invested in mining the less to be gained from the mining process, as each mining device will decrease the gain from the other device (Dannen, 2017). Unluckily, such studies were incorrect, as numerous factors might reduce the costs of new mining devices. For example, one of the reasons why new devices would cost more is that power would be more expensive. People managed to solve this problem by putting their mining devices in countries with cheap electricity, like China for example. China is the best location for the mining process, which is why China is the basement of Ethereum mining. In China the cost of electricity, cooling hardware is a little bit rational for investors. As a result, they can put up a large number of Ethereum mining devices and increase their mining return without lowering their marginal income. As a result, the Ethereum sector became more centralized, and TTM Digital Assets & Technologies now has a huge market share (Feng, Niu, Zhang, Wang & Cheng, 2019).

Ethereum was created to replace PayPal and Visa as they are centralized and authorized currencies. Customers were unhappy because they were bewildered that they paid fees to move their money and that the money merely went to the CEO's pocket, and they were also confused and concerned that all of their transactions might be easily revealed. The developer of Ethereum

guaranteed that no one or even entity has the authority to freeze client assets or divulge transaction history, hence the goal of Ethereum was to demolish CEOs or any corporation that has the authority to know any transaction at any time. Instead of creating an entity that maintains the record of transactions, there are billions of miners that maintain records (Panescu & Manta, 2018). The big challenge for Ethereum was how to keep the consistency of the Blockchain. They secure the consistency by a very strict protocol that it is difficult to change anything in the ledger by making every block join to the solution of a complex crypto puzzle. This crypto puzzle is designed to make the first one who guesses the right solution of the puzzle, is the one who gains Ethereum reward. Guessing the solution is the mining devices' mission. When Vitalik Buterin created Ethereum, he had to find a way to confirm transactions in the Blockchain without a third party. Consequently, he used the proof of work model (Dannen, 2017). Mainly, proof of work is used to make nodes know how to secure transactions, to make sure that every transaction is valid, to make sure that no one can break the chain of the Blockchain and put fake block inside the chain, and to make sure that no one is selling his Ethereum twice (Tikhomirov, 2017).

Proof of work depends on a mathematical form called cryptography, and this is why Ethereum is called cryptocurrency. Proof to work uses very complex equations that no one can solve except powerful devices. Once the equation is solved, it can't be repeated twice, which makes every Ethereum unique, as the solution of the equation makes a unique ID for the new Ethereum that is created (Natoli & Gramoli, 2016). Although proof to work is a successful method, it has several flaws, including the requirement for powerful devices and a large amount of electricity, as well as the fact that this system can only handle a limited number of transactions at once. There is a lot of evidence that mining Ethereum contributed to global warming. Thus developers tried to come up with a new way to mine Ethereum. In 2012, Scott Nadal and Sunny King developed new consensus mechanisms called proof of stake. At first mining, Ethereum by this model cost \$150,000 for electricity per day. Later, they managed to develop this model to consume less electricity. Unluckily, Ethereum has had a lot of difficulties adopting the proof of stake model; till today, no proof of stake data has been confirmed, therefore there is no document or other evidence that Ethereum has successfully transitioned from Proof of Work to Proof of Stake (Sajana, Sindhu & Sethumadhavan, 2018).

By using Ethereum you can buy Xbox games, book a hotel on Expedia, or even invest in it and sell Ethereum after with a higher price. One of the most recent ways to use Ethereum is to get a digital wallet and connect it to some of the crypto art websites and buy some NFTs (Non-fungible tokens). NFT is a fresh business that started in 2017. Therefore, only a few studies are made about this business. NFT is a unique asset that cannot be exchanged with another NFT, as it is a Non-fungible token (Trautman, 2021). What do non-fungible tokens mean? In simple words, it is something that cannot be easily swapped or divided up, to simplify it USD can easily be exchanged with the Egyptian pound, and on the other hand, no one can exchange The Last Supper by Leonardo da Vinci for The Starry Night by van Gogh, both artworks do not have the same value for everyone. One can see The Last Supper painting as worthless and the other as priceless, it's all based on opinion. The same thing applied in the NFT business, there is no NFT that has the same value as the other NFT, so NFTs cannot be exchanged with another NFT. NFT is not a stable business to invest in, as it has no real value. The only value it has is the value the media gives to them (Franceschet, 2020).

NFTs opportunities and challenges

It is used to prove that a digital asset is unique and therefore not interchangeable. NFT can be used to represent digital assets like images, movies, audio, etc. NFTs are electronic tokens that can be used to buy and trade digital art. However, unlike a painting, which may be exhibited in a buyer's home, an NFT is more equivalent to a piece of paper saying that you own

something, digital artwork, or a movie. Occasionally, a strange-looking cat will appear (Kastrenakes, 2021).

NFT is a new trend that not everyone knows about. OpenSea, Mintable, and Rarible are the most popular platforms that allow you to buy NFT. Most of these sites do not deal in digital currencies but deal in cryptocurrencies. OpenSea, Mintable, and Rarible platforms are working just like eBay, when you want to buy an NFT, you can bid on it. The one who sets the higher bid is the one who gets this NFT. Unlike any internet auction site, the purchasing process is not done by using the USD, trading in OpenSea, Mintable, and Raible are done by using cryptocurrencies. The popular cryptocurrency for buying NFTs is Ethereum and Bitcoin. Cryptocurrencies, in simple word, it is digital assets, and it can be definite also as secure electronic cash. In OpenSea, Mintable, and Rarible no one can use the USD, so the buyer needs to convert his dollars into Ethereum and put them in a digital wallet (Clark, 2021).

The fundamental problem with cryptocurrencies is that they enable people to undertake large-scale transactions that the government cannot easily trace. It promotes tax evasion, money laundering, criminality, and terrorism, all of which governments cannot allow quietly. However, central banks and regulators have been slow to respond. Long-term growth is possible for Bitcoin and other cryptocurrencies (Reyburn, 2021). The initial purchase of NFT was motivated by a desire to collect. These crazes were driven by people who wanted to own these objects rather than trade them. Different collectibles become popular for a variety of reasons, but they all appear to have something in common: a desire for control and order. However, the point is that such objectives did not always involve a desire to get wealthy. Later, speculators and investors recognized that the enormous demand for these items meant that if you bought the correct ones, you might make a lot of money, which fueled even more demand, driving prices further higher, and so on (Surowiecki, 2021).

NFT System and how it operates?

Buying NFTs is a process that not many people would understand. NFT space will grow fast, so people will want it to become more accessible. The process of buying NFTs has some barriers. A lot of platforms that sell NFTs require the buyer to use his crypto wallet. According to Blockchain.com (2021), only 73 million people have a crypto wallet. It is about 1% of the population of the world. Some developers aimed to let anyone be an art collector, so they developed user-friendly platforms. Those platforms accept credit card payments. Nifty Gateway is one of those platforms that allow users to buy using their credit cards. Nifty Gateway is a centralized platform, as this platform does not require buyers and sellers to have a crypto wallet. The only one who owns a digital wallet is the platform and it is called “Nifty Gateway Omnibus Wallet”. All NFTs there are owned by Nifty Gateway-omnibus. That may make it easy for buyers, but this centralizing service made user account vulnerable. Several Twitter users stated that their Nifty Gateway accounts had been hacked and NFTs valued thousands of dollars had been stolen. This brings up another important point about NFTs: they are equally as susceptible to hacking as your email or other online accounts (Schneider, 2021).

After Gateway was hacked, owners announced that their website was not hacked, the stolen items were because account owners did not secure their accounts, they also advised them to use two-factor authentication to secure their accounts (Schneider, 2021). Two-factor authentication (2FA) is a security solution that necessitates the use of two distinct forms of identity to obtain access to anything. A password is usually the first factor, followed by a text message with a code sent to your smartphone or biometrics like your fingerprint, face, or retina (Wallace, 2020). Every transaction, even those that are effectively theft, is nearly permanent due to the immutability of the Blockchain record and the lack of a centralized authority to oversee it. It is irrevocable for both the account owner and the NFT. If they gain access to your

NFT account and transfer the NFT to them, they are the owner. You have no control over the situation. There is no central authority to rely on, and there is no bank to call (Schneider, 2021).

NFT customers

When you buy an NFT from one of the different NFT marketplaces, you are paying for a token that symbolizes a unique object. In other words, you're paying for a very small digital record, usually only a few bytes in size that often contains a URL or a serial number and is sent to your Blockchain address. Possession of an NFT is similar to possession of a house's deeds. The deeds, not the house, serve as proof of ownership. Similarly, an NFT is a record of the ownership or legality of an asset, not the thing itself (Nighthale, 2021).

When a person purchases an NFT, they can gain access to the unique token, but only on the Blockchain. When someone buys an image or meme, they can claim ownership on the Blockchain, but they cannot control how it is distributed. When you purchase an NFT, you are typically purchasing a token that links your name to the artist's work on the Blockchain. It's impossible to predict if NFTs will hold their value in the long run. Billionaire Mark Cuban told Insider that buying NFTs is motivated by scarcity. The buyer knows that there is only one token was made. Buyers are not necessarily fans of the artists. Many buyers are investors. NFTs can function similarly to any other speculative asset in that you buy it and hope that the value of it rises one day so that you can sell it for a profit (Kay, 2021).

One of the most obvious benefits of buying art is that you may financially support artists you admire. When you buy an NFT, you usually get some basic usage rights, such as the ability to share the image online or use it as your profile picture. Of course, owning the painting comes with bragging rights, as well as a Blockchain entry to verify it (Clark, 2021). To buy NFT you will not be obligated to pay only the certain amount of money that the sellers require. There is a hidden cost called gas fees. Simply gas fees are the payment that buyer and seller have to pay to compensate for the computer power necessary to process and validate transactions on the Ethereum blockchain. Because Ethereum transactions need the expenditure of processing energy, the Blockchain imposes a gas fee based on the Ethereum metric of Gwei on users. Gwei is simply a little amount of Ethereum that is used to calculate the costs associated with transaction processing. On most NFT platforms, buyers pay a gas cost to validate a transaction on the Blockchain network using their digital wallet. Sellers may also pay for gas to list and sell NFTs. The price of gasoline varies greatly depending on the time of day. Buyers and sellers can save a lot of money by waiting for gas prices to decline. While you may not be able to avoid paying for gas, you can always lower the expense. Actual charges are difficult to estimate because NFT gas fees vary based on the size of the digital asset and the complexity of the transaction.

There are a lot of fees that any platform takes when anyone tries to sell an NFT. These fees vary from one platform to another. Opensea the largest NFT platform gets a 2.5% fee on the sale price. Seller is not required to pay gas fees, gas fees are on the buyer that makes Opensea popular with sellers, as they are only charged 2.5% on the sale price. Another reason for the platform's popularity among sellers is that sellers can charge consumers a 2.5 percent fee. The Nifty Gateway platform also functions as an NFT marketplace. Sellers can seek a 5-50 percent commission on secondary sales using Nifty Gateway. On secondary sales, Nifty Gateway receives a 5% commission plus a \$0.30 charge. There are no petrol fees; they only apply when withdrawing money from an ATM. That means dealers can list and sell NFTs without having to pay for gas. The reason why Nifty Gateway does not apply any gas fees is that Nifty Gateway is a centralized website, which has its digital wallet called "Nifty Gateway Omnibus Wallet". This wallet contains all of the transactions conducted on this website. Nifty Gateway-omnibus owns all of the NFTs in the area (Schneider, 2021).

First and foremost, NFT is predicated on trust, belief in the value of these tokens. Buyers are simply purchasing metadata that describes what they have purchased. That faith isn't placed in the correct place. The system that NFT employs is extremely risky. For the buyer of the \$69 million NFT that Beeple sold at Christie's, this system produced the most costly 404 ERROR. The artist's identity, the title of the work, and the NFT itself have all vanished from Christie's.

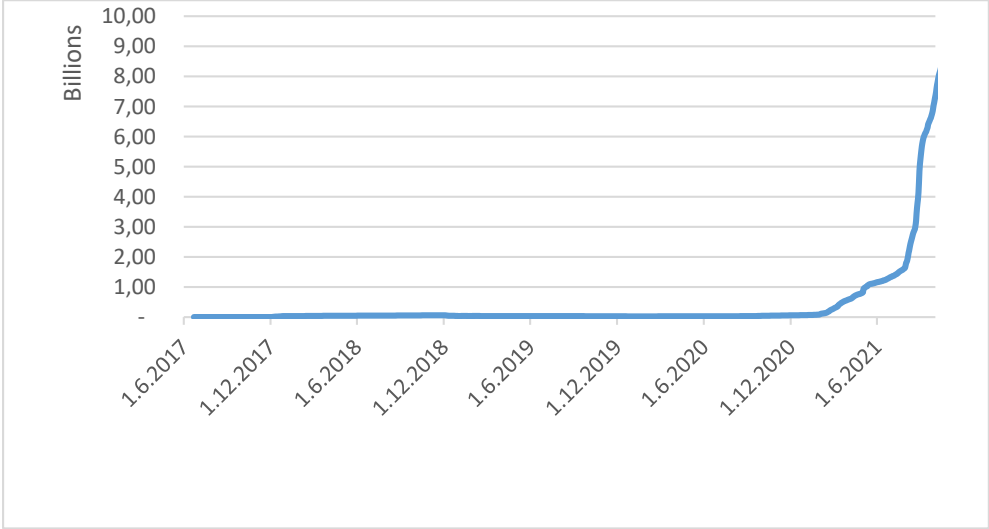
That isn't a problem in Beeple's NFT; it's simply the way the system operates (Iyengar & Sarlin, 2021). NFTs use connections to send you to another area where the art and any information about it are preserved. This is a crucial weakness in the NFT system that ensures an NFT remains intact. Links can and do go down, as anyone who has used the internet knows. The NFT provides information on where to locate a description of the artist's identity and the work's title, although such information is rarely seen on the Blockchain. NFTs include directions for finding the artwork they represent.

NFTs face significant hurdles when using traditional URLs. The domain owner may redirect the URL to somewhere else, or they may simply forget to pay their hosting subscription, and everything goes away. Grimes' animation, which sold for \$389,000, is mostly sourced from a pair of traditional URLs, which might fail if one of the two firms (Nifty Gateway, the auction platform, or Cloundinary, the webserver) goes down. Unless you were wealthy enough to buy the entire domain and pay to keep it online, you would have no control as the buyer (Kastrenakes, 2021).

NFT Future

Dataset used in this paper comprises 1,912 daily observations from June 22, 2017, to October 31 2021 on the NFT sales volume in USD, NFT Art sales in million USD, NFT Games sales in million USD, and NFT Art sales in million USD. All datasets are collected from NonFungible Corporation (NonFungible, 2021).

Figure 1: NFT sales in Billion USD

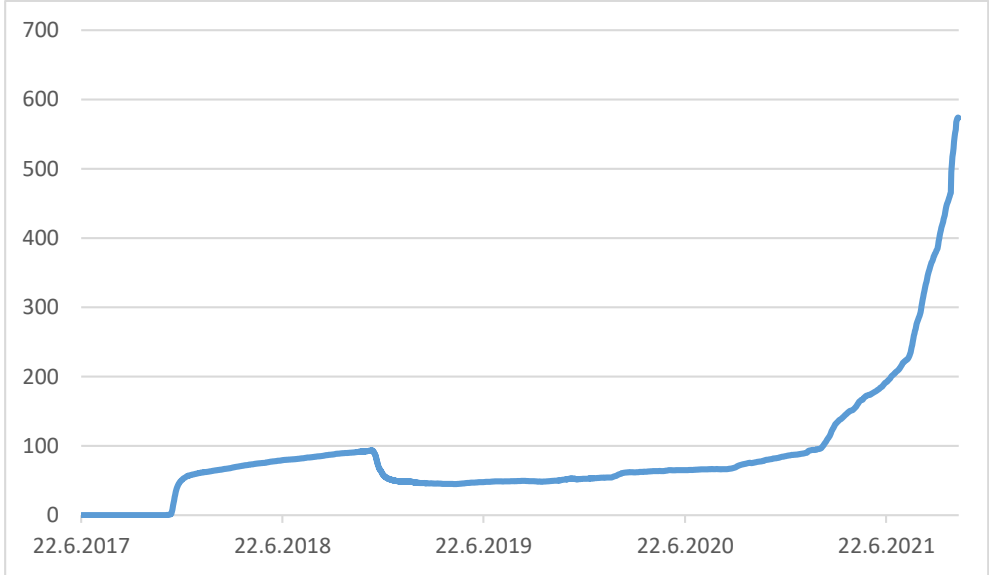


Source: NonFungible, NFT Market History

Figure 1 represents the volume of NFT sales in billion USD during the period from 2017 to 2021. It shows that there was an intense increase in the NFT sales during the end of 2020. Sales jumped from \$66 million on December 31, 2020, to become \$575 million. During the year 2017, the volume of NFT sales reached \$33 million. This volume increased to become 58 million at the end of 2018. Sales did not increase at all in 2019. It declined to become 23

million which was lower than NFT sales in 2017. During the quarantine and the extreme media coverage of NFT sales increased and became billions not millions during early 2021, sales were \$2billion. In October 2021, sales reached \$ 9 billion. Needless to say, that the NFT market is growing rapidly.

Figure 2: Number of active NFT wallets



Source: NonFungible, NFT Market History

This graph shows the number of wallets that bought or sold an NFT during the period from 2017 to 2021. This data shows the number of people who are interested in NFT. There was around 2 thousand wallet interaction during June/November 2017, this number increased to reach its max during this year to be 56,279 active wallets. The number of new wallets interacting with NFT kept increasing during 2018 to reach 92 thousand wallets. Needless to say that during the Quarantine the number of active wallets increased to reach 8 million wallets. There was an extreme increase in active wallets since early 2021 due to the peak of media coverage.

It should also be emphasized that during epidemics, when people spend a lot of time indoors, there is a lot of frenetic speculating in assets that have no physical substance. Between 1635 and 1636, tulip mania coincided with a bubonic plague outbreak in the Netherlands, which killed one-fifth of Amsterdam's population (Cuthbertson, 2021).

Concerns about the environment may be one-factor dampening interest in NFTs. Another potential is a drop in the value of Bitcoin and Ethereum, which are related to NFT values. According to Ante (2021), Bitcoin and Ethereum pricing affect NFT sales, but NFT sales do not affect the price of Bitcoin and Ethereum. A drop in Bitcoin and Ethereum value will cause affect negatively the NFT sales.

Conclusion

NFT is a new product where a group of people perceives it as a craze behavior during 2021. The paper tries to answer if this crazy behavior can secure a long-term investment or not? The paper shows that human behavior of buying unique things is not new where people will repeat what old does. Customers of cryptocurrency are more than satisfied with this currency as it is secured and there is no third party in any transaction that occurs. No one can fake any transaction as the whole devices in the blockchain are maintaining transactions and every transaction should be verified by all devices. The existence of NTFS in the art industry

made more profit for artists. It even made them get profit from things they did not think they could sell, like memes, and tweets. NFTs are a new business that needs a lot of studies to know how to get more profit from it. No one knows how the NFT market will evolve over the next few years or decades.

Even though many experts believe that NFTs are here to stay, many others believe that the industry is a bubble. In this paper we analyzed NFT sales and the number of active wallets to examine the real number of people who are interested in NFT, finding that there are 2 main peaks in the active wallets first one in late 2017, the second in late 2020. We also found that NFT sales are dependent on cryptocurrency prices. NFT is a new industry that not many researchers have done on it. NFT theft is an issue that has yet to be entirely resolved. The recommendation in this paper emphasizes the importance of rationality and thinking twice before entering this business in order not to lose huge amounts of money, as in this business anyone can either get high profit or lose a huge amount of money, as this business depends on the price of the cryptocurrency.

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