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Crypto-art and NFTs from a double perspective: a technical and aesthetic analysis

Supervisor
Ch. Prof. Pietro Ferrara

Assistant supervisors
Ch. Prof. Pietro Conte
Ch. Prof. Marina Mussapi

Graduand
Laura Coppelli
Matriculation Number
883155

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To my Dear Father

TABLE OF CONTENTS

INTRODUCTION

Over the past few years, especially after the pandemic outbreak in 2020, the art world has witnessed the unrestrained development of **Crypto-art** and **NFTs**. After reaching record breaking numbers, today, NFTs constitute an ever-growing market that cannot be ignored or treated like a mere transitory trend. Crypto-art is seeking its place in the history of art and the different actors involved in the traditional art field are starting to respond to these new artistic and economic stimuli that could lead to a progressive convergence of digital and physical domains in the arts and culture.

The present dissertation investigates Crypto-art's phenomenon from a *double perspective*: a more technical and technological point of view on one side and a conceptual and aesthetic perspective on the other. The choice of merging together very different approaches such as the one of information technology and the one of aesthetics through a dual analysis was conceived with the purpose of reflecting the very nature of NFTs, whose technological qualities go hand in hand with their intrinsic artistic side, but also with the aim of mirroring the *hybrid nature* of the Ca' Foscari University's EGArt course.

Therefore, the thesis is essentially structured in *two parts*. The first deals with technical aspects related to Crypto-art, namely the blockchain technology on which it is based, with a particular focus on the Ethereum blockchain — the most used for NFTs' implementation — taking into account its advantages but also its threats, whereas the second focuses on conceptual aspects of NFTs, such as Crypto-art's radical revolution of aesthetic enjoyment and its challenge towards the traditional idea of art collecting, but also recurrent dynamics that surprisingly pertain to NFTs as well as the traditional art system.

For the purpose of this dissertation, different actors working in the art field whose activity involves Crypto-art were interviewed in order to examine how the art world is concretely reacting to this disruptive technology and what interactions between digital and physical domains could be actualized in the future.

The **first chapter** corresponds to the most technical section of the dissertation. It is specifically focused on Blockchain technology with the purpose of defining what it is, how it works and its peculiarities and advantages compared to traditional systems. The technical analysis takes into account both the structure and the algorithmical logics that constitute the blockchain system — with the support of blokchain's web demonstrations — and its decentralized network, which represents the technology's key strength. Only after a necessary historical overview of the technology's evolution and development the chapter will finally introduce the concept of Non Fungible Token, which will be thoroughly analyzed starting from the Smart Contract's tool to the "minting" process and the different ways to achieve it. Finally, the technological analysis will conclude with a paragraph dedicated to the principle of transparency and block explorers' platforms such as *Etherscan*.

The **second chapter** specifically addresses the phenomenon of Crypto-art with the aim of analyzing NFTs' from both an artistic and commercial perspective. The first part of the chapter aims at shedding light on the phenomenon's roots and its complex relation with both digital and physical artifacts, providing readers with a clear and unambiguous definition of what Crypto-art is from an artistic point of view. Moreover, relying on a study conducted on the basis of trending tags in the SuperRare's domain, the chapter will offer a picture of Crypto-communities' preferences in terms of aesthetics and artistic trends, including a specific focus on *Collectibles*. The second section of the chapter instead will explore NFTs' market; in particular, its incredible records and evolution through time, the central role of online platforms, notably the distinction between *curated* and *non-curated marketplaces*, and finally the selling process of Non Fungible Tokens.

The **third chapter** corresponds to the aesthetic and conceptual analysis of the phenomenon, which also constitutes the main contribution and added value of the present thesis to the dialogue around Crypto-art and NFTs at an academic level. The chapter is structured in three paragraphs, each one dealing with a different aspect of Crypto-art's aesthetic dimension. The first paragraph aims at contesting and refuting the main narrative around Crypto-art that defines it as an artistic practice in complete contradiction with traditional art. Consequently, the paragraph will also identify the unexpected features that mark a great connection between Crypto-art and more

canonical forms of art, rather than a drastic rupture. The second paragraph discusses the crucial issue of *reproducibility* in the Crypto-art domain starting from two major texts for the philosophical branch of aesthetics in relation with art, namely *The Languages of Art* (1968) by **Nelson Goodman** and *The Work of Art in the Age of Mechanical Reproduction* (1935) by **Walter Benjamin**. The analysis carried out in this paragraph will lead to recognize the *democratization of aesthetic enjoyment* as the actual revolution brought about by Crypto-art. The fourth and final paragraph explores the paradoxical phenomenon of *destruction* of physical assets for the purpose of creating NFTs. The issue will be addressed through the analysis of various examples, especially the latest NFT project by British superstar artist **Damien Hirst** with the purpose of exploring the controversial relationship between physical and digital assets and the idea of their apparent impossibility of coexistence conveyed by this popular practice.

The **fourth and last chapter** includes the contributions of different actors of the cultural system working with Crypto-art and NFTs, whose activities represent virtuous examples in the art field — respectively Alfredo Zanini, Davide Zanini and Sandie Zanini from **Zanini Arte Gallery**, the Crypto-artist **Federico Solmi** and the cultural entrepreneur **Andrea Concas** — who were expressly interviewed in order to analyze how the art world is responding to the technological revolution of NFTs and potential future interactions between the traditional and crypto domains.

In conclusion, this work aims at offering a general overview of Crypto-art, which is not taken into account as a phenomenon on its own, but is considered in a wider context that includes its intersections with the traditional art system and its possible future implications.

CHAPTER 1

Blockchain: the technology behind Crypto-art

1.1 Blockchain technology

Crypto-art is strictly related to the blockchain technology. As a matter of fact, there are two universally accepted definitions of Crypto-art and they both deal with the blockchain's concept. We can include in the Crypto-art field all the works which are *inspired* by blockchain as well as all the ones whose *creation* is directly *based* on this emerging technology[1]. The prefix "crypto", associated with the word "art", makes the correlation between this new kind of artistic expression and the cryptography domain very direct. The term cryptography derives from the Greek words *kryptos* (hidden) and *graphein* (to write)[2], basically meaning "secret writing", and is defined as "the science of securing information by transforming it into a form that only intended recipients can process and read"[3]. Blockchain systems rely on cryptography in order to safeguard holded data and their integrity. Therefore, in order to understand how Crypto-art and NFTs work, it is necessary to focus on the digital technology on which they are grounded.

1.1.1 The structure of the blockchain system

The Merriam Webster dictionary defines the Blockchain as a "digital database containing information (such as records of financial transactions) that can be simultaneously used and shared within a large decentralized, publicly accessible network"[4]. The name "blockchain", basically a "chain of blocks", already suggests

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[1] Andrea CONCAS, *Crypto arte*, Milan, Mondadori Libri S.p.A., 2021, p. 25.
[2] Gustavus J. SIMMONS, *Cryptology*, Britannica.com, n.d.
[3] Annika FEIGN, *What is Cryptography?,* CoinDesk.com, 2021.
[4] MERRIAM-WEBSTER Online dictionary.

how the technology is built. As a matter of fact, in the digital ledger that is the blockchain, all the blocks related for example to a record of financial transactions are linked, or better, *enchained*, to each other through cryptographic means. The use of the term "enchained" helps to understand how the blocks and the connections between them are indissoluble and unmodifiable. From a technical point of view, the blockchain is a sequential structure of data in which each block has a unique identifier and a link to the previous and the following one that is determined by algorithmical logics[5]. This means that a new block can only be added *at the end* of the pre-existing chain and never at the beginning or in the middle, since every block contains a specific reference to the block that precedes it and the one that follows it, making it — almost — impossible to manipulate the data and the chronology related to the concerned transactions.
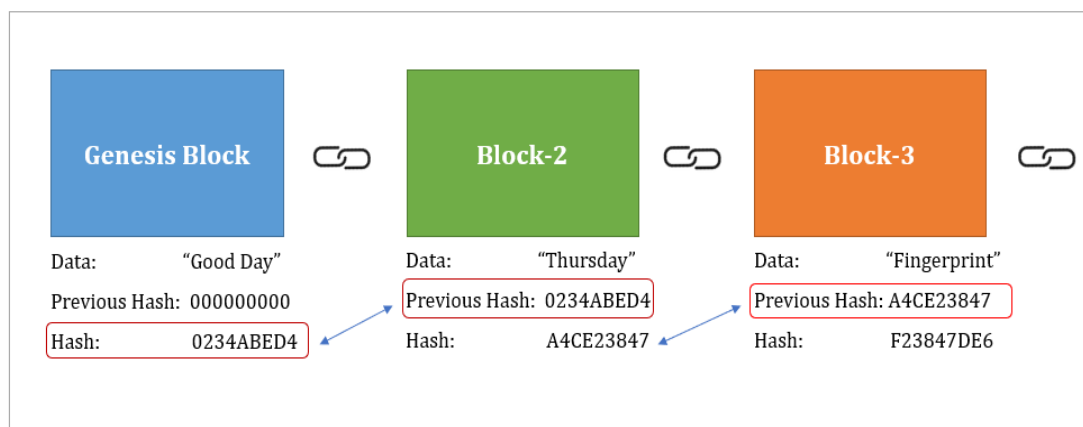
Figure 1 – *Blocks in a blockchain linked cryptographically through hash.*
(Source: Medium.com)

As we can notice in the image above, the unique identifier that is related to each block and that links blocks to each other is the so-called **HASH**. "Hash is a mathematical function that converts an input of arbitrary length into an encrypted output of a fixed length"[6], which consists of a bit string also called *digest*. These functions are usually identified by the acronym SHA, which stands for **Secure Hash**

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[5] Filippo ANNUNZIATA, Andrea CONSO, *NFT L'arte e il suo doppio*, Milan, Montabone editore, 2021, p. 9.
[6] Jake FRANKENFIELD, *Hash*, Investopedia.com, 2022.

Algorithms. According to the National Institute of Standards and Technology, the approved hash algorithms families are SHA-1, SHA-2 that includes SHA-224, SHA-256, SHA-384, SHA 512, SHA-512/224, SHA 512/256, and SHA-3 which is based on the Keccak-256 algorithm[7]. In these algorithms, the number in each acronym corresponds to the length of the digest they produce; for example, as we can see in the table below, no matter the length of the text of the input, the Keccak-256 algorithm will always produce a 256 bit digest, which corresponds to 64 alphanumeric digits. The main characteristic of hash functions is that they are "one-way", a principle that distinguishes functions whose computation cannot be inverted and that consequently make it impossible to retrieve and find data starting from the hash value only. Basically, the hash value could be compared to a fingerprint that, instead of a human, is related to a file and its transaction, providing it with a unique and irreplicable digital identity.

Table 1 – *Conversion from input text to output hash with Keccak-256 hash function*

Girl with a Pearl Earring	51f3f74dfc0f87c5ac1e9bafeba64f9ac02 e869f1c7c1e89409826d643f55397
Mona Lisa	eb232570fde6b23a454a1ad6e2326fa1f1 e04e537e0dc958d2129159d16136f2
The Starry Night	20a599aeef8b8a3ef4a320e7410106202 950c114c2923adc609c168372ed7254

(Source: table created using online converter Github.io)

Transactions in a block are usually aggregated through the *Merkle Tree* structure. Starting from the fact that each transaction has its own hash value, the Merkle Tree *pairs* transactions two by two. Every time two transactions are paired a new hash is generated on the basis of the combination of their previous hashes and the process goes on until there is just one hash left, that is the one that identifies the whole block[8].

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[7] NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, *Hash functions*, Csrc.Nist.Gov, 2020.
[8] The Merkle Tree is used both in Bitcoin and Ethereum blockchains. The proposed example corresponds to the simplest kind of Merkle Tree, the binary one. Ethereum uses a more complex kind
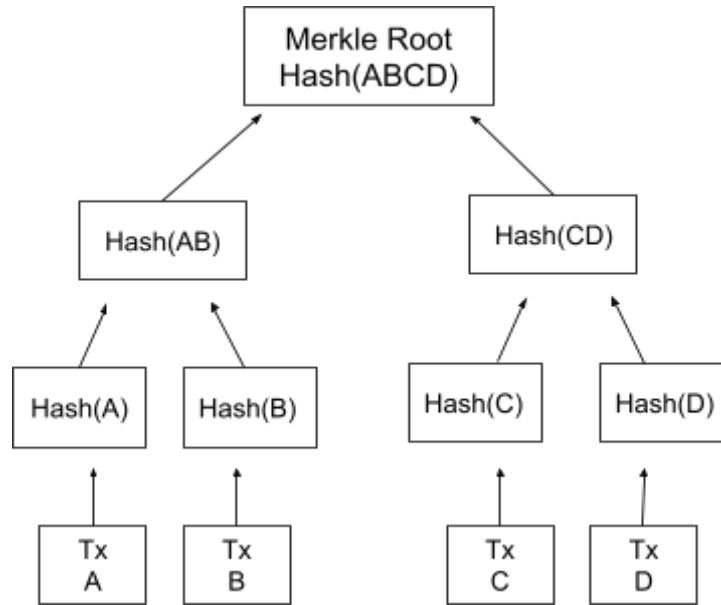
Graphic 1 – *The Merkle Tree visual representation* (personal elaboration)

Especially in the case of Crypto Art and NFTs, it is important to point out that, clearly, blockchain data only contain the alphanumeric string corresponding to the hash value and not the file to which the latter is related, which will be accessible only through the use of a private decodification key possessed by the owner of the file

Through some examples, the following pages will propose a demonstration of the blockchain system's functioning realized using the web demo developed by Professor Anders Brownworth, expert in cryptocurrency and blockchain technology. After showing the visual representations of a block and the blockchain system, we will observe and analyze what happens when a modification is applied to a block.

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of Merkle Tree, the so-called *Patricia Tree* (Vitalik BUTERIN, *Merkling in Ethereum*, Blog.Ethereum.org, 2015).

Figure 2 – *Visual representation of a single block.*
(Source: Andersbrownworth.com)

Figure 2 contains the following elements:

- '**Block**' corresponds to the number of the block in the blockchain system.
- '**Tx**' corresponds to the list of transactions that are recorded in this specific block[9].
- '**Prev**' corresponds to the hash of the previous block. [10]
- '**Hash**' corresponds to the hash value, the "fingerprint" of the concerned block.
- The '**Mine**' button is related to *mining*, which is "the process of creating a block of transactions to be added to the blockchain"[11].
- '**Nonce**' stands for "number used once" and is strictly related to the mining process[12].

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[9] The fact that this demo shows *dollars* as a currency is purely random, since the one concerned is not a real blockchain, but just a mere example.
[10] In this case, the hash is a string of zeros, since this block is a *genesis block*, which corresponds to the first block of a blockchain.
[11] ETHEREUM, *Mining*, Ethereum.org, 2022.
[12] The mining process will be explained in detail in paragraph 1.1.4.
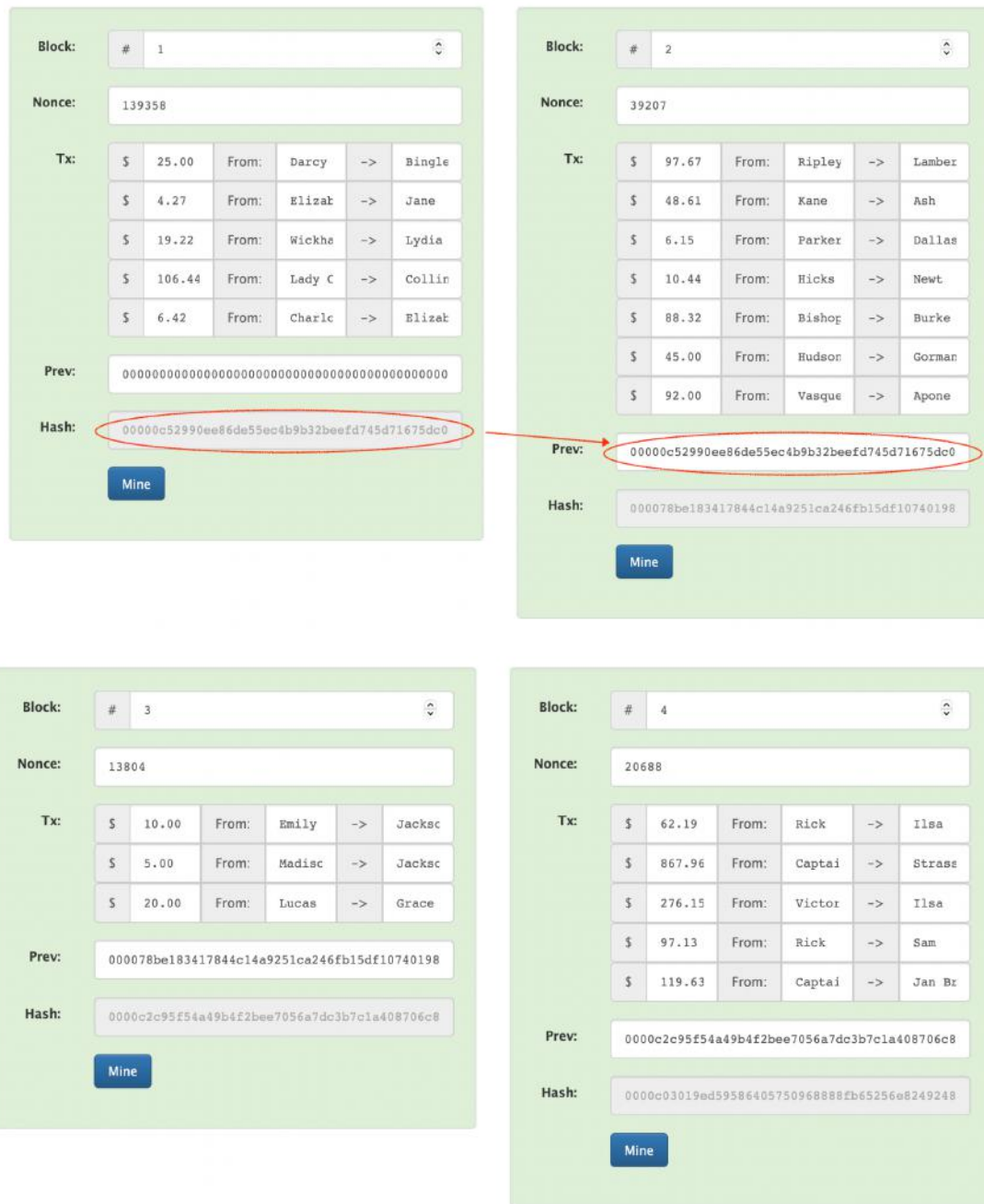
Figure 3 – *Visual representation of a blockchain.*
(Source: Andersbrownworth.com)

The visual representation of the blockchain system allows us to notice how each block is related to the preceding one through the voice '**Prev**', where we can retrieve the previous block's hash.

Figure 4 – *Visual representation of an alteration in the blockchain system.*
(Source: Andersbrownworth.com)

In **Figure 4** it is possible to notice how the alteration of information in a single block not only invalidates the concerned block, but also all the following ones; as a matter of fact, in the web demonstration, all invalid blocks become red. In this case, the alteration was computed in block number 2, where the amount of money of the first transaction (circled in red in the figure) was changed from 97.67 to 65.51. The only possibility for a user to modify data and make the blockchain valid again is to modify all the following blocks by **re-mining** them all. The process will be long and

time-consuming, which could already be a deterrent for those who want to tamper blockchain data, but still *possible*.

Figure 5 – *Visual representation of re-mining process*
(Source: Andersbrownworth.com)

The **fifth figure** shows how, after re-mining all blocks (in the web demo it was sufficient to click on the blue "mine" button down on the left), all blocks, whose hash

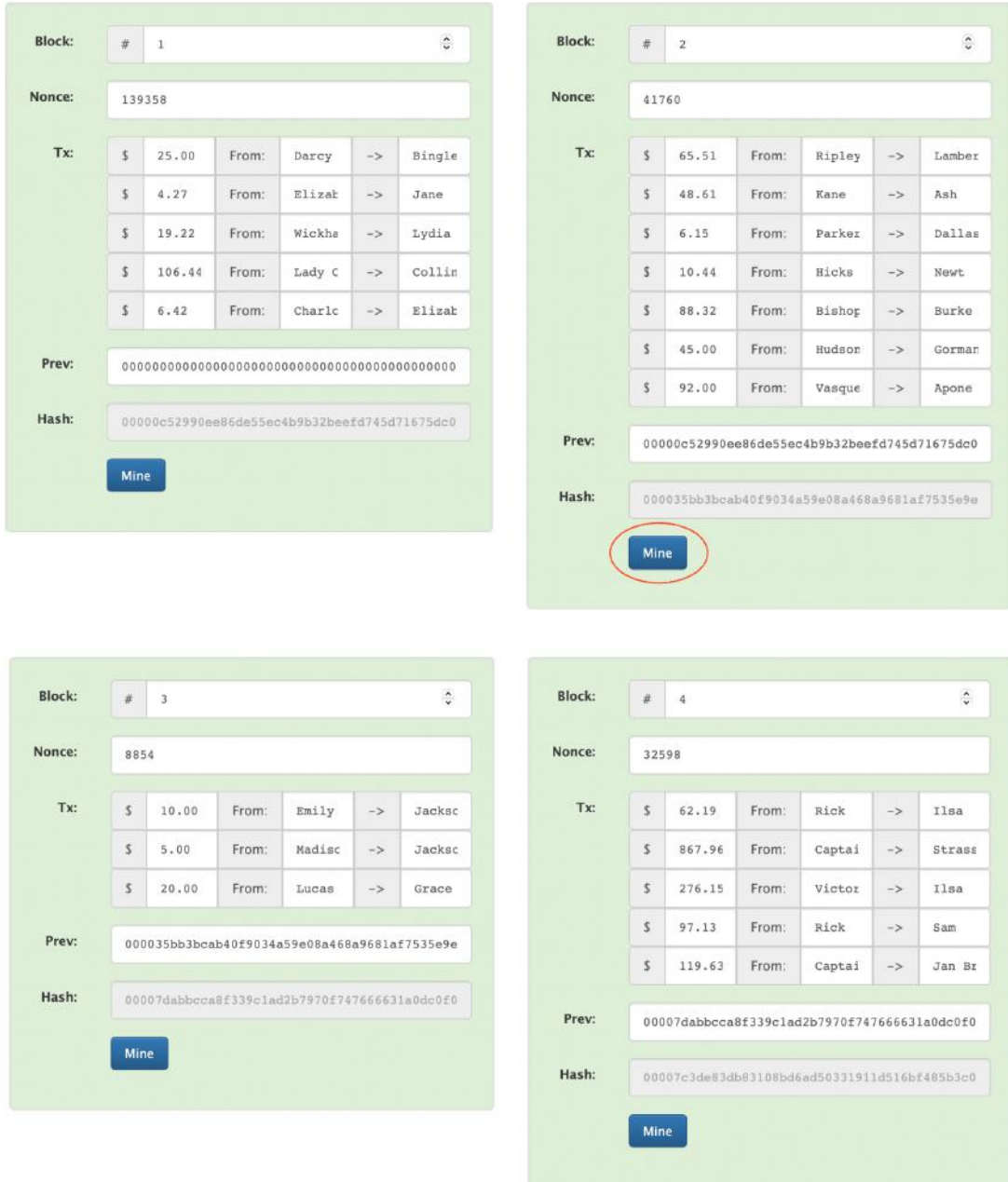values and nonces have been recalculated[13] are valid again, as all the blocks are green.

1.1.2 Types of blockchain

Before exploring further all the peculiarities and the advantages of the blockchain system, it is necessary to make a very important distinction. As a matter of fact, it is possible to identify different types of blockchain, among which the two most relevant ones are **permissionless blockchains** and **permissioned blockchains**. Permissionless blockchains are also called *public,* since, potentially, the participation to their network is permitted to anyone, whereas permissioned blockchains are also named *private*, which means that they do *not* permit open participation to anyone, but just to intended participants[14]. Permissionless ones include great and well-known examples such as **Bitcoin** and **Ethereum**; on the contrary, permissioned ones could incorporate interorganizational networks used by closed systems such as industry consortia and companies in general[15].

This definition of permissioned networks is in complete contradiction with the first definition of blockchain that was provided at the beginning of the previous paragraph which describes it as a *publicly accessible* and *decentralized* system. Basically, the only common feature among the two types of blockchain is the structure, which is organized in blocks, but, if the system is closed and, consequently, under the control of a single entity, as it is the case with permissioned systems, "only chaining blocks to each other, based on the hash of the previous one, cannot ensure the integrity and the security of the data and protect transactions against tampering"[16]. As a matter of fact, the blockchain web demonstration that was

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[13] Comparing data in figure 5 with those of figure 4, it is possible to notice how they are different after the re-mining process.

[14] Siamak SOLAT, Philippe CALVEZ, Farid Naït-Abdesselam, *Permissioned vs. Permissionless Blockchain: How and Why There Is Only One Right Choice,* Journal of Software vol. 16, no. 3, 2021, p. 97.

[15] Henry M. KIM, Hjalmar TURESSON, Marek LASKOWSKI, Amir Fard BAHREINI, "Permissionless and Permissioned, Technology-Focused and Business Needs-Driven: Understanding the Hybrid Opportunity in Blockchain Through a Case Study of Insolar," in IEEE Transactions on Engineering Management, vol. 69, no. 3, 2022, p. 776.

[16] Siamak SOLAT, Philippe CALVEZ, Farid Naït-Abdesselam, *Permissioned vs. Permissionless Blockchain: How and Why There Is Only One Right Choice,* op. cit., p. 97.

analyzed in the previous paragraph showed that changing data in a blockchain is actually possible, as long as all blocks are re-mined. So, despite the architecture of the system, the real crucial feature that constitutes blockchain's main strength and guarantees the security of the data is *decentralization*, that characterizes permissionless systems only.

Thus, it is fundamental to clarify that, despite the block structure, which pertains to both types of blockchain, this dissertation only focuses on **public** ones, with a particular attention to the Ethereum blockchain.

1.1.3 The network of the blockchain system

Back to Merriam Webster's definition of blockchain, besides its unique structure, another fundamental characteristic of the blockchain technology is that, in contrast to traditional centralized databases, it is not under the control of a single entity, but instead it is *shared* within a decentralized and publicly accessible network. Since, as previously explained, all blocks are irretrievably linked and enchained to each other through hash values, the only possibility to change data in a set of blocks is to modify them all. This could be possible if the control of the blockchain was entrusted to a single entity or server, but, on the contrary, the blockchain system manages to overcome this obstacle through the establishment of a **Peer-to-Peer** network (visual representation can be found in **Figure 7**). As a matter of fact, the blockchain goes under the category of **DLT** (**Distributed Ledger Technology**). According to the Italian Legislative Decree n. 135 of the 14 of December 2018, DLT are defined as "technologies and computer protocols that use a register that is *shared*, *distributed*, *replicable*, *simultaneously accessible*, *architecturally decentralized* on a cryptographic basis in such a way to allow registration, validation, updating and the storage of data both in clear text and protected by cryptography verifiable by each participant, *not alterable* and *not editable*"[17, 18]. This means that, differently from the typical client-server architecture of centralized systems, "blockchain is *distributed* to

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[17] DECRETO-LEGGE 14 December 2018 n. 135, Gazzettaufficiale.it.
[18] All translations from Italian to English were made by the author of this dissertation.

all the peers in the blockchain network in real-time (...) and all peers to which blockchain is copied will have equal access permissions, providing transparency"[19].

The difference between centralized and decentralized systems can also be detected in the informatic functions they allow. The centralized system allows users to perform all the four basic functions of persistent storage applications, which in the computer programming field go by the acronym **CRUD**, which stands for: **C** - Create, **R** - Read, **U** - Update, **D** - Delete.

On the contrary, blockchain only allows **two** functions, the **Read** and **Write** operations, which respectively correspond to the *validation* of a transaction and the *writing* of a new one[20]. These functions can be performed by all the peers that participate in the network.

The "peers" at issue, also called *nodes*, are none other than servers, basically any kind of device such as computers or laptops, which are connected and constantly exchange the latest blockchain data with each other[21], making it possible for everyone in the network to verify the correctness of new additions and modifications. Consequently, in order for a block to be added, a process that in the crypto domain is called **mining**, the majority of nodes in the network must *agree* with its addition and proceed with its *validation*, a procedure that constitutes a consensus-based system that is technically called **Proof-of-Work**. This implies that the only possibility — which is very remote — for a hacker to manipulate and distort data in the blockchain apparatus is to control at least 51% of the peers in the concerned network, the so-called "51% attack".

The web demonstration displayed in figure number 5 (see *Paragraph 1.1.1*) proved how altering data in a blockchain system is possible by re-mining all the blocks that follow the modified one, demonstrating how concatenation only is not enough to guarantee the security of blockchain data. The following figure, instead, will show how decentralization is the real *key feature* that makes a difference in securing the integrity of information in a blockchain network.

[19] Venkat KATSHALA, *Blockchain key characteristics and the conditions to use it as a solution*, Medium.com, 2019.
[20] Shaan RAY, *Blockchain versus traditional databases*, Towardsdatascience.com, 2018.
[21] S. JIMI, *Blockchain: What are nodes and masternodes?*, Medium.com, 2018.

Figure 6 – *Visual representation of the Peer-to-peer network*
(Source: Andersbrownworth.com)

Figure number 6, which was once again created by means of Professor Anders Brownworth's web demonstration, does not only focus on the structure of the blockchain system, as it was the case with figure number 5, but is extended to its *network*. As a matter of fact, it is possible to notice the presence of *multiple peers*: **Peer A**, **Peer B** and **Peer C**. All the peers at issue take part in the blockchain network and, consequently, have access to its data. We will assume that Peer A is the one who changed the data in the first transaction of block 2, where 97.67 was replaced by 65.51. Peer A then re-mined all the blocks in the blockchain to make them valid again. However, as the red circles in the image graphically underline, the data corresponding to the Hash value of Peer A's chain *do not correspond* to the data of Peer B and Peer C, who in this case, represent the majority in the network (one peer versus two peers). Therefore, the consensus about the modification of data is not reached and Peer A's attempt to tamper the data is consequently hampered and prevented. In order to concretely alter blockchain data, Peer A should gain the control of at least one of the other two peers, either Peer B or Peer C, taking over the majority of nodes in the network.
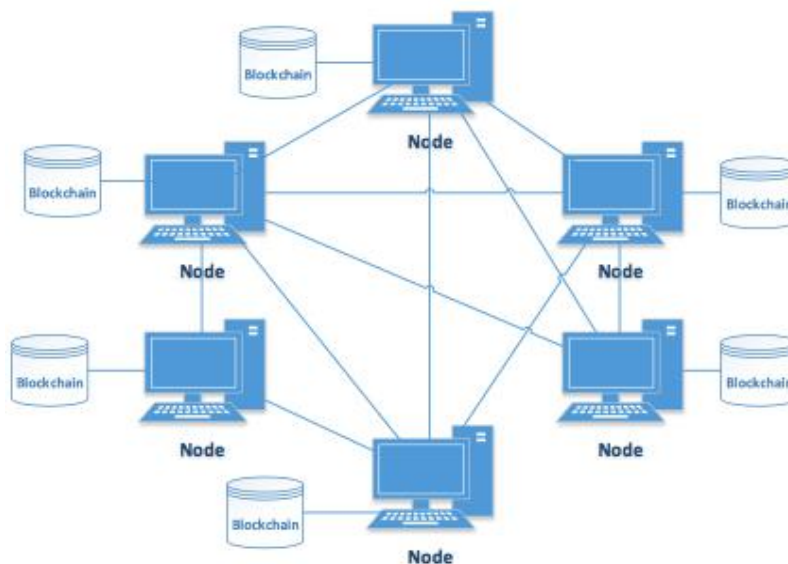

Figure 7 – *Blockchain P2P Network.*
(Source: Researchgate.net)

1.1.4 The mining process

Despite the simplicity through which the web demonstration allows users to "mine" blocks by just selecting the "mine" option that was used purely by way of example in the previous paragraph, **mining** is actually a really complex process on which the whole decentralized network relies. First of all, mining, the activity of the so-called "**miners**", is the process of convalidation of transactions through a device in a network that consists of solving complex algorithmic problems to prove the correctness of a transaction and consequently consent the addition of a new block in the blockchain system in exchange for a coin reward[22].

Mining is based on two basic processes: the **creation of a new block** and its consequent **validation** and registration in the distributed ledger. The process of creation of a block is carried out by one single miner, whereas the process of its validation involves all nodes in the network. Starting with the process of creation, the following are the steps for a block to be created and mined:

1. First of all, miners receive all new transactions "requests", which until that moment can also be defined as **unconfirmed transactions**, which means that they are "valid, known in the network of nodes, but they are not yet included in the distributed ledger"[23].

2. Secondly, mining nodes start aggregating unconfirmed transactions in a single potential block[24], which are then combined on the basis of the Merkle Tree structure that was previously mentioned and explained.

3. The mining process actually starts. This process requires miners to "solve a computationally expensive puzzle"[25] to create a new valid block that can be added to the blockchain ledger. The mathematical problem that miners have to solve in order to mine the block consists in finding the so-called **nonce**. As already seen in **Figure 2**, the nonce is a constitutive information of blocks and is crucial in the mining activity. Just as a "nonce-word" is a term coined

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[22] Filippo ANNUNZIATA, Andrea CONSO, *NFT L'arte e il suo doppio*, op. cit., p. 11.
[23] Anthony LEWIS, *A gentle introduction to bitcoin mining*, Brave New Coin, n.d.
[24] ETHEREUM, *Mining*, Ethereum.org, 2022.
[25] Jan RÜTH, Torsten ZIMMERMANN, Konrad WOLSING, Oliver HOHLFELD, *Digging into Browser-based Crypto Mining*, 2018, p. 70.

for one specific occasion[26], the nonce in the cryptography domain is the abbreviation for "number used once" and corresponds to the string that miners need to **discover** in order to solve the algorithmical problem and for a block to be considered valid (or *signed*). This process generates a *competition* among miners and, therefore, involves several of them, but only the one who solves the computational problem *first* will actually be identified as the miner of the block and will consequently gain a profit from mining activity.

4. After the computational problem is solved, the block is shared with all the other members in the network that verify its correctness through what is generally known as the Proof-of-Work system, that, as the name implies, *proves* the accuracy of the miner's work.

5. The block is finally registered in the blockchain ledger. After the block is registered, the more blocks will be built on top of it, the harder it will be for the data in the concerned block to be altered[27].

The choice of the term "mining" and "miners" to identify the process and the actors involved in the creation and the validation of new blocks that might apparently seem random is actually a really precise and careful choice of words. As a matter of fact, the cryptocurrency reward, for example the bitcoin reward, that is obtained by miners in exchange for their computational work corresponds to the emission of brand new coins in the market. So, just as gold diggers find gold only by means of their work and resources, crypto-miners gain coins without having to exchange for example fiat currencies such as euros, but only thanks to their mining activity.

Finding the solutions to mining algorithmical problems is **difficult**, since every blockchain establishes a standard of calculation difficulty that miners need to achieve in order to mine blocks. In the case of Brownworth's web demonstration — that will be once again used, in this case, to explain the complexity of mining calculations — the difficulty lies in finding the right nonce so that the corresponding hash value starts with a certain number of zeros.

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[26] WORDREFERENCE Online dictionary.
[27] Anthony LEWIS, *A gentle introduction to bitcoin mining*, op. cit.

Figure 8 – *Example of wrong nonce*
(Source: Andersbrownworth.com)

In **Figure 8** it is possible to notice how Nonce 72608 does not meet the established conditions, since the corresponding hash does not start with zeros and consequently the block is invalid (red).

Figure 9 – *Example of right nonce*
(Source: Andersbrownworth.com)

On the contrary, in **Figure 9**, it is possible to observe how Nonce 215668 meets the established conditions, since the corresponding hash starts with four zeros and therefore, the block is valid (green).

It is easy to imagine that finding the right nonce to produce a string that starts with the exact number of zeros requested to validate the block consists of a very long process based on an infinite number of attempts. This implies that, in order to put the mining activity into practice, it is necessary to possess devices that are endowed with a high computational power. Thus, miners need specific technical equipment in order to start their activity.

At this point, it is of major significance to clarify that *not all nodes are also miners*. Infact, nodes identify all the *devices* which are connected to the blockchain system and, according to Ethereum's official website, everyone who possesses an average consumer-grade computer could possibly run a node[28]; these nodes will eventually become a part of the blockchain network, they will store its data while online and act as validators in the addition of new blocks, contributing to the Proof-of-Work system and to the security of the data, but they won't gain any profit from it, since their devices could hardly compete with the high computational power of miners' equipment and would therefore be unable to mine blocks first.

Clearly, mining entails several costs. The following lists reports the mining costs that are listed on the Ethereum website:

- Potential costs of the hardware necessary to build and maintain a mining rig.
- Electrical cost of powering the mining rig.
- Potential cost of equipment to support mining rig (ventilation, energy monitoring, electrical wiring, etc.)[29].

The several costs associated with mining serve as another deterrent for those who might think to achieve the control of the majority of nodes in the network by creating fake mining nodes identities (the so-called *Sybil attack*). In any case, if on one hand the costs related to mining might disencourage hackers to attack the system and therefore constitute a point in favor of the blockchain system and, in particular, of the Proof-of-Work process, on the other hand it is also important to consider the incredible amount of energy that is necessary to run mining nodes which implies a great waste in terms of energy resources and the implementation of a system that is

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[28] ETHEREUM, *Run a node*, Ethereum.org, 2022.
[29] ETHEREUM, *Mining*, Ethereum.org, 2022.

clearly *unsustainable* in the long run. Both Bitcoin and Ethereum use the Proof-of-Work method, but, in order to overcome the sustainability issue, Ethereum is progressively switching to a more sustainable method, the so-called ***Proof-of-Stake*** (POS)[30].

All the features described until now, including the structure of "blocks" that characterizes the system and its distribution among a network of nodes, which distinguish this technology in comparison with traditional systems, contribute to the implementation of a very safe and transparent structure for which the blockchain is usually praised and because of which it is possible to predict that in the future its use will be extended to a multitude of other applications and fields.

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[30] The present dissertation does not enter into the merits of the Proof of Stake's functioning. It will be sufficient to know that, according to Ethereum's official website, with respect to the Proof of Work system, the Proof of Stake is "more secure, less energy-intensive, and better for implementing new scaling solutions" (ETHEREUM, *Proof-of-Stake (POS)*, Ethereum.org, 2022).

1.2 The evolution of Blockchain technology

The focus on what the Blockchain technology is, how it works and its peculiarities and advantages compared to traditional systems, still does not explain what Crypto-art has to do with it. In order to understand the connection between Crypto-art and blockchain technology, it is necessary to make a very important distinction. As a matter of fact, the creation and the implementation of NFTs has to do with the *evolution* of the blockchain, since, despite being a relatively "young" technology, blockchain already boasts a quite considerable history. Nevertheless, the comparison with traditional systems used to explain the blockchain's functioning that was introduced in previous paragraphs was a necessary premise to make, since the first Blockchain, promoted by **Satoshi Nakamoto**[31], was expressly created as a *counter-proposal* to the institutions' models.

> A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another **without going through a financial institution**[32].

As a matter of fact, the first lines of the abstract of the white paper related to blockchain and bitcoin, which can be considered as a sort of "manifesto" of the technology, already marked the *political intention* of detachment from financial institutions and the aim of creating a system for the people and, especially, *run by* the people; basically, "removing power to authorities to transfer it in public hands"[33]. Satoshi Nakamoto is designated as the promoter of the first blockchain and its respective cryptocurrency, bitcoin, which represents "the first application"[34] to the system. However, nowadays Bitcoin "only" represents the first stage of the blockchain evolution, the one that goes under the definition of *Blockchain 1.0*, that was followed by *Blockchain 2.0* and the most recent *Blockchain 3.0*, which were developed with the intention of exploiting all blockchain's features and advantages at

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[31] Satoshi Nakamoto is a pseudonym. The identity of the first blockchain's creator has never been officially revealed.
[32] Satoshi NAKAMOTO, *Bitcoin: A Peer-to-Peer Electronic Cash System,* Bitcoin.org, 2008.
[33] Filippo ANNUNZIATA, Andrea CONSO, *NFT L'arte e il suo doppio*, op. cit., p. 13.
[34] Gwyneth IREDALE, *History Of Blockchain Technology: A Detailed Guide*, 101blockchains.com, 2020.

best. NFTs and Crypto-art, which represent the core of this dissertation, are strictly linked to the second "stage" of the blockchain evolution, the so-called **Blockchain 2.0**; therefore, as previously mentioned, the distinction between the latter and the standard blockchain concept is fundamental in order to dive deeper into the Crypto-art subject.

1.2.1 Blockchain 2.0: Ethereum

The second stage of the blockchain development is related to the implementation of the **Ethereum Blockchain**, launched in 2015 by Vitalik Buterin (Kolomna, 1994). With Ethereum, Buterin managed to *upgrade* the blockchain basic technology, enriching the system with more functionalities and "creating applications that go *beyond* just enabling digital currencies"[35], as it is the case with Bitcoin, which is strictly related to transactions and their registration in the blockchain system. These new features made the Ethereum system somehow more "flexible" than Bitcoin, which is limited to the record of transactions in the distributed ledger. In particular, Buterin enabled a function that allows peers to record other assets such as slogans or contracts, or better, *smart contracts*, in the Ethereum domain, that made the latter a platform also for decentralized applications and not just a cryptocurrency[36]. As a matter of fact, Ethereum does not only allow regular transactions, namely transactions from one wallet to another, but also contract deployment transactions, which identify transactions that do not contain a "to" address and whose data field contains the contract code[37]. This functionality was introduced thanks to the implementation of the **ERC 20 Protocol**. This protocol allows, basically anyone, to produce new assets, or better, *tokens*, giving life to an extremely powerful and malleable digital product that allows the *creation* of several types of *tokens*[38]. The evolution of the blockchain allowed the generation of new crypto-assets, including NFTs. Therefore, it is possible to attest that the incredible and unrestrained

[35] Nathan REIFF, *Bitcoin vs. Ethereum: What's the Difference?*, Investopedia.com, 2022.
[36] Gwyneth IREDALE, *History Of Blockchain Technology: A Detailed Guide*, op. cit.
[37] ETHEREUM, *Transactions*, Ethereum.org, 2022.
[38] Filippo ANNUNZIATA, Andrea CONSO, *NFT L'arte e il suo doppio*, op. cit, p. 22.

development of Crypto-art certainly coincided with the generation and the advancement of the Ethereum Blockchain.
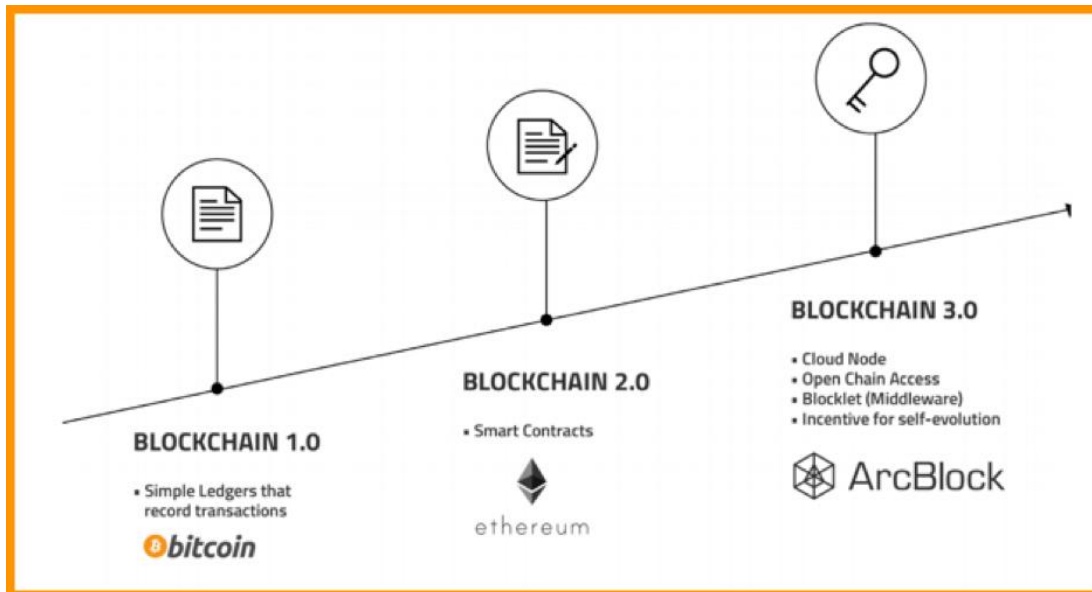

Figure 10 – *Blockchain evolution*
(Source: Designveloper.com)

1.3 Crypto-assets: introducing NFTs

A very common way to explain what NFTs are is through the method of comparison, especially with the very well-known bitcoin. Nevertheless, despite sharing some similarities, they represent different entities. Thus, before comparing them, it is necessary to make some distinctions in terms of vocabulary and meanings. Certainly, they both belong to the set of **crypto-assets**, that, according to MiCA — Markets in Crypto-Assets Regulation[39] — are defined as "a digital representation of value or rights which may be transferred and stored electronically, using distributed ledger technology or similar technology"[40] a definition that automatically includes both *coins* and *tokens*. All of this aside, coins can be considered as a digital equivalent of money: they include bitcoin, which is the most famous example of the category and *altcoins*, all the alternative cryptocurrency coins that are different from bitcoins[41], among which we can also find *ether*, Ethereum's cryptocurrency.

Table 2 – *Terminology and abbreviations related to blockchain systems.*
(Personal elaboration)

Blockchain	Crypto-currency	Abbreviation
Bitcoin[42]	**b**itcoin	BTC
Ethereum	ether	ETH

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[39] "The European Commission's Regulation of Markets in Crypto-assets (MiCA) proposal is a regulatory framework developed since 2018 to help regulate currently out-of-scope crypto-assets and their service providers in the EU and provide a single licensing regime across all member states by 2024" (SYGNA, *MiCA: A Guide to the EU's Proposed Markets in Crypto-Assets Regulation*, Sygna.io, n.d.).

[40] EUROPEAN COMMISSION, *Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Markets in Crypto-assets, and amending. Directive (EU) 2019/1937*, Eur-Lex.Europa.eu, 2020.

[41] BONPAY, *What Is the Difference Between Coins and Tokens?*, Medium.com, 2018.

[42] In terms of vocabulary, the only difference between the term used to define the blockchain and its cryptocurrency is on a graphic level. *Bitcoin* with a capital letter identifies the blockchain system, whereas *bitcoin* with a lowercase letter identifies the cryptocurrency/coin.

Fundamentally, coins are always associated with their specific blockchain in which they are exclusively generated and distributed, whereas *tokens* do not have their own register, but they can *lean on* a pre-existing blockchain, such as Ethereum[43]. In fact, despite the term "token" implies the reference to something that can be *exchanged*, just like coins, they do not always constitute a cryptocurrency. We can conclude that coins represent just a particular kind of token, *payment tokens*, whereas, the more general definition of *token* also includes crypto-assets which are *not* cryptocurrencies, such as the unique case of **NFTs**. Coins are tokens, payment tokens in particular, whereas tokens are not always coins. Thus, the two terms are not interchangeable at all times.

1.3.1 NFT - Non Fungible Token

First of all, the acronym NFT stands for *Non-Fungible Token* and, to the extent of understanding the concept of non-fungibility that characterizes this particular kind of token, the comparison with bitcoin that was outlined at the beginning of the previous paragraph proves to be really effective. Bitcoins are *fungible* tokens because, just like fiat money such as euros, the value of one bitcoin corresponds exactly to the value of another bitcoin, so the exchange of a bitcoin for another one would be pointless. On the contrary, NFTs are *not fungible*, which means that they are *unique* and *not interchangeable*, characteristics that certainly establish a clear link with the art field and works of art, whose *uniqueness* represents one of its most fundamental values. Therefore, just as the *Starry Night* by Vincent Van Gogh and the *Mona Lisa* by Leonardo Da Vinci are two unique, non-interchangeable pieces of art, the same applies for two different NFTs. Despite this basic comparison that helps understanding why works of art are related to this specific kind of token, in order to avoid a very common misunderstanding, when talking about NFTs it is fundamental to stick to the "token-dimension".

> NFTs are tokens that we can use to represent ownership of unique items. They let us tokenize things like art, collectibles, even real estate. They can only have one official

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[43] Filippo ANNUNZIATA, Andrea CONSO, *NFT L'arte e il suo doppio*, op. cit., p. 19.

owner at a time and they're secured by the Ethereum blockchain – no one can modify the record of ownership or copy/paste a new NFT into existence[44].

The definition of NFTs that can be directly found on the Ethereum website, which identifies NFTs as tokens that *represent* the ownership of unique items, immediately clarifies that the NFT is *not* the work of art itself, as it is often erroneously defined, nor a medium for its creation[45]; on the contrary, it is the *token* to which the work of art is *associated*. Basically, it is a "unique and not reproducible *cryptographic certificate of authenticity* holded in a blockchain system"[46].

[44] ETHEREUM, *Non-fungible tokens*, Ethereum.org, 2022.
[45] Kevin BUIST, *Chain reaction*, Artforum.com, 2021.
[46] Stefano PIANTINI, *NFT per principianti. Una rivoluzione nel mondo dell'arte o il nulla certificato dal nulla?*, Artribune.com, 2021.

1.4 How to implement NFTs: smart contracts and the minting process

> NFTs are **minted** through **smart contracts** that assign ownership and manage the transferability of the NFT's[47].

The information provided by the Ethereum official website is once again a great starting point to, in this case, discover the roots of Non-fungible tokens, or, in other words, how they are generated. First of all, the verb *to mint*, that can be found in the Ethereum quote, is a very common term in the crypto domain since it identifies the process of registering or "uniquely publishing a token on the blockchain to make it purchasable"[48]. This process is possible thanks to the existence of a particular kind of software, that is, precisely, the so-called (already quoted in previous paragraphs) **smart contract**.

1.4.1 Smart contracts

The Smart contract was first theorized in 1994 by Nick Szabo[49], who defined it as "a computerized transaction protocol that executes the terms of a contract"[50]. Differently from traditional contracts, aside from the language in which they are written (smart contracts are computer programs and, thus, clearly different from traditional contracts), smart contracts not only contain the terms of the agreement, but they can also be *automatically* executed. Basically, they consist of "*self-executing contracts* with the terms of the agreement between buyer and seller being directly written into lines of code"[51]. Moreover, unlike standard contracts, they benefit from the peculiar characteristics of the blockchain technology, which guarantees their transparency and immutability. Among the various types of smart contracts, including for example those that allow the issue of certificates, some of them have

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[47] ETHEREUM, *Non-fungible tokens*, Ethereum.org, 2022.
[48] Rachel MARTIN, *What does it mean to "mint" an NFT and how do you do it?*, Artessere.com.
[49] According to a speculation theory, Nick Szabo could also be Satoshi Nakamoto, even though he expressly denied it.
[50] Nick SZABO, *Smart Contracts*, Fon.Hum.Uva.nl, 1994.
[51] Jake FRANKENFIELD, *Smart Contracts*, Investopedia.com, 2022.

the specific purpose of generating tokens and nowadays, there are several platforms and protocols that consent their writing[52]. As previously mentioned in paragraph 1.2.1, Ethereum implemented the protocol **ERC-20**, that allows basically *anyone* to create tokens on the platform. Ethereum's guide for writing smart contracts establishes the ERC-20 as "the technical standard used for all smart contracts on the Ethereum blockchain for **fungible** token implementations"[53].

```
1    pragma solidity ^0.6.0;
2
3    interface IERC20 {
4
5        function totalSupply() external view returns (uint256);
6        function balanceOf(address account) external view returns (uint256);
7        function allowance(address owner, address spender) external view returns (uint256);
8
9        function transfer(address recipient, uint256 amount) external returns (bool);
10       function approve(address spender, uint256 amount) external returns (bool);
11       function transferFrom(address sender, address recipient, uint256 amount) external returns (bool);
12
13
14       event Transfer(address indexed from, address indexed to, uint256 value);
15       event Approval(address indexed owner, address indexed spender, uint256 value);
16   }
```

Figure 11 – *Example of ERC-20 on Ethereum Blockchain*[54]
(Source: Ethereumdev.io)

After the description of NFTs that was carried out in paragraph 1.3.1, the term **fungible** that was used to define the functionality of ERC-20 protocol, should immediately make clear that, even though ERC-20 is the most used and common standard, this protocol is only employed to generate *fungible* tokens and consequently cannot apply to NFTs, since they are **non-fungible**. As a matter of fact, the standard that is dedicated to the creation of Non-fungible tokens is **ERC-721**, which was created in 2018 by William Entriken, Dieter Shirley, Jacob Evans and Nastassia Sachs. ERC-721 is defined by its authors as "a standard interface for non-fungible tokens, also known as deeds (...) that allows for the implementation of a

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[52] Filippo ANNUNZIATA, Andrea CONSO, *NFT L'arte e il suo doppio*, Milan, op. cit., p. 21.
[53] JDOURLENS, *Understand the ERC20 token smart contract*, EthereumDev.io, 2020.
[54] Line 1 indicates the programming language, which in this case is Solidity.
  Line 3 indicates the used protocol, ERC20.
    Line 5 *function total Supply()* indicates the number of generated tokens, that in this case is not specified since it only concerns an example.

standard for NFTs within smart contracts. This standard provides basic functionality to track and transfer NFTs"[55].

```
1       function balanceOf(address _owner) external view returns
        (uint256);
2       function ownerOf(uint256 _tokenId) external view returns
        (address);
3       function safeTransferFrom(address _from, address _to,
        uint256 _tokenId, bytes data) external payable;
4       function safeTransferFrom(address _from, address _to,
        uint256 _tokenId) external payable;
5       function transferFrom(address _from, address _to, uint256
        _tokenId) external payable;
6       function approve(address _approved, uint256 _tokenId)
        external payable;
7       function setApprovalForAll(address _operator, bool
        _approved) external;
8       function getApproved(uint256 _tokenId) external view
        returns (address);
9       function isApprovedForAll(address _owner, address
        _operator) external view returns (bool);
10
```

Figure 12 – *Example of ERC-721 on the Ethereum blockchain*
(Source: Ethereum.org)

According to the authors' statement, each ERC-721 smart contract contains an identifying number, also known as token ID, identified by the variable **uint256** (a 256 bit alphanumeric string)[56], that shall *never* change. The first extremely famous case for which ERC-721 was employed is the one of **CryptoKitties**, which represent one of the first online games that is based on the blockchain technology and that allows the collecting of virtual cats. In this case, even though all kitties are part of the same group or class and exist in a great amount, every cat has its own "DNA", that corresponds to the 256 bit string[57].

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[55] William ENTRIKEN, Dieter SHIRLEY, Jacob EVANS, Nastassia SACHS, *Non-Fungible Token Standard.* Ethereum Improvement Proposals, no. 721, Ethereum.org, 2018.
[56] This bit string clearly corresponds to the hash value that was explained in detail in paragraph 1.1.1.
[57] Filippo ANNUNZIATA, Andrea CONSO, *NFT L'arte e il suo doppio*, op. cit., p. 29.

1.4.2 How to mint NFTs

Is *minting* a new NFT a process that necessarily requires coding language skills?

First of all, it is crucial to remind that the minting process has nothing to do with the creation of the work of art itself. As a matter of fact, 'minting' is basically the step that *follows* the creation of the artwork and that allows its association with a token. Basically, it consists of the process of '**tokenization**' of the crypto-art project.

Even though the generation of NFTs clearly involves the use of programming language, essentially, there are **two different ways** to implement NFTs in the blockchain system: one of them requires coding, whereas the other does not. Nevertheless, even if the creator has the possibility to skip the coding process and create NFTs in a simplified manner, both 'minting paths' demand a common starting point. The precondition that precedes every minting process is the choice of a specific blockchain on which to develop tokens, that must be consistent with the choice of the marketplace where NFTs will be traded and sold. As a matter of fact, the latter should necessarily be compatible with the chosen blockchain, supporting its specific cryptocurrency. For example, Ethereum, the most used platform for NFTs' implementation, is compatible with the marketplace **OpenSea**, where users can sell and buy tokens exchanging Ethers. Another prerogative for the minting process is to possess a cryptocurrency **wallet**, that once again, should be compatible with the blockchain's coins. In the crypto domain, a *wallet* identifies "a digital wallet that allows users to store, manage, and trade their cryptocurrencies"[58], moreover, it also allows the storing of NFTs. The main distinction that lies in wallets' categories is the one between **hardware wallets** and **software wallets**: software ones store NFTs online, whereas hardware wallets are considered to be more secure since they store NFTs offline[59]. Continuing to follow the previous example, some of the most important wallets that comply with Ethereum's blockchain system and that consequently are accepted on online platforms that support Ethereum, such as OpenSea, are **MetaMask**, **Coinbase Wallet**, **WalletConnect** and **Fortmatic** (but there are many more).

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[58] Jake FRANKENFIELD, *Blockchain Wallet*, Investopedia.com, 2022.
[59] OUTMANE, *How to Create NFT Art?*, Proactivecreative.com.

So, for those who are familiar with programming languages, it is possible to create an NFT from scratch through coding starting from the blockchain of reference[60], using **Web3** applications, an "emerging version of the web that relies on decentralization and blockchain technology"[61]. However, for creators who do not usually deal with programming language and the complexity of Web3, the web version that everybody uses nowadays and to which basically everyone is accustomed, **Web2**, offers way more simple possibilities. Many marketplaces, such as OpenSea, have implemented easy ways to create NFTs that require no technical skills at all[62]. In the case of OpenSea, it will be sufficient for the creators to visit the platform's website, click on the **CREATE** option, connect their wallet and follow the instructions, completely avoiding the technical coding part. It consists of a very superficial process that we could metaphorize as the tip of the iceberg of the actual minting procedure.
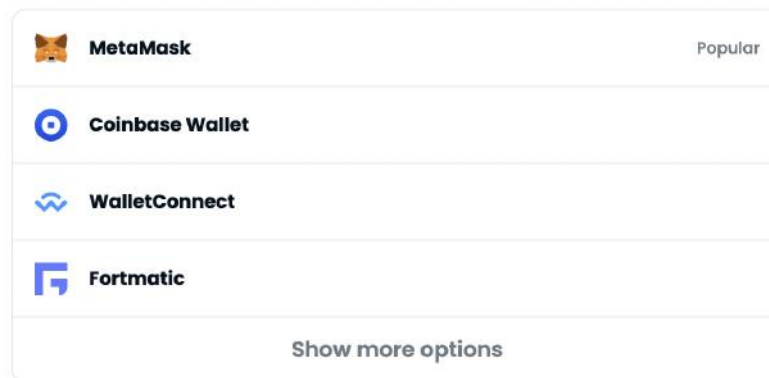
Figure 13 – *The connection of the compatible cryptocurrency wallet on OpenSea.*
(Source: Opensea.io)

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[60] By way of example, we will maintain our focus on the Ethereum blockchain, which also provides many tutorials for beginners who would like to approach coding.
[61] MORALIS BLOG, *Decentralized Applications Explained – What are dApps?*, Moralis.io, 2021.
[62] OUTMANE, *How to Create NFT Art?*, op. cit.

Figure 14 – *The minting of an NFT on the OpenSea platform*
(Source: Blog.opensea.io)

This simplified manner of creating NFTs certainly extends Crypto-art to a more **democratic dimension**, allowing anyone with a basic understanding of the blockchain system and NFTs to create and sell their artworks in the crypto domain. Nevertheless, this easy operation is certainly a bit disdained by those who actually know how to deal with coding and Web3 and consider themselves "advocates" of decentralization, since creating NFTs through marketplaces kind of centralizes the process offering not truly decentralized solutions[63].

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[63] MORALIS BLOG, *How to Mint NFTs – Full Tutorial to Minting an NFT*, Moralis.io, 2021.

1.5 Blockchain's transparency

The existence of a network of nodes which store and have access to blockchain data might arouse a question about the actual *transparency* of the blockchain system: *does one necessarily need to run a node in order to have access to the blockchain data?* Absolutely not. Blockchains have developed dedicated online platforms, easily accessible from Web2, where *anyone* can observe and retrieve data and transactions in real time; these platforms are usually identified as *block explorers*. In the case of Ethereum, there are different portals that offer access to its data: *Etherscan*, *Etherchain*, *Ethplorer*, *Blockchair*, *Blockscout* and *OKLink*[64]. Nevertheless, even though many platforms offer this service, in order to explain how a block explorer works and verify blocks' transparency, the next paragraph will be focused on just one of them, *Etherscan*.

1.5.1 Etherscan

First of all, Etherscan allows the observation of basic data regarding the general trends and performance of Ethereum such as the Ether current price, the total number of transactions or the present level of mining difficulty.

Secondly, it lists and continuously updates all the latest mined blocks and transactions. In the following image, we will observe a random block chosen among the ones listed in the latest mined blocks section on Etherscan.

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[64] ETHEREUM, *Block explorers*, Ethereum.org, 2022.

Figure 15 – *Example of a block on Etherscan*
(Source: Etherscan.io)

Block #14520840 contains all the basic information that were previously mentioned and analyzed such as the hash value of the block, the one of the previous block and the nonce, but also other information like the time at which the block was mined (**Timestamp**), the difficulty that was required to accomplish its mining and some information about the miner, including its identifying address. In particular, Block #14520840 was mined by miner 'MiningPoolHub' in 42 seconds and contains 344 transactions. Etherscan also allows users to explore all transactions in a block. As a matter of fact, by clicking on the number of transactions it is possible to directly access the list of transactions (shown in figure 11). Among the transactions that were aggregated in Block #14520840 we can observe the presence of an **OpenSea transaction**, one of the most famous marketplaces for selling NFTs.

Figure 16 – *Example of transactions in a block*
(Source: etherscan.io)

Etherscan allows users to see the set of transactions contained in a specific block, as well as the details pertaining to each transaction.
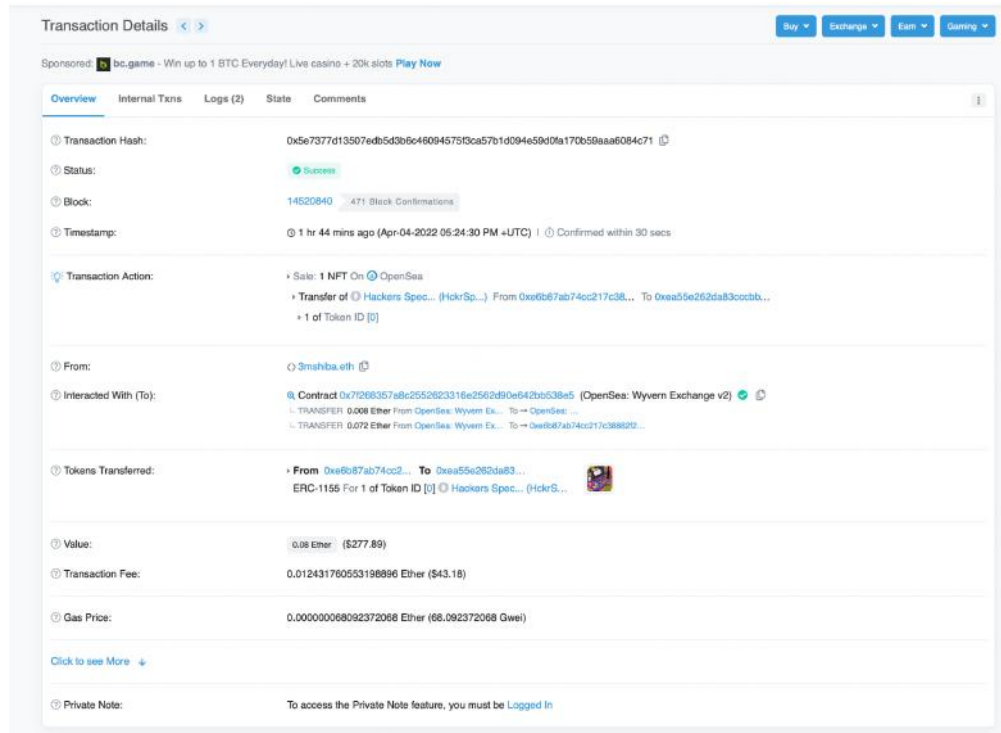
Figure 17 – *Example of NFT's transaction.*
(Source: Etherscan.io)

Figure 17, shows how Etherscan allows access to all the specific information related to a transaction. The concerned OpenSea transaction contained in Block #14520840 is linked, of course, to the sale of an NFT on the OpenSea marketplace that was transferred from one owner to another. The previous and the new owner are identified through an ID address that is present in the 'Transaction action' section. Moreover, from the 'Tokens transferred' section, it is possible to visualize the piece of art that is the object of this transaction, its creator and all the history of the item activity. This NFT was sold for 0.08 ETH, which corresponds to $277.89.

Figure 18 – *Example of a sold NFT on Etherscan: Women Hackers Club Genesis by everyNFT-me.*
(Source: Etherscan.io)

CHAPTER 2

Crypto-art

2.1 What is Crypto-art

When it comes to the terminology related to the crypto domain there is still a lot of confusion, probably because of the continuous and rapid evolution that characterizes blockchain technology and its declinations. Thus, providing a distinct and unambiguous definition of **Crypto-art** proves to be a quite challenging task. Nevertheless, without any doubt, it is possible to state that, generally speaking, Crypto-art identifies all art that has to do with blockchain technology, or rather, that all art which is *tokenized* (associated with an NFT) and consequently registered and sold through the blockchain system is by definition Crypto-art.

  The question that may arise at this point is whether the technological and digital nature of NFTs implies that Crypto-art *is* **Digital art**. As a matter of fact, many tend to interchange the two terms to define the same thing, but this association is actually erroneous[65], at least partially, and deserves some further clarifications. First of all, it is fundamental to underline that Crypto-art does not define a specific art practice, nor is it necessarily related to forms of art that share common technical features or concepts and ideas. As a matter of fact, as Domenico Quaranta in his book *Surfing with Satoshi* states, "there is nothing that identifies and unifies all works of art that go under the definition of Crypto-art other than the fact that they are tokenized in the blockchain system"[66]. Certainly, there are some artistic *tendencies* that are, so to say, "going with the flow" of Crypto-art and are emerging as Crypto-art main trends and preferences of the crypto communities, but from a theoretical point of view Crypto-art could literally be *any kind* of art, even physical

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[65] Andrea CONCAS, *Crypto arte*, op. cit., p. 22.
[66] Domenico QUARANTA, *Surfing con Satoshi. Arte, blockchain e NFT*, Postmedia Books, 2021, p. 127.

art. In fact, potentially, even a material work of art could be associated with a token and consequently registered in the blockchain system. Thus, Crypto-art's domain is not limited to Digital art only and the two terms define different entities that are absolutely not interchangeable.

2.1.1 How Crypto-art revolutionized Digital art

Contrary to Crypto-art, **Digital art** identifies a particular artistic practice that started to exist way before Crypto-art. As a matter of fact, Digital art first productions date back to the 50s, when computers started to make their way into the world[67] and clearly, at the time, blockchain did not even exist. The Tate Modern Museum's online glossary provides a definition of Digital art, identifying it as art that is *made* or *presented* using digital technology, so both art that is realized using computers and technology as its creative media, but also art that is for example scanned and presented through a digital support[68]. On the contrary, as previously stated, Crypto-art's term is specifically related to blockchain technology and this is the reason why the two words represent different phenomena, one concerning an *artistic practice* whose works of art share the "interaction with digital matter"[69] and the other classifying all works of art, without any particular distinction, that pertain to the same specific system of authentication and registration, namely the blockchain's distributed ledger.

Nevertheless, there is a reason why the two are so connected and their respective terms are sometimes even mistakenly used as synonyms. In fact, Crypto-art happened to be the *solution* to Digital art's main issue. Before NFTs were an option, the trouble with digital creativity, in contrast with physical works of art, was the matter of *reproducibility*. As Quaranta states, no matter how rare a *.jpg* image could be in terms of content or style, it will always be infinitely replicable[70] and reproducibility is exactly what deprived Digital art of a fundamental feature of art itself: *economic value*. Since it was impossible to claim ownership over a digital

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[67]Andrea CONCAS, *Crypto arte*, op. cit., p. 22.
[68] TATE Online Glossary, *Digital Art*, Tate.org.uk, n.d.
[69] Andrea CONCAS, *Crypto arte*, op. cit., p. 23.
[70] Domenico QUARANTA, *Surfing con Satoshi. Arte, blockchain e NFT*, op. cit., p. 132.

item, digital works of art were basically at anyone's mercy online, becoming a sort of "second rank" art — in economic terms — that was not taken into account by collectors and from which creators could not gain any profit. Paradoxically, their only option in order to monetize their work was to turn their digital projects into *physical* art[71], which could be easy for digital images, but impossible for animated works. So, according to Sotheby's official website, NFTs represented a "paradigm-shift" for digital art, since they managed to bring the elements that endow physical art and assets with value into the digital realm[72]. It is not by chance that Crypto-art is also defined as "rare digital art"[73], so digital art, plus the attribute of rarity, which was a totally unknown feature in the digital domain before NFTs' advent. Basically, NFTs gave value to something that did not have any, allowing digital items to become *assets*, just like physical ones; they allowed digital products to have a single owner. This of course applied to Digital art, but also to all other kinds of digital files. This is the reason why Jack Dorsey, Twitter's creator, sold his first Tweet for 2.9 million dollars; nowadays, literally *anything digital* could be possibly sold: videos, memes, Tweets, pdf files, mp3 files and all other kinds of digital content. Thus, on one side the phenomenon of NFTs is responsible for giving Digital art recognition and the means for it to be on the same level of traditional art, providing a great resolution to what seemed an insurmountable obstacle for digital creators. On the other hand, it also incredibly implemented speculation on contents that have absolutely nothing to do with art. Therefore, it is possible to assume, as Kevin Buist wrote on Artforum, that the NFT in itself, rather than an artistic revolution, is more of a "*financial innovation* masquerading as an art innovation"[74].

That said, for sure, we can conclude that Digital art has a sort of preferential way with NFTs and certainly occupies the majority of Crypto-art's production simply because, conversely to traditional art, the latter represents the only way for it to be safely certified and sold, but certainly, *tokenization* has become an option and an opportunity also for artists who work with traditional media.

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[71] Mandee McFERREN, *Can physical art be turned into NFTs?*, Artessere.com, n.d.
[72] SOTHEBY'S, *NFTs: Redefining Digital Ownership and Scarcity*, Sothebys.com, 2021.
[73] Massimo FRANCESCHET, Giovanni COLAVIZZA, T'ai SMITH, Blake FINUCANE, Martin Lukas OSTACHOWSKI, Sergio SCALET, Jonathan PERKINS, James MORGAN, Sebastián HERNÁNDEZ, *Crypto-art: a decentralized view*, Arxiv.org, 2019, p. 3.
[74] Kevin BUIST, *Chain reaction*, Artforum.com, 2021.

2.1.2 Physical NFTs

The conjunction of the terms "physical" and "NFT" certainly sounds like an oxymoron. Even if it is true that Crypto-art does not exclude it from its domain, the matter with physical art and NFTs is still quite controversial and therefore should be analyzed more thoroughly. The first point to be taken into account is that NFTs are always associated with a digital file. This means that artists who intend to associate their physical works of art, such as paintings or sculptures, with a token, should first arrange for the *digitization* of their work, which could be done for example through a scanning procedure or a photograph. Consequently, according to the Tate's definition of Digital art that also includes art that is digitally *displayed* and not only art which is digitally created in the first place, even this kind of art would be incorporated in Digital art's domain. However, despite the necessity of a digitized version of the physical work of art in order for an NFT to be minted, nobody forbids the selling of the digital file *in conjunction* with the physical version. In that case, the NFT could act both as a certificate of authenticity of the physical work of art, but also as an added value to the physical purchase[75]. Clearly, this system, despite being possible, raises some issues. For example, the fact that after the first selling, it would be basically impossible to guarantee that the physical and the digital items "remain in sync"[76], since the buyer could for example resell the two assets separately. In order to avoid this trouble, artists could rely on the possibility to treat the digital NFT and the physical work as separate pieces in the first place, that can be distinctively sold and bought[77]. This kind of operation has been experimented also by famous cultural institutions and museums in the attempt to enter the crypto domain and gain additional profit from their collections. For example, the **Uffizi Gallery** in Florence, which sold the digital version of Michelangelo's *Tondo Doni* for 170,000 dollars, or the **Belvedere Museum** in Vienna that, on the occasion of Valentine's day 2022, decided to drop 10,000 NFTs of *The Kiss* by Gustav Klimt, where each digital file corresponded to the high-resolution image of a unique part of the painting.

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[75] Mandee McFERREN, *Can physical art be turned into NFTs?*, op. cit.
[76] APPLIED BLOCKCHAIN, *Physical NFTs*, Appliedblockchain.com, 2021.
[77] *Ibidem.*

Basically, what differentiates digital files and physical objects in association with an NFT is that the digital file will always be irretrievably enchained to its certificate of authenticity, the NFT, and will be easily tracked, traded and exchanged from wallet to wallet in real time, whereas the same of course cannot apply to a physical work of art whose *physicality* definitely complicates the process, especially in terms of secure tracking. This "impasse", that does not totally prevent physical artworks to access the blockchain system, but at the same time certainly makes it a lot harder compared to Digital art, might be one of the very reasons of the development of a practice which is more and more in vogue: the **destruction of physical works of art** for the purpose of creating NFTs. The most famous case of this phenomenon is probably the original Banksy print *Morons* that was burnt in a livestream video and whose digital copy was sold via NFT for 380,000 dollars, more than the price at which the physical piece was actually sold[78], a provocative and disruptive gesture that has become increasingly popular. It is enough to consider **Damien Hirst**'s latest NFT project, *The Currency*, that will be further discussed in Chapter 3 of this dissertation. For the occasion, the British artist realized 10,000 physical works of art related to as many digital NFTs; after the tokens will be sold, owners will have one year to choose whether to keep the physical object or the NFT and the one item they will not wish to keep will be destroyed.

In conclusion, despite, theoretically, NFTs could be associated with any work of art, it is undeniable that Digital art suits this kind of technology better than physical art and its association with a token turns out to be more effective and secure. Moreover, even if they are not excluded from the tokenization process, in order to exploit and benefit from this system, physical works of art would still need to go through a digitization process and the creation of a sort of "digital alter-ego", a mechanism that makes the digital "supremacy" in the blockchain's domain very evident. Nevertheless, it is still interesting to observe the conspicuous pressure among artists working with traditional media towards this digital revolution, which was clearly generated by economic dynamics: it feels like NFTs and their prosperous market have turned the tide of digital and physical art. If, once, in order to gain recognition in the market system, digital artists had to make a "physical turn",

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[78] Cristina CRIDDLE, *Banksy art burned, destroyed and sold as token in 'money-making stunt'*, Bbc.com, 2021.

nowadays, it is traditional artists who are looking for a *digital* turn of their works of art in order to access and achieve acknowledgement in the Crypto market. Finally, as it is stated on the Ethereum official website, nowadays "the tokenization of physical items isn't as developed as their digital counterparts. But there are plenty of projects exploring the tokenization of real estate, one-of-a-kind fashion items, and more"[79] and it is easy to predict that in the future physical items will be more and more included in this digital revolution.

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[79] ETHEREUM, *Non-fungible tokens (NFTs)*, Ethereum.org, n.d.

2.2 Crypto-art's main trends

The absence of limitations, the "democratic principle" according to which *anyone* could possibly tokenize and sell works of art[80], the decentralized nature of NFTs and the consequent *global reach* of the phenomenon contribute to the implementation of an incredible variety of works of art, in terms of aesthetics and styles as well as artistic, especially digital, techniques of creation.

Nevertheless, it is possible to identify some artistic *trends* that stand out from NFTs' incredible vastness and that constitute crypto-communities' major preferences. A good method to get an idea of where Crypto-art is orienting its styles and aesthetics and to understand what is currently most appreciated by NFTs' collectors is certainly the observation and analysis of the most used ***tags***, which represent key-words that artists use to define and label their art on marketplaces platforms in order to attract buyers. In March 2021, the team of *Artnome,* a platform that specifically deals with art analytics, with the support of Flash Art and MoCDA (The Museum of Contemporary Digital Art), carried out a particularly illuminating analysis on Crypto-art based on the historical data of one of the most famous NFTs' marketplaces, SuperRare, *"in search of an aesthetics of Crypto-art"*[81], which is also the title of the research itself. In particular, the research team focused on tags used by artists, but also collectors' favorites and views, together with the prices at which the tag-related works of art were actually sold. Moreover, even SuperRare's website offers a whole section dedicated to *trending tags*, where anyone can have a glimpse of artists and collectors' predilections.

For the purpose of defining Crypto-art's main trends, this paragraph will examine Artnome's findings in comparison with today's SuperRare's trending tags, whose analysis was undertaken more than a year after the publication of Artnome's article. The artistic tendencies in the Crypto-art domain in relation with tags can be divided into two categories, one pertaining to "**medium-specificity**"[82] and the other to **themes**.

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[80] Alex ESTORICK, Kyle WATERS, Chloe DIAMOND, *In search of an aesthetics of Crypto-art,* Artnome.com, 2021.
[81] *Ibidem.*
[82] *Ibidem.*

Medium-specificity related tags

3D

3D refers to three dimensional digital graphics. According to Artnome's research, *3D* appeared to be the most used tag by artists, occurring in at least 17% of NFTs uploaded on SuperRare's platform; it also identified as the most viewed kind of art with higher selling points, enough reasons to believe that 3D art could embody a medium *specific* to Crypto-art [83].

Figure 19 – *Some works of art in SuperRare's trending tags section*[84]
(Source: Superrare.com)

2D

Despite the popularity of 3D works of art, 2D art (two dimensional digital graphics) still occupies a place in SuperRare's trending tags and consequently in Crypto-art's most popular designs. In recent years, there has been an increasing interest in retro video games graphics, such as arcade games, and this revival of old designs manifests as a steady presence also in the Crypto-art field, which has always had a strict connection with the world of gaming and where *Pixel art* projects such as the renowned series of collectibles *Cryptopunks* represent one of the first examples of

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[83] *Ibidem.*
[84] From left to right: *Noodle Chair* by *@petr* - *Quasar* by *@criscoart* - *Etērnal Dream* by 25m42 and Aeneas Middleton.

NFTs and were actually the inspiration for the ERC-721 standard[85], Ethereum's protocol for NFTs' implementation. Even though 2D is way less present in NFTs tags compared to 3D (only 2%), according to Artnome's research it is identified as the second most expensive tag on the platform[86].

Figure 20 – *Some examples of Cryptopunks*
(Source: Larvalabs.com)

ANIMATION/GIF

Animation is clearly an added value of Digital art compared to physical works of art; therefore, finding it among the list of SuperRare's trends is definitely not surprising. As a matter of fact, among the most expensive artworks of Crypto-art, which include works by superstar artists such as **Beeple**, **Pak**, **Xcopy**, **Mad Dog Jones** and **Fewocious**, there are mainly animated works[87], or animated GIFs, which stand for "graphics interchange format"[88] and identify a format for sending moving images in particular. In March 2021 this particular tag was related with 10% of NFTs on the platform[89].

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[85] LARVA LABS, *Cryptopunks*, Larvalabs.com, n.d.
[86] Alex ESTORICK, Kyle WATERS, Chloe DIAMOND, *In search of an aesthetics of Crypto-art*, op. cit.
[87] CRYPTO ART, *Most expensive artworks*, Cryptoart.io, n.d.
[88] BRITANNICA, T. Editors of Encyclopaedia, *"GIF."*, Britannica.com, 2021.
[89] Alex ESTORICK, Kyle WATERS, Chloe DIAMOND, *In search of an aesthetics of Crypto-art*, op. cit.

#animation

Figure 21 – *Some works of art in SuperRare's trending tags section*[90]
(Source: Superrare.com)

ILLUSTRATION

Most crypto-artists started their career exactly as illustrators. Thus, as for the case of animation, it does not surprise that many artists deploy this specific term when it comes to describing their own art.

#illustration

Figure 22 – *Some works of art in SuperRare's trending tags section*[91]
(Source: Superrare.com)

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[90] From left to right: *The Warriors* by Idris Veitch - *Lugares* by Hola Lou - *Degen's Lifestyle* by Subway (all works displayed are animated).
[91] From left to right: *Figure of Rat racer* by Will A.K - *Kiwi Kawaii* by Kiwi Kawaii - *Little Boxes* by Taylor C. Adams.

PHOTOGRAPHY

Nowadays, photography represents a consolidated digital practice. As a matter of fact, the digital "turn" of photography from analog medium to digital technology dates back to the 80s with the implementation of the first digital cameras and the introduction of the first version of Adobe Photoshop, that allowed the digital manipulation of images, in the 90s[92]. Therefore, photography perfectly suits NFTs' digital nature and holds considerable attention in the crypto domain.

Figure 23 – *Some works of art in SuperRare's trending tags section[93]*
(Source: Superrare.com)

Theme-related tags

SURREALISM/SURREAL/ABSTRACT

These three words are very common tags in the Crypto-art domain. In terms of themes and representations, Crypto-art is definitely dominated by surreal imagery, where dreamy or nightmarish landscapes and figures are often the subject of representation by crypto-artists. At the date of Artnome's analysis, March 2021, the tags *#surreal* and *#abstract* in particular were present in at least 10% of SuperRare's

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[92] Helmut Erich Robert GERNSHEIM, Andy GRUNDBERG, Naomi ROSENBLUM, Beaumont NEWHALL, *History of photography*, Britannica.com, 2021.
[93] From left to right: *Rose* by Fumiaki Yamazaki - *Sandrops* by Giulio Aprin - *Ascension* by Ren Mcgann.

NFTs; moreover, *#surreal* also corresponded to the second most expensive tag among the top 50 tags[94].

Figure 24 – *Some works of art in SuperRare's trending tags section*[95]
(Source: Superrare.com)

SCI-FI

Sci-fi stands for *Science Fiction*. Apparently, the futuristic utopian (or dystopian) imagery typical of Science Fiction is extremely eradicated and established in the Crypto domain, representing "the highest grossing tag by average sale price" and also the most viewed tag by collectors[96], even though, just like 2D, at the date of March 2021, it was less used by artists to define their art (4% of NFTs were labeled with this tag). Once again, a contributing factor of the huge success of this kind of aesthetic could be the connection between Crypto-art and video-games, where Sci-fi, with its virtual worlds, identifies an incredibly popular genre.

[94] Alex ESTORICK, Kyle WATERS, Chloe DIAMOND, *In search of an aesthetics of Crypto-art*, op. cit.
[95] From left to right: *The "Evolutionary Club"* by crocodilePOWER - *The Roots* by Dolce Paganne - *Downward ∇⇧ Ascent* by @xsullo.
[96] Alex ESTORICK, Kyle WATERS, Chloe DIAMOND, *In search of an aesthetics of Crypto-art*, op. cit.

Figure 25 – *Some works of art in SuperRare's trending tags section*[97]
(Source: Superrare.com)

PORTRAIT

Despite the predominance of surreal, abstract atmospheres and gaming-related imagery, in terms of iconography and choice of subjects, the **human figure** is still very much present and at the core of crypto-artists' interest. In March 2021, the works of art tagged as *#portrait* were related to about 8% of NFTs uploaded on SuperRare's marketplace, demonstrating how, surprisingly, such a disruptive technology, can have strong connections with ancient forms of art like portraiture.

#portrait
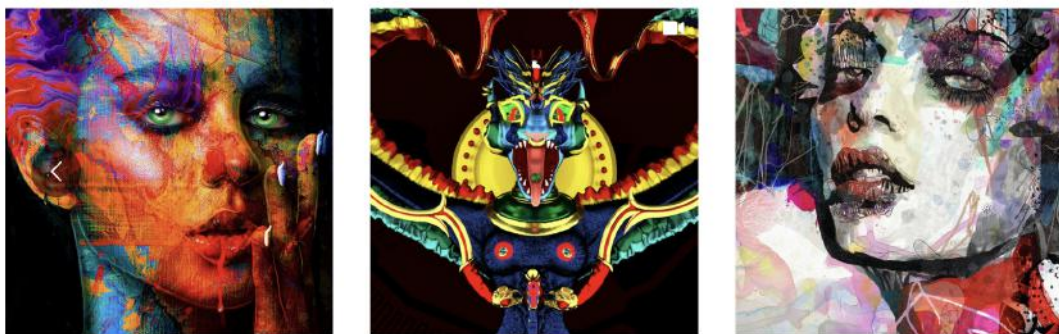
Figure 26 – *Some works of art in SuperRare's trending tags section*[98].
(Source: Superrare.com)

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[97] From left to right: *Ascension* by Aris Roth - *Trio 01* by @guillermo_arismendi - *Uchronium* by Reza Afshar.
[98] From left to right: *Almost Losing Hope* by Chi (chisweetart86) - *DEJA VU* by Spaced Painter - *Carnation* by Giulio Iurissevich.

Graphic 2 – *% of NFTs containing the tags described in Paragraph 2.2* [99]
Personal elaboration based on Artnome.com research conducted in March 2021
(Source: Artnome.com)

Graphic 3 – *Top 50 Tags by Number of NFTs: Average Price ($) vs. % of all SuperRare NFTs with that Tag*
(Source: Artnome.com)

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[99] Despite being present in Paragraph's 2.2 description of trending tags, the tag "Photography" is excluded from *Graphic 2*, since the data in the graphic refer specifically to Artnome's research findings, according to which the tag "Photography" was not listed among the 50 most used tags at the date of March 2021.

Average Views vs. Average Price Sold by SuperRare Tag

Graphic 4 – *Top 50 Tags by Number of NFTs: Average Price ($) vs. Average Number of Views*
(Source: Artnome.com)

Another tag which is very much present in the Crypto-art narrative and is worth mentioning is *#glitch*, related to **Glitch Art**. Glitch Art is definitely noteworthy both because it appears among the 50 best tags in Artnome's research, as it is possible to observe in the graphics above (even though, according to the graphics it occupies a lower position compared to other tags that were previously mentioned) and also because, as with Animation, it corresponds to a creation process that pertains to Digital Art only. The term "glitch" literally means technical problem and usually corresponds to "sudden malfunctions"[100] which occur especially in computer procedures. As a matter of fact, Glitch Art is art that is generated by errors or system failures. Despite the negative connotation of the term, these errors assume an aesthetic value and become the very means of expression of glitch-artists, demonstrating how beauty can flourish from mistakes.

Considering Artnome's graphics, another process of creation, which is present in Crypto-art's trends and consequently in its production and is significant because of its exclusively digital nature, is **Generative Art**. According to Tate's Museum's online glossary, Generative Art corresponds to "art that is made using a

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[100] OXFORD LANGUAGES, *"Glitch"*, Languages.oup.com, n.d.

predetermined system that often includes an element of chance that is usually applied to computer based art"[101]. The first practitioner of this kind of art was Harold Cohen, who, in the late 60s, used computer-controlled robots to generate paintings[102]. Basically, in the case of Generative Art, the machine completely takes over the process of creation, generating images which are not the result of the artist's creativity, but instead randomly derive from algorithmical logics. This process of creation is very common in the phenomenon of *Collectibles*, such as *Cryptopunks*, whose creators praised the procedure of Generative Art stating:

> The advantage of generative art is that the process, once set in motion, can produce results that are even surprising to us. We ran the generator hundreds of times, reviewed the results, and made adjustments[103].

Clearly, trends are *transitory*, as a matter of fact, SuperRare's tags in the trending section slightly vary almost everyday, and therefore, the latter cannot be considered as an ever-lasting standard for Crypto-art, neither can it predict in any way its evolution in terms of preferences, especially because of the volatility that characterizes Crypto-art's market, but, undeniably, it is possible to state that the above list mirrors NFTs most important sellings and most popular crypto-artists who have dominated Crypto-art's scene up to now; moreover, SuperRare's current trends basically correspond to those that were found in *Artnome*'s research, which was carried out in March 2021. The compatibility between Artnome's data and the most recent SuperRare's trending tags, implies that during the last year trends have been quite stable and that the tags that were analyzed above can be considered quite reliable in order to describe the main trends that have holded the stage of Crypto-art so far, or at least to get a sense of the dominating tastes that have emerged until now.

Talking about trends, a phenomenon that has definitely prevailed in NFTs' market and that was previously only barely hinted at with the reference to *Cryptopunks* and Generative Art is certainly the one of **Collectibles**, whose specific trade has been so active and intense that deserves to be separately categorized.

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[101] TATE Online Glossary, *Generative Art*, Tate.org.uk, n.d.
[102] *Ibidem.*
[103] CHRISTIE'S, *10 things to know about CryptoPunks, the original NFTs*, Christies.com, 2021.

2.2.1 The phenomenon of Collectibles

This paragraph does not have the intent, nor the conceit of entering into the merits of what is art and what is not. Nevertheless, the present analysis takes Collectibles into consideration separately from Crypto-art, because of peculiarities and dynamics that precisely pertain to the phenomenon of collectibles and their related market only which have nothing or little to do with art. After all, even on marketplaces platforms such as OpenSea, *Art* and *Collectibles* define two different categories.

First of all, Collectibles' projects correspond to the earliest examples of NFTs, in particular **Rare Pepe** (2016), **Crypto Punks** (2017) and **CryptoKitties** (2017), a fact that already states their importance in the crypto domain and in relation with NFTs' development. Moreover, in terms of market, in August 2021, Crypto-art reached 400 million dollars in sales, whereas sales related to *collectibles* added up to 600 million dollars[104], a significant gap that sets off *collectibles'* supremacy, at least for what concerns trading, in the NFTs' sphere. Collectibles, as their name suggests, could be compared to trading cards; as a matter of fact, just as trading cards, their subjects are basically always human figures or anthropomorphic animals, usually represented from the waist up, just like *avatars* in video-games. The reference to video-games' avatars is not at all casual. In fact, in gaming, avatars are used to *identify* the player, they basically correspond to the digital alter-ego of gamers and Collectibles have a lot to do with the concept of *identity*.

Some of the most famous cases of collectibles are **The Bored Ape Yacht Club** (BAYC), **Cyrptopunks**, **Crypto Kitties**, **Rare pepe** and others. The Bored Ape Yacht Club, a collection of 10,000 apes, starting from the name of the project, is very useful to understand the phenomenon of collectibles in relation to the concept of identity. As a matter of fact, with the BAYC, the concept at the root of collectibles goes way beyond the one expressed by other collections such as Cryptopunks: its creators presented the project not just as a collection, but "as an exclusive **social organization** offering additional benefits"[105]. According to its denomination, it is a "club", a "yacht club". The term "club" defines a group of people who are identified

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[104] Andrea CONCAS, *The future of NFTs: Crypto-art or collectibles?,* Cryptoconomist.ch, 2021.
[105] NON FUNGIBLE, *CryptoPunks VS Bored Ape Yacht Club: The Final Clap*, Nonfungible.com, 2022.

by some common characteristics[106], it means *community* and triggers a *sense of belonging* and the idea of *privilege*. For the purpose of this analysis, a statement that can be found directly on The Bored Ape Yacht Club proves to be very useful:

> When you buy a Bored Ape, you're not simply buying an avatar or a provably-rare piece of art. You are gaining **membership access** to a club whose **benefits** and **offerings** will increase over time. Your Bored Ape can serve as your **digital identity**, and **open digital doors** for you[107].

The clear message of this statement is that buying an ape is not limited to a financial investment only, but has consequences that extend way beyond mere possession, implying exclusivity and privileges that affect collectors' lives and life-style. As a matter of fact, unsurprisingly, Collectibles catalyzed the attention of many celebrities who bought Bored Apes and other collectibles for record figures. Thus, owning an ape apparently means to have the same benefits of superstars like Snoop Dogg or Justin Bieber (who are famous NFT collectors). It means to be part of something exclusive that others cannot achieve which triggers the human tendency to "show-off" and brag about privileges and the fact of being a member of a certain luxury community.

It is important to observe that Collectibles projects such as Crypto Punks and The Bored Ape Yacht Club are also called "PFP" NFT, where "PFP" stands for "profile picture". This means that these NFTs projects were designed to become avatars on social media profiles in the first place[108]. In that respect, **Twitter** in particular made a move towards NFTs collectors and their need to publicly attest their status, introducing the **NFT profile picture**, which probably represents the highest level of connection and overlapping between Collectibles and the concept of identity. Instead of their face, collectors are allowed to use their NFTs to present themselves in the digital world. It is true that anyone could possibly use the image of an avatar as a profile picture, but Twitter's move towards NFTs collectors goes beyond showing the NFT as a profile picture. As a matter of fact, in order to use their NFTs as profile pictures, collectors must first connect their wallet to Twitter. At this

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[106] MERRIAM WEBSTER Dictionary, *"Club"*, merriam-webster.com, n.d.
[107] BORED APE YACHT CLUB, *Welcome to the club*, Boredapeyachtclub.com, n.d.
[108] Shanti ESCALANTE-DE MATTEI, *The Future of NFTs: How PFP-Based Projects Took Over the Market*, Artnews.com, 2021.

point, they will be able to select the NFT they want to use on their profile and their picture will appear in a special *hexagon shape*. This hexagon shape is exactly what identifies the Twitter user as the *owner* of the NFT[109]. In this way, the NFT, at least in the social media domain, will precede the identity of the owner, or better, it will assume the role of identifying the person as an NFT collector before anything else. In conclusion, it is possible to claim that collectibles play a huge role in defining the **social status** and identity of collectors, a matter that probably prevails over the desire to possess a great piece of art and that reveals the actual *social nature* behind the phenomenon.

Figure 27 – *Some Bored Apes*
(Source: Boredapeyachtclub.com)

[109] OPEN SEA Help Center, *How do I set my NFT as my Twitter profile picture?*, Opensea.com, n.d.

2.3 Crypto-art's market

2021 certainly corresponds to the year of NFTs "boom", to the point where the Collins Dictionary named the term "NFT" Word of the Year 2021, overcoming even pandemic-related words such as "double-vaxxed"[110], which certainly catalyzed a lot of attention throughout the year. Actually, even though they have started being in the public eye only in recent times, NFTs' history began definitely earlier. The first NFT to be ever sold was *Quantum* by Kevin McCoy, which was first minted on May 3, 2014, on Namecoin blockchain, and was recently sold at auction by Sotheby's for $1,472,000[111], which was then followed by numerous implementations in the gaming industry as "means for game players to trade virtual goods"[112], such as the case of **CryptoKitties**, the first example of the use of ERC-721 Ethereum's protocol in 2017.

A pivotal moment which definitely contributed to the switch of NFTs from a "niche phenomenon"[113] to a mainstream market of global interest was certainly marked by **Christie's** selling of *EVERYDAYS: THE FIRST 5000 DAYS* by **Beeple** for the incredible breaking number of $69,346,250 which put NFTs under the spotlight at a global level. As a matter of fact, Christie's was the first auction house to ever sell a digital work of art associated with an NFT, an extraordinary moment in the history of art which made Beeple one of the top three most valuable living artists, surpassed only by David Hockney and Jeff Koons, respectively in the second and first position, which is absolutely surprising considering Beeple's complete extraneousness from the traditional art world before Christie's auction.

In March 2022, the platform *NonFungible.com* released the **Yearly NFT Market Report 2021**, which represents "the most in-depth and comprehensive piece of research about the NFT Industry"[114] since its first edition in 2018. According to the report, in 2021, the NFT market recorded an exponential growth. The total value

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[110] David SHARIATMADARI, *Get your crypto at the ready: NFTs are big in 2021*, Collinsdictionary.com, 2021.
[111] SOTHEBY'S, *Natively Digital: A Curated NFT Sale*, Sothebys.com, n.d.
[112] Foteini VALEONTI, Antonis BIKAKIS, Melissa TERRAS, Chris SPEED, Andrew HUDSON-SMITH, Konstantinos CHALKIAS, *Crypto Collectibles, Museum Funding and OpenGLAM: Challenges, Opportunities and the Potential of Non-Fungible Tokens (NFTs). Appl. Sci.* **2021**, *11*, 9931.
[113] Domenico QUARANTA, *Surfing con Satoshi. Arte, blockchain e NFT*, op. cit., p. 5.
[114] NON FUNGIBLE, *Yearly NFT Market Report*, Nonfungible.com, 2022.

of transactions explosively grew, with an increase of 21,350% compared to 2020, specifically from $82,492,916 in 2020 to $17,694,851,721 in 2021, a development which goes hand in hand with the one of active wallets, whose total number increased from 89,061 in 2020 to 2,574,302 in 2021[115].

A central role in the NFTs market and its incredible development is certainly the one of marketplaces, which address to both potential collectors and creators in a very intuitive way, becoming a sort of "digital door" for anyone who wishes to enter the NFT market. Online marketplaces basically represent the new *mediators* in the Crypto-art domain.

2.3.1 Marketplaces: curated and non-curated platforms

Among the different marketplaces for NFTs' trading it is possible to distinguish two main categories: **non-curated** platforms, such as OpenSea, and **curated** platforms, such as SuperRare, which will be respectively analyzed in this paragraph by way of example of the two classes. **OpenSea** was launched in 2017 by Devin Finzer and Alex Atallah and, as declared on its website, it is the **first** and **largest** marketplace for NFTs[116]. As Quaranta states, the purpose of Finzer and Atallah was to create a deliberately generalist marketplace[117], without any kind of selection or distinction. OpenSea offers open access to digital assets and the crypto domain to both buyers and sellers. On OpenSea, users can literally find "anything", as the name of the platform itself suggests. Clearly, this (*theoretical*) complete absence of limits in terms of uploaded items and digital assets raises some issues, especially in terms of the contents' actual quality. As a matter of fact, it is probably in response to this quest for quality in the Crypto-art domain and the desire to consciously choose great art and great investments among the "mare magnum" of NFTs present online that led to the creation of curated platforms, such as **SuperRare**, which was founded in 2018. SuperRare is specifically focused on Crypto-art (for instance, you will not find Collectibles on SuperRare); in particular it only sells **single-edition** digital artworks,

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[115] NON FUNGIBLE, *Our 2021 NFT Yearly Report is out!*, Nonfungible.com, 2022.
[116] OPEN SEA, *About*, Opensea.com, n.d.
[117] Domenico QUARANTA, *Surfing con Satoshi. Arte, blockchain e NFT*, op. cit. p. 134.

a singular choice which contributes to the establishment of a high quality and exclusive artworks' selection. In fact, SuperRare only accepts a limited number of *hand-picked* artists who, in order to get on SuperRare's "radar" must first submit their profiles to the attention of SuperRare's team of curators[118].

If on one hand marketplaces are complementary to blockchain's main principle of decentralization and its intrinsic democratic nature, because they facilitate both creators and consumers, allowing *anyone* with a basic understanding of Web2 and blockchain to access the Crypto-domain, on the other hand their presence can also be identified as really controversial, since they kind of *centralize* the process, becoming extremely powerful entities in the definition of trends and in determining the artists' success; marketplaces are, as the Artnome's researchers define them, "**gatekeepers** in defining the bounds of artistic legitimacy"[119]. For example, appearing on the home-page of one or the other platform or being directly promoted by them can be life-changing for a crypto-artist. The controversy with respect to crypto main pillars culminates especially in curated platforms such as SuperRare that also impose a **selection** of the works of art, which implies the exclusion of certain artists. Nevertheless, even though it is controversial with respect to the crypto domain's main principles, selection proves to be fundamental for the development of the phenomenon and for it to "upgrade" and be acknowledged as an art movement also outside the boundaries of the crypto field. If traditional art is seeking recognition in the digital world, it is also true that Crypto-art is seeking more acknowledgement in the art world, which is only possible through sorting. It is exactly in these kinds of platforms that one of the first **intersections** between Crypto-art and the traditional art system is realized.

2.3.2 Selling NFTs

Minting NFTs is not free. This is the reason why in the previous paragraph there was a reference to a **theoretical** absence of limits when it comes to mint NFTs on the

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[118] SUPERRARE, *About*, Superrare.com, n.d.
[119] Alex ESTORICK, Kyle WATERS, Chloe DIAMOND, *In search of an aesthetics of Crypto-art*, op. cit.

various platforms. In fact, even though anyone could possibly register and authenticate a new NFT — especially on non-curated platforms such as OpenSea — it is also important to consider the presence of a monetary constraint, which does not depend on the single platforms, but on the Ethereum blockchain itself. In order to mint an NFT on Ethereum it is necessary to pay a variable sum of ether, the so-called "**gas fee**". It is possible to state that gas fees are payments which are required in order to perform *any* action on the Ethereum blockchain[120]. As a matter of fact, gas fees need to be paid not only when a new NFT is minted, so, by the creator, but also by the buyer everytime an NFT is sold. The gas corresponds to a unit that directly depends on the computational power needed in order to perform actions on Ethereum, such as the registration and validation of new blocks carried out by miners in the Proof-of-Work system that was described in the first chapter of the dissertation. Gas fees are paid in ether (ETH) and are expressed in "gwei", a denomination of ether where each gwei is equal to 0.000000001 ETH (10-9 ETH)[121].

As gas fees often act as a deterrent towards possible creators, to overcome the issue, some platforms have developed the system of the so-called "**lazy minting**". For instance, on OpenSea, it is possible to create and upload NFTs without paying any gas fee, as the NFT won't be concretely minted on the Ethereum blockchain until the first purchase is made[122]. Therefore, creators will only pay a fee to initialize their account [123] and will be then free to create their NFTs without worrying about gas fees.

In terms of privileges, another advantage of digital creators who decide to create and sell NFTs is the fact that once their work is sold for the first time, when it will access the secondary market, they will still be able to gain profit from it. This great benefit of NFTs is actualized in the possibility of setting up **royalties**, a share of each sale that will go to the original creator[124].

On online marketplaces, artists can choose among different types of sellings. For example, OpenSea, allows creators to put items at a fixed price, to put them up

[120] Griffin McSHANE, *What Are Ethereum Gas Fees?*, Coindesk.com, 2022.
[121] ETHEREUM, *Gas and Fees*, Ethereum.org, 2022.
[122] OPEN SEA, *Can I list an item without paying to "mint" it?,* Support.opensea.io, n.d.
[123] *Ibidem*.
[124] Christian HEIDORN, *Explained: How OpenSea Royalties Really Work*, Tokenizedhq.com, n.d.

for auction, or to reserve them for a specific buyer[125] . Artists and online platforms often exploit the system of "drops" to sell NFTs', which correspond to the date of release of collections[126] and are usually announced on social media platforms such as Discord, Twitter, Telegram or Instagram in order to create a great hype around them. Buying an NFT on the occasion of its drop might be very convenient for investors, first of all in terms of exclusivity, as they can have access to rare items, but also in economic terms, as they can save some money as well[127].

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[125] OPEN SEA, *How do I sell an NFT?*, Support.opensea.io, n.d.
[126] Kathryn UNDERWOOD, *What Are NFT Drops? Inside Scoop for Investors*, Marketrealist.com, 2021.
[127] Alex GOMEZ, *What is an NFT drop? NFTs Drops Explained*, Cyberscrilla.com, n.d.

CHAPTER 3

Conceptual and aesthetic analysis of the phenomenon

3.1 Crypto-art's unexpected connection with traditional art

The main narrative around Crypto-art often describes the phenomenon in complete contraposition to art in its most traditional sense. This idea is reinforced by the fact that the majority of SupeRare's tags in the sample analyzed by Artnome's team has no reference at all to traditional fine art's terminology, which, according to the researchers, supports the *impression* of a break with tradition[128]. It is a matter of *impression* because, controversially, five of the top ten tags are actually connected to traditional art's vocabulary[129]. As a result, although Crypto-art is usually intended as art that drastically rejects conventional forms and rules of established artistic practices, it might be surprising to notice that it shares many unexpected features with traditional art: this unquestionably marks a great connection between the two, rather than a harsh rupture, as usually implied.

Published in 2019, the academic paper *Crypto-art: a decentralized view* is of great interest for the Crypto-art domain since, as declared in its prologue, it proposes a *decentralized* view on Crypto-art based on the viewpoints of various actors of the system, including crypto-artists (Sergio Scalet from the Hackatao duo and Martin Lukas Ostachowski), collectors, galleries (in particular Jonathan Perkins, founder of SuperRare), **art scholars** and data scientists[130]. Among these viewpoints, the one which is certainly fundamental for the purpose of the conceptual analysis proposed in this chapter is that of art scholars, respectively **T'ai Smith** and **Blake Finucane** from the Department of Art History, Visual Art and Theory of the British Columbia University, whose study comes in handy to dismantle the idea that Crypto-art is

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[128] *Ibidem.*
[129] *Ibidem.*
[130] Massimo FRANCESCHET, Giovanni COLAVIZZA, T'ai SMITH, Blake FINUCANE, Martin Lukas OSTACHOWSKI, Sergio SCALET, Jonathan PERKINS, James MORGAN, Sebastián HERNÁNDEZ, *Crypto-art: a decentralized view*, op. cit., p. 1.

radically in contrast with canonical art. In particular, Smith and Finucane conclude their historical analysis of the phenomenon with some further thoughts and provocations, including the following statement:

> Crypto art is often positioned as a radical alternative to traditional or conventional art, but when examining its form, we note it has tended to **follow the rather academic logic of the two-dimensional, rectangular picture** (like a painting or drawing). Since the work is made to be viewed through a screen – on a computer, phone, or tablet – much of crypto art work features **bright colours** and a **central, large, bold image**[131].

When scrolling through online marketplaces, even though the aesthetics might differ (it was already mentioned in Chapter 2 that the decentralized nature of NFTs contributed to the implementation of many different "styles") and although images might be still or animated, it is true that they all share the same shape, a **squared shape**, at least for what concerns their immediate appearance on marketplaces. Whilst there are not actual restrictions or obligations in terms of the shape of NFTs' corresponding digital artifacts, marketplaces usually display them as squares[132], cutting the parts which do not "fit" in the selected shape. This is a clear example of how marketplaces centralize the process — as it was previously hinted at in Chapter 2, *Paragraph 2.3.1* — and tend to impose implicit constraints on the creative practice, since it is evident that the majority of artists are likely to stick to square — or rectangular shapes at most — in the creation of their art, complying to the aesthetic guidelines of websites. After all, squares and rectangles also correspond to the allowed formats for social media posts and, because of their predominantly digital nature, NFTs certainly have a direct link to the social media domain as well, which might be another reason for the consistency in terms of the images' shape which is present among crypto artifacts. Thus, the white interface of marketplaces with its displayed works of art inevitably ends up being reminiscent of the walls of an art gallery or a museum displaying physical works of art. Oversimplifying the concept, it is possible to state that Crypto-art's works basically look like digital versions of paintings and drawings.

Besides their usual shape, which is therefore in complete accordance with the one used in traditional forms of art such as painting and already marks a great

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[131] *Ivi*, p. 17.
[132] NFT EDITOR, *Do NFTs Have To Be Square*, Nftmarketfeed.com, 2022.

common point between the two, Crypto-art, as Smith and Finucane suggest, tends to follow academic logics also in terms of **representations** and **iconography**. A concrete example of this assumption is the presence of the tag *#portrait* among the fifty most used tags on SuperRare's platform, corresponding to about 8% of NFTs present on the marketplace[133]: this shows how such an ancient form of art like portraiture, which flourished at least 5000 years ago in Ancient Egypt[134], is still so dominant in the digital realm. As previously mentioned, despite the surreal imagery which is typical of NFTs, Crypto-art's productions still give great attention to figurative elements, the human figure in particular but also anthropomorphic animals, extremely popular in the collectibles' domain. These figures are usually the main subject of works of art, displayed as "central, large, bold"[135] easily recognizable images, demonstrating how the approach of figurative art is still incredibly influential in the digital field. Clearly, many Crypto-art productions also include abstract representations, whose subjects are detached from real world's elements and more ambiguous compared to figurative art. Nevertheless, despite the massive presence of abstract imagery, the defined squared shape of Crypto-art images, their consequent evident contrast from what surrounds them, also emphasized by the usual choice of bright colours and, more than anything, the fact they are meant to be viewed through a screen leave no doubt about their representational character: all of these elements immediately declare the image-nature of Crypto-artifacts, without any degree of illusion.

The "throwback" of NFTs in terms of iconography and styles can also be retrieved in the use and the choice of colors. Artnome's analysis led to the definition of a Crypto-art's "palette", where the dominant colors — "pastel hues of red, pink and purple"[136] — not only remind of Rothko's school of data visualization but also of what the researchers defined as "an allure of technostalgia"[137]. **Technostalgia** is efficiently described by media historian Tim van der Heijden as "the reminiscence of

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[133]Alex ESTORICK, Kyle WATERS, Chloe DIAMOND, *In search of an aesthetics of Crypto-art*, op. cit.

[134] TATE Online Glossary, *Portrait*, Tate.org.uk, n.d.

[135] Massimo FRANCESCHET, Giovanni COLAVIZZA, T'ai SMITH, Blake FINUCANE, Martin Lukas OSTACHOWSKI, Sergio SCALET, Jonathan PERKINS, James MORGAN, Sebastián HERNÁNDEZ, *Crypto-art: a decentralized view*, op. cit., p. 17.

[136] Alex ESTORICK, Kyle WATERS, Chloe DIAMOND, *In search of an aesthetics of Crypto-art*, op. cit.

[137] *Ibidem.*

past media technologies in contemporary memory practices"[138]; it consists of an increasing interest, or better, *melancholic* interest towards old-fashioned technologies, such as arcade games, whose graphics are very much in vogue in the Crypto-art's field and contribute to the implementation of **retro** aesthetics, proving how Crypto-art is openly oriented not only to established forms of representation, but also to outdated styles and looks, a "vintage" trend that nowadays is actually present in various markets besides Crypto-art, such as fashion and design.

Traditional art can also be identified as a **source of inspiration** for many Crypto-artists or even as a sort of starting material for the actual creation of the crypto-artifact. A great example of how traditional art can be reworked and give life to digital artifacts is *Machine Hallucinations - Renaissance Dreams*, where crypto artist Refik Anadol mixed through artificial intelligence thousands of Renaissance's paintings, producing a hypnotic whirl of colors.

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[138] Tim VAN DER HEIJDEN, *Technostalgia of the present: From technologies of memory to a memory of technologies*, Necsus-ejms.org, 2015.

Figure 28 – *Machine Hallucinations - Renaissance Dreams by Refik Anadol photographed in Palazzo Strozzi's yard in Florence* (personal photograph).

The idea that Crypto-art is closer as an art form to traditional art than one could ever imagine can also be retrieved in the academic paper *In Search of an Aesthetics of Crypto-art,* in which the authors underline how, paradoxically, Crypto-art is more consistent as an art form compared to more recent contemporary artistic practices. According to this theory, despite its digital and intangible nature, Crypto-art would be more related to traditional forms of art such as painting, rather than most contemporary works of art even though the latter share with traditional media the attribute of physicality. Specifically, the authors stated:

> One characteristic of fine art over the last fifty years has been the proliferation of **hybrid installations** rather than discrete works of traditional media: painting,

sculpture, etc. [...] What crypto art stands to offer is a notion of quality that is potentially more secure than contemporary art because it is more coherent in its media[139].

The roots of installation's hybrid forms date back to conceptual art and Marcel Duchamp's famous ready-made works and nowadays still represent one of the most common forms of contemporary artistic practices[140]. According to Tate's online glossary, Installation art usually refers to large-scale, mixed media constructions which are typically created to fill whole 'environments'[141]. As their definition suggests, installations, differently from traditional art forms, are not consistent in terms of media and, more importantly, they are meant to be "complete unified experiences, rather than a display of *separate*, individual artworks"[142]. As a matter of fact, contrary to traditional art, installations are usually meant to be *experienced* by the public, rather than observed: they require a sort of *switch* in the public's attitude, from mere passive observers to active experiencers. It is no surprise that installations sometimes occupy whole spaces and are meant to be walked through, or even touched (even though it is not always the case); Crypto-art's works on the contrary are usually "circumscribed" to their specific, well delimited area of representation, just like paintings, whose "object of art is independent of its environment"[143]. Therefore, they turn out to be perfectly suitable for the human standard attitude of *contemplation* which is usually triggered and required in front of traditional forms of art. As Oliver Grau states "inner and visual distance are essential prerequisites for the experience of art and the world in general. Since the eighteenth century, aesthetic theories have regarded distance as a constitutive element of reflection, self-discovery, and the experience of art and nature"[144].

Crypto-art surprisingly complies to the traditional essential prerogatives for the experience of art mentioned by Grau, which are, on the contrary, paradoxically challenged by other forms of *physical* contemporary art such as hybrid installations.

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[139]Alex ESTORICK, Kyle WATERS, Chloe DIAMOND, *In search of an aesthetics of Crypto-art*, op. cit.

[140] Efe KURT, *A Hybrid Field of Expression in Contemporary Art: Installation*, Warholamag.com, n.d.

[141] TATE Online Glossary, *Installation Art*, Tate.org.uk, n.d.

[142] *Ibidem*.

[143] Efe KURT, *A Hybrid Field of Expression in Contemporary Art: Installation*, op. cit.

[144] Oliver GRAU, *Virtual Art: From Illusion to Immersion*, trans. Gloria Custance, Cambridge, MA: MIT Press, 2003, p. 286.

Moreover, a less trained public may probably be more prone to acknowledge the art's status of Crypto works, rather than conceptual physical works of art or other forms of hybrid installations, perhaps because Crypto-art does not offer any controversy in terms of its image nature. To be clear, Beeple's *Into the ether* (2020) is less likely to raise debates on its artistic nature, than *America* (2016), the famous golden toilet by Maruzio Cattelan or Marcel Duchamp's urinal *The Fountain* (1917).

Figure 29 – *Comparison between "Into the ether" (2020) by Beeple on the left and "America" (2016) by Maurizio Cattelan on the right.*
Sources: Into the Ether (Beeple) - Nuomomo.com
America (Maurizio Cattelan) - ©photo Gail, Worleygig.com

In order to prove how the public's attitude of contemplation is triggered by Crypto-art's works, we will analyze by way of example the latest exhibition of Palazzo Strozzi in Florence, *Let's get Digital!,* which is exactly focused on the topic of NFTs and Crypto-art, including works by superstar artists such as **Beeple** and **Daniel Arsham**, and in particular the way it was set up. The main space is occupied by Beeple's works of art, which are displayed on rectangular screens on black partitions. Despite the darkness of the space which makes images emerge better,

since they are displayed on screens which radiate light on their own and do not need to be lit, the exhibition space is definitely comparable to the ones of art galleries or museums displaying paintings or drawings, as it is possible to notice in the comparison proposed by Figures 25 and 26 in the following page, where *Let's get Digital!* exhibition space is compared to the one of the Gallerie d'Italia museum in Naples.

Figure 30 – *View of Beeple's exhibition hall, Let's Get Digital!, Palazzo Strozzi, Florence (2022)*
(Source: ©photo Ela Bialkowska OKNOstudio - Artemagazine.it)

Figure 31 – *View of Gallerie d'Italia (Naples) exhibition hall*
(Source: Fanpage.it)

As it is possible to observe in the images above, the "sacred" atmosphere surrounding the artworks is not compromised by the digital nature of Beeple's artifacts: the works of art are clearly separated from the viewers and are evidently there to be observed from a distance and contemplated in silence.

Figure 32 – *Contemplative attitude.*
On the left: Let's Get Digital!, Palazzo Strozzi, Florence. On the right: Neue Pinakothek, Berlin. (Personal photographs).

On the other hand, *Let's get Digital!* also proposes a sort of encounter between Crypto-art and the form of installation, with the NFT project *Anyma*, which is defined as a site specific installation by Matteo Milleri and Alessio De Vecchi. Therefore, in the same exhibition, it is possible to retrieve a combination of different experiences, from a more static one in the case of Beeple's works of art, to a more immersive one in the case of *Anyma*'s project. *Anyma*'s installation consists of a dark room where animated works of art displayed on rectangular screens on each wall are accompanied by riveting sound effects, which give the feeling of entering into a timeless space. Despite the engaging nature of the project, the presence of benches in the middle of the room suggests that images are still meant to be observed from a

distance, preferably sitting on the bench in order not to interfere with other visitors' view of the works.

Figure 33 – *View of Anyma's project exhibition hall, Let's Get Digital!, Palazzo Strozzi, Florence (2022)*
(Source: ©photo Ela Bialkowska OKNOstudio - Artemagazine.it)

What is important to emphasize is the fact that the "immersivity" provided by the *Anyma* project — despite still maintaining a certain degree of passivity — is offered by the museum context, by the setup of the room, by the amplified sounds effects and not by the visual Crypto work itself, which is still framed in its area of representation. Consequently, it is possible to state that NFTs have the *potential* to offer immersive experiences, but only in a particular *physical* context. The potentiality is given by the fact that NFTs, contrary to paintings and drawings allow the implementation of **animation** and **sounds**, two elements which certainly are able to trigger more emotional engagement in the public than static works of art. If Van Gogh's artworks have to be turned into digital images in order to offer a more immersive experience, such as in the case of *Van Gogh's experiences*, the digital

matter of Crypto artifacts allow them to be more flexible products not needing any kind of transformation process to offer more engaging experiences, yet always keeping in mind that the revolution in the dynamicity of such works of art was produced by Digital art's development and not by Crypto-art.

In conclusion, it is possible to claim that Crypto-art does not correspond to a revolution in terms of art forms or in its relationship with the public, because it does not correspond to a "new method for making images"[145]. Rather than in the way of representation, Crypto-art's actual innovation lies in its **democratic nature** in terms of aesthetic enjoyment.

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[145] Kevin BUIST, *Chain reaction*, op. cit.

3.2 The democratization of aesthetic enjoyment

Before Crypto-art, infinite reproducibility and the consequent impossibility to verify the artworks' authenticity constituted the main issue of digital art and creators. In his text *Languages of Art* (1968), Nelson Goodman addressed the matter of art and authenticity, establishing the crucial distinction between *autographic* and *allographic* works of art. An artwork is autographic "if and only if the distinction between original and forgery of it is significant"[146], as in the case of painting, where even the most perfect and accurate copy will never be considered as genuine. On the other hand, works of art are non-autographic, or allographic, when they are based on a notational system[147], such as the case of music or literature. As a matter of fact, as long as the work itself is not modified, the copy of a book or the reproduction of a music play will never be considered as forgery. Crypto-art, and Digital art before it, *challenged the idea of copy* and Goodman's distinction, since their productions do not fall neither in the autographic category nor in the allographic one. Basically, the concept of copy has completely lost relevance in the digital field, because *reproducibility* is an intrinsic feature of art itself: it is a prerogative, an unavoidable part of its very own nature. Before NFTs' implementation, this property of Digital art constituted a boundary which identified Digital art as less worthy in economic terms than other forms of art. The impossibility of distinguishing the original from the copy is exactly what deprived digital art of economic value and consequently of their perceived aesthetic value as well, since the concept of reproducibility has never ever been compatible with the idea of art, traditionally related to originality and uniqueness. Crypto-art made it possible for digital artifacts to become assets of value by *relocating originality* from the work of art to the NFT, allowing collectors to "own" Digital art[148]. Nevertheless, despite the introduction of the concept of scarcity in the digital realm achieved through the introduction of NFTs, the attributes of originality and uniqueness still do not pertain to works of art, but only to their related certificate of authenticity, the NFT. For this reason it is possible to claim that the

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[146] Nelson GOODMAN, *Languages of Art*, Indianapolis - New York - Kansas City, The Bobbs-Merrill Company, Inc., 1968, p. 113.
[147] *Ivi*, 122.
[148] It is necessary to point out that owning an NFT does not necessarily imply the possession of the work's copyrights.

concept of scarcity, of uniqueness in relation to digital artifacts is actually a mere illusion[149], a pure artificial construct, or, even, as Domenico Quaranta states, a lie[150].

In *The Work of Art in the Age of Mechanical Reproduction* (1935), Walter Benjamin already addressed the issue of "reproducibility" in the art field, especially in relation to the phenomenon of the *mechanical* reproduction allowed by photography. In his text Benjamin argued how photography's enormous acceleration of the process of pictorial reproduction sorted a double outcome: on one hand, mechanical reproduction contributes to a democratization of art and aesthetic enjoyment, a process for which photography is praised by the philosopher; on the other hand, the mechanical reproduction of works of art always irretrievably causes the loss of what Benjamin defines the "aura", an attribute which only pertains to the original and never to its reproductions. The issue of reproducibility, as previously stated, is certainly at the core of both Digital and Crypto-art and Benjamin's accurate analysis proves to be still incredibly relevant in this regard. In particular, it is possible to state that Crypto-art basically brought the democratization of aesthetic enjoyment described by Benjamin in relation to photography to a whole new, extreme level. According to Benjamin, the possibility of art's technological reproduction altered the relationship of the masses to art[151], giving them access to what was impossible to reach before. Since the development of photography, one does not necessarily need to go to the Louvre to see the Mona Lisa, but can simply contemplate it in a magazine, or in the form of a photograph in general, in any country around the world. Nevertheless, despite offering a great opportunity for the masses to achieve artistic knowledge, according to Benjamin reproductions will never equate to the original work of art: there will always be a difference, an irretrievable dichotomy between the copy and the original work of art, which lies in the latter's aura. Crypto-art completely *nullified* this dichotomy. That is the reason why it is possible to claim that, rather than creating a radical new form of art, Crypto-art's real revolution lies in the **extreme maximization of aesthetic enjoyment's democratization**, which is in complete accordance with the

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[149] Aleksandr HOVHANNISYAN, *NFTs are a problem*, Aleksandrhovhannisyan.com, 2021.
[150] Domenico QUARANTA, *Surfing con Satoshi. Arte, blockchain e NFT*, op. cit., p. 26.
[151] Walter BENJAMIN, *The Work of Art in the Age of Mechanical Reproduction* (1936), English translation by J. A. Underwood, Penguin Books Ltd, 2008, p. 26.

blockchain's main principles. As a matter of fact, the difference between owning Crypto-art and owning physical works of art — which can still possibly be reproduced through photography and observed and shared among the masses despite being concretely owned by a single individual — is that Crypto-art's collectors have no benefits at all in terms of aesthetic enjoyment of their works of art as compared to the masses. This completely challenges the traditional idea of art collecting, in which the financial advantage of owning a work of art is always accompanied by a privileged access to that art. On the contrary, anyone could potentially aesthetically enjoy Crypto-art's works on their personal devices such as computers, tablets or smartphones, in the same exact way as those who actually paid for those artifacts. If Benjamin stated that mechanical reproduction made it possible for the original work to come closer to the person[152], to the masses, it is possible to state that with digital reproduction the original work and the masses have never been so close, since there is no distinction anymore between the original and the copy: the work is intrinsically "original" and a reproduction at the same time.

What embodies collectors' privilege is the NFT, which "takes charge" of the attributes of scarcity, uniqueness and rarity traditionally pertaining to the works of art. Thus, this could mean that also the aura — an exclusive asset of the original in Benjamin's opinion — is now incorporated into the NFT. However, according to Benjamin, the aura of the work of art, its genuineness, only pertains to the *here and now* of the original, "its unique existence in the **place** where it is at this moment"[153], which implies that, in order to capture the art's aura, the observer needs to share the same spatiotemporal dimension of the work of art. Despite incorporating the idea of uniqueness, the NFT — just like the digital artifact to which it is associated — is a digital matter, consequently deprived of tangibleness and physicality and thus does not exist in relation to a particular physical space, which is essential in Benjamin's concept of aura.

It is probably because of this complete absence of a concrete physical space of contemplation, along with the fact that Crypto-art's artifacts abruptly enter people's lives through everyday instruments such as smartphones, that the general public,

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[152] *Ivi*, p. 6.
[153] *Ivi*, p. 5.

even after NFTs implementation, still struggles to put Crypto-art and traditional forms of art on the same level and sometimes even tends to devalue digital artifacts; all of these conditions make it difficult for users to "catch" Crypto-art's aura.

The attempts of **musealization** of NFTs and digital artifacts — like the one analyzed in the previous paragraph — probably correspond to efforts of recollocating the aura on the artifacts providing them with a physical space in which, as a matter of fact, they are usually presented in atmospheres of pure contemplation and holiness typical of traditional art's displays as an attempt to achieve greater recognition by the public. Even in these cases though, the aura is actually *inducted* by the museum context and consists once again in a sort of illusion, as the digital work of art will never exist specifically in relation to a physical space: it will always be *everywhere*, in a sort of expanded "aura", which is barely perceptible.

3.3 The paradox of Crypto-art in the phenomenon of *destruction*

At this point, it should be evident that, despite Crypto art's connection with traditional forms of art, the relationship between Digital art and the concept of "physicality" is quite controversial. A phenomenon that clearly expresses this paradoxical issue is the one of the **destruction of physical works of art for the purpose of creating NFTs**, which is registered as an increasingly popular tendency in relation to the Crypto domain and seems to declare a sort of **incompatibility** between the intangible nature of Crypto artifacts and the bodily quality of traditional works of art. This destructive approach has extended also beyond the field of Crypto-art, as in the case of Tascha Che, who bought a diamond for $5,000, digitized it, smashed it and then sold it as an NFT for $19,000[154]. The rise of NFTs' market — as already mentioned in Chapter 2 — has triggered an increasing need for traditional artists to enter the Crypto domain, a process that can only be achieved through the digitization of physical assets. On the contrary, Digital art, thanks to NFTs' implementation, has become completely autonomous and *self-sufficient*, not needing any kind of transformation in order to be monetized: Crypto-art is born digital and will remain so[155]. Moreover, not only does the artwork's digital version contain all the elements of the physical asset, but it also incorporates its certificate of authenticity and property while securing its preservation[156], consequently establishing a sort of superiority in comparison with its physical counterpart.

The act of digitizing physical assets to then destroy them with the aim of selling NFTs is not only common among collectors — such as the previously mentioned case of *Morons* by Banksy, which clearly was not destroyed by Banksy himself, but by its owners, the blockchain company *Injective Protocol* — but also among artists. If we consider the point of view of an artist, when the physical artwork is conceived with the intention of minting an NFT in the first place, the destruction of the physical object is almost automatic: it becomes a natural process of the creative practice itself. In this specific case, the physical work of art acts as a sort of

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[154] Laura SHIN, *She Destroyed a $5,000 Diamond. So Why Is Its NFT Selling for $123,000?*, Laurashin.bulletin.com, 2021.
[155] Roberto COLANTONIO, *Distruggere un'opera d'arte Gli NFT e il caso Basquiat*, Ntplusdiritto.ilsole24ore.com, 2021.
[156] *Ibidem.*

matrix for the forge of its digital version, just like it happens with limited edition graphics, whose matrix is usually destroyed or ruined in order to avoid reproductions in the future and increase the value of the existing copies. An example of this process was applied by street artist **Nathan Murdoch**, who purposely damaged one of his works — throwing white paint on it — in order to sell it as an NFT. Therefore, in the perspective of selling an NFT, burning Banksy's print was considered by Injective Protocol as a sort of *inevitable act*, otherwise the value of the work would have endured in the physical object[157], representing a "threat" for the digital item. This idea implies the existence of a "**competition**"[158] between the physical and the digital assets which establishes a sort of **impossibility of coexistence** of the two items. Roberto Colantonio, lawyer specialized in Art Law, claimed that the co-presence of both digital and physical assets of the same item generates "an **intrinsic inflation** of the artwork"[159] which inevitably leads to the destruction of the physical asset.

This concept is clearly conveyed by **Damien Hirst**'s first NFT project, *The Currency*, which can also be considered as a sort of social experiment designed to discover which asset, physical or digital, holds supremacy in the art domain. The British superstar artist created 10,000 physical works of art — dot paintings on paper — related to as many digital NFTs, the latter realized in collaboration with **HENI Editions**. On the 29th of July 2021 the collection was put up for sale on the online platform **Palm** for $2,000 each. Each work is unique and was automatically assigned to successful buyers, or better, applicants, who, only after obtaining the work, discovered its title and specific characteristics. The owners were then given a one year period to decide whether to keep the NFT or to trade it in for the physical edition[160]: the "left" item, whether physical or digital, will be destroyed. In particular, NFTs will be erased from the collectors' wallets through a "burning mechanism"[161], whereas the remaining physical works will be displayed in an exhibition before being publicly destroyed "in the form of a ceremonious burning"[162] and, who knows,

[157] Mario Francesco SIMEONE, *Il Banksy bruciato sbanca il mercato NFT e moltiplica il valore*, Exibart.com, 2021.
[158] *Ibidem.*
[159] Roberto COLANTONIO, *Distruggere un'opera d'arte. Gli NFT e il caso Basquiat*, op. cit.
[160] Dev MOORE, *The Exchange Mirror for Damien Hirst's The Currency is Now Open*, Palm.io, 2021.
[161] *Ibidem.*
[162] RHODES CONTEMPORARY ART, *Damien Hirst: 'The Currency Series'. The ongoing debate between the value of digital and physical value explored*, Rhodescontemporaryart.com, 2022.

maybe, the video of the burning physical works will become an NFT as well, just like it happened with Banksy's print.

In January 2022, Joe Hage — HENI's founder and Hirst's manager — declared that the profit of the initial sale amounted to 18 million dollars to which is to add a further 5% of proceeds from the secondary market of NFTs' reselling. Unfortunately, the final results of the "test" are still not publicly available, as the granted period of time will end in July 2022. Nevertheless, some information was leaked by Hirst's manager, who, in December 2021, declared that only 5% of buyers had opted for a painting[163], which makes the final result of the experiment quite predictable. Moreover, three and a half months after the initial selling, the secondary market prices were "driven by the unique characteristics of the works as they were *digitally* conveyed to the collectors"[164], which implies that the NFT's version of the items dominated the secondary market.

Hirst's project, besides "testing the connection between the virtual and the physical worlds"[165], also aimed at challenging the idea that art and money are separate entities, as its provocative title suggests. The fact that Hirst decided to entitle an art project *The Currency* already implies an overlapping of artistic and economic value. As a matter of fact, the core question of the whole project revolves around a *monetary* issue: *which of the two assets will be the best investment?*

Before selling the artworks, there was some confusion about their actual *uniqueness*, since they are all composed by coloured dots of the same palette and therefore extremely difficult to distinguish from one another. This ambiguity regarding the originality of each work was actually purposely intended by Hirst in order to "level the playing field for art and money, by removing the "X" factor of the aura"[166]. This means that the dot representation was intentionally meant to deprive the works of art of their "aura" — which in this case corresponds to the concept of originality — in order to make the monetary value prevailing over the aesthetic one. Clearly, this ambiguity was removed once the works were leaked, as each one is accompanied by a list of accurate percentages of characteristics and peculiarities present in the artwork.

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[163] Scott REYBURN, *Damien Hirst and the Art of the Deal*, Nytimes.com, 2022.
[164] Julia FRIEDMAN, David HAWKES, *'The Currency' Referendum*, Whitehotmagazine.com, 2021.
[165] Paul SULLIVAN, *A Painting or an NFT: which will be more valuable?*, Nytimes.com, 2021.
[166] Julia FRIEDMAN, David HAWKES, *'The Currency' Referendum*, op. cit.

A criticism about the project is that, since the collection was leaked on Palm, an online platform, and primarily sold through digital currency as an NFT, it was addressed to a public who was already familiar with NFTs, crypto-wallets and anything related to the blockchain system. This implies that this kind of audience will probably be more oriented to the choice of keeping the NFT rather than the physical asset. Therefore, it is possible to conclude that the results could be biased and that, perhaps, it would have been different if the works had been sold through an auction house, without any "technological" obstacle.

Nevertheless, Hirst's project certainly represents a very interesting tool, also from a theoretical point of view, to analyze not only people's preferences in terms of aesthetics but also to explore the interconnections between art and money, which are certainly not new to art, but were definitely brought to an extreme level by NFTs. Moreover, the idea behind *The Currency* might be helpful to determine what according to Artnome's researchers is still an unsolved question: whether Crypto-art will be ultimately defined by its nuance as a financial instrument or by its aesthetic nature of digital artifact[167], or both.
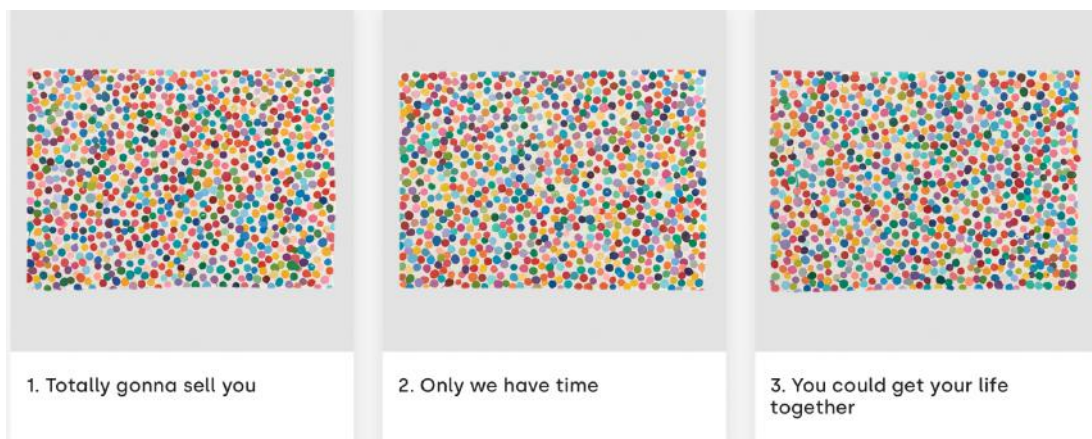

Figure 34 – Some works of '*The Currency' series by Damien Hirst.*
(Source: Heni.com)

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[167] Alex ESTORICK, Kyle WATERS, Chloe DIAMOND, *In search of an aesthetics of Crypto-art*, op. cit.

CHAPTER 4

The art world's response to Crypto-art

The Crypto-art domain excluded in principle all the intermediaries which are the pillars of the traditional art system — for instance art galleries — providing both creators and collectors with a very direct system based on quick and straightforward communication between the two parties, as the role of mediators was completely taken over by online marketplaces. Nevertheless — despite some skepticism — the art world has not just stood aside passively observing, but has progressively tried to wade into Crypto-art's innovation, just like the case of auction houses, which were able not only to profit of this new system, but also to become a fundamental part of its development and upgrade to a globally acknowledged art phenomenon.

In order to analyze the art world's reaction to Crypto-art and NFTs — besides a brief introduction concerning auction houses and their crucial role in the development of Crypto-art and NFTs' — the present chapter is centered on the contributions offered by various actors of the art system working with Crypto-art — respectively Alfredo Zanini, Davide Zanini and Sandie Zanini from **Zanini Arte Gallery**, the Crypto-artist **Federico Solmi** and the entrepreneur **Andrea Concas** — who were all directly interviewed for the purpose of this dissertation's analysis. What all these actors have in common is a **visionary approach** towards the phenomenon of Crypto-art for which it is possible to consider them pioneers and essential contributors in the dialogue between art and technology.

3.1 Auction houses

Considering the art world's traditional institutions, **auction houses** were certainly visionary in foreseeing NFTs' potential. They were the first established organizations to ever consider and envision the power of Crypto-art's market, paving the way for its incorporation into the art's system. **Christie's** was the first auction house to

envisage the importance of NFTs' market, followed by **Sotheby's**, **Phillips**, **Bonham** and **Cambi**[168]. In particular, in March 2021, the selling of *EVERYDAYS: THE FIRST 5000 DAYS* by Beeple — a monumental digital collage which was exclusively minted for **Christie's**[169] — marked a crucial moment in the history of Crypto-art and art in general, representing the first *intersection* of Crypto-art and the traditional art's system. The digital artwork, as previously mentioned, was sold online for the breaking number of $69,346,250, marking — as stated on Christie's official website — "two industry firsts": Christie's was the first major auction house to ever sell a digital work of art associated with a Non-fungible token and also the first to accept cryptocurrency as a payment[170]. In July 2021, Christie's reinforced its commitment to promote a dialogue around art and digital technology by establishing an **Art+Tech Summit** entirely dedicated to NFTs in the Rockefeller center in New York which was sold out both in-presence and virtually[171], as the event was also streamed online. Moreover, in December 2021, Christie's announced a collaboration with OpenSea - the project ***Christie's X OpenSea*** - the first on-chain auction on OpenSea curated by Christie's[172], which was considered by Marcus Fox — Christie's Global Managing Director of 20th / 21st Century Art — "as an important step forward in bringing the traditional and digital art worlds closer together"[173].

Another industry first was marked by **Sotheby's**. First of all, Sotheby's debuted in the NFTs' market right after Christie's, in April 2021, with an NFT collection by Digital Artist **Pak**, which was sold on Nifty Gateway's platform and realized 17 million dollars[174]. Nevertheless, the crucial move and one of the greatest achievements realized by the auction house was certainly the launch in October 2021 of ***Sotheby's Metaverse***, which marked an incredible "engagement between the high end art world and digital art"[175]. Sotheby's metaverse corresponds to the auction house own NFTs' marketplace offering a selection of rare works of Crypto-art,

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[168] Andrea CONCAS, *Crypto arte*, op. cit., p. 49.
[169] CHRISTIE'S, *Beeple's opus*, Christies.com, n.d.
[170] *Ibidem*.
[171] CHRISTIE'S, *Art+Tech Summit: NFTs and Beyond*, Chirsties.com, n.d.
[172] CHRISTIE'S, *CHRISTIE'S ANNOUNCES COLLABORATION WITH OPENSEA – THE WORLD'S LEADING NFT MARKETPLACE*, Christies.com, n.d.
[173] *Ibidem*.
[174] SOTHEBY'S, *$17 Million Realized in Sotheby's First NFT Sale with Digital Creator Pak*, Sothebys.com, 2021.
[175] Eileen KINSELLA , *Sotheby's Launches Metaverse, a Dedicated Digital Art Platform, With a Little Help From Pak, Paris Hilton, and Time Magazine*, News.artnet.com, 2021.

directly curated by Sotheby's experts[176], an initiative that is clearly in line with the increasing desire for quality and selection in the crypto domain and is defined as another way of "bridging the gap" between traditional collectors and crypto-enthusiasts[177]. Interestingly, all bidders who decide to take part in Sotheby's metaverse will receive a unique avatar created by Digital Artist Pak[178]. In June 2021, Sotheby's also opened a virtual gallery in **Decentraland**[179] with a digital replica of its London Galleries[180], securing itself a spot in the virtual reality of Metaverse as well.

In June 2021, **Cambi** became the first Italian auction house to enter the digital realm of NFTs. In collaboration with SuperRare, Cambi proposed *Dystopian Visions*, a curated selection of NFTs by Serena Tabacchi, the director of *MoCDA* (Museum of Contemporary Digital Art)[181]. Cambi's auction is another example of the increasing pressure towards high quality and more oriented choices in terms of investment in the Crypto-art field, which is clearly along the lines of SuperRare's mission. This intent is explicitly declared by the auction house whose selected works are defined as "the right starting point to navigate in a potentially *boundless sea* of works with naturally indefinable physical boundaries"[182].

In conclusion, it is interesting to notice how, paradoxically, what was theoretically rejected by Crypto-art — namely, canonical institutions — was actually the *driving force* which made Crypto-art mainstream extending the boundaries of its market beyond the niche of crypto-communities and consequently allowing it to reach record breaking figures that probably would not have been possible without this extraordinary **intersection between innovation and tradition**.

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[176] ART RIGHTS, *Sotheby's lancia Metaverse, una piattaforma dedicata all'arte digitale su Blockchain*, Artrights.me, 2021.
[177] Sophie HAIGNEY, *Next Stop: The Metaverse*, Sothebys.com, n.d.
[178] Eileen KINSELLA , *Sotheby's Launches Metaverse, a Dedicated Digital Art Platform, With a Little Help From Pak, Paris Hilton, and Time Magazine*, op. cit.
[179] Decentraland is a virtual reality platform based on the Ethereum blockchain.
[180] DECENTRALAND*, Sotheby's opens a virtual gallery in Decentraland*, Decentraland.org, 2021.
[181] CAMBI, *Dystopian Visions: a curated NFT digital art collection*, Nft.cambiaste.com, n.d.
[182] *Ibidem*.

Figure 35 – *Sotheby's location on Decentraland*
(Source: Sotheby's Twitter)

3.2 Art galleries. Interview with Zanini Arte Gallery

Before entering into the details of art galleries' response to NFTs, it should be noted that auction houses were certainly favored in the process by their absolute commercial nature which makes them a sort of established alter-ego of online platforms. On the contrary, galleries certainly face a more difficult task, as — despite sharing with auction houses and marketplaces the "business matrix" — they always exist in conjunction with a physical exhibition space and, just like museums, are extremely bounded to material and tangible goods. Therefore, except for those galleries which specifically flourished in concurrence with NFTs' development — such as the case of the first Crypto-art physical gallery created by Superchief in New York[183] — all other pre-existing institutions are still trying to correctly respond and pertinently position themselves in this new domain. In this respect — especially for what concerns the Italian scene — Zanini art gallery's activity turns out to be extremely significant and crucial when it comes to analyzing the role that art galleries will possibly play in the digital field of NFTs.

The Zanini family started the gallery business in 1917 in San Benedetto Po, near Mantua. Zanini Arte is a *dual* gallery, which — in its three locations — features both Antiques and Contemporary Art[184], a peculiar dichotomy which already marks the gallery's uniqueness. As a matter of fact, despite the local context in which the gallery is rooted, Zanini Arte has always proven to be ahead of its time, becoming one of the first galleries experimenting with Crypto-art. In particular, Zanini's enlightened vision consisted in considering NFTs and Crypto-art as a challenge to reach new frontiers and as an opportunity for the art gallery to grow and renew, rather than a threat for its business.

Zanini Arte's entrance in the Crypto-art domain is strictly related to the Italian artists duo **Hackatao** — composed by Sergio Scalet and Nadia Squarci — who were already represented and supported by Zanini Arte in their physical productions such as painting and sculpture. Despite the canonical validation process they went through

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[183] Brittany CHANG, *A NYC gallery just became the first to display crypto art physically — see how it works*, Businessinsider.com, 2021.
[184] ZANINI ARTE, *Zanini Arte*, Zaniniarte.com, n.d.

in the art system[185], Hackatao have always embraced Crypto-art's potential[186] and nowadays are considered both absolute pioneers and founders of the Crypto-art movement at a global level. Zanini Arte basically followed Hackatao in their digital — and then crypto — "turn", starting in 2018 with the interaction between physical and digital works of art realized by the artistic duo, which were proposed by the gallery in various occasions such as art fairs throughout 2018 and 2019, before Crypto-art went mainstream. For instance, *Art Never Dies* — tokenized on SuperRare — a work on canvas connected to its animated digital "Doppelgänger" through augmented reality was displayed for the first time at Zanini Arte's solo exhibition *The Truth is* in December 2019[187]. Therefore, Zanini Arte was at the cutting edge of new artistic practices even before NFTs went viral and continued its journey between the physical and digital domains, even making its debut in the Metaverse. Zanini Arte was one of the protagonists of **BOOming Contemporary Art Show**, the first Italian Contemporary Art Fair in the Metaverse in January 2022, which was followed by a physical edition in May 2022 in Bologna. Even in the Metaverse's context, the gallery stood out for its innovative approach, displaying actual Crypto-artifacts — such as animated works of art — whereas other galleries limited themselves to exhibit physical objects which were merely digitized and transposed in the digital domain.

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[185] Andrea CONCAS, *Hackatao: i più famosi Crypto Artisti NFT Italiani*, Artrights.me, 2021.
[186] HACKATAO, *BIO*, Hackatao.com, n.d.
[187] ZANINI ARTE, *Crypto Art*, Zaniniarte.com, n.d.

Figure 36 –
*A view of Zanini Arte's stand in the Metaverse of BOOming-Contemporary Art Fair
(personal screenshot).*

In order to describe how Zanini Arte is reshaping the art gallery's role in the
Crypto domain, it should be noted that, as of today, collectors of physical works of
art — who usually interact with art galleries — and crypto-collectors still represent
two separate categories: usually "standard" collectors are — mainly due to a
technological block — "outsiders" with respect to the Crypto-art's field. It is exactly
in response to this *marginalization* of collectors that Zanini Arte is moving forward,
favouring NFTs' main principle of **democratization**. During the interview, Sandie
Zanini emphasized how the aim of Zanini Arte is to enhance the gallerists' role as
educators and **advisors** towards collectors, allowing them to access the digital
dimension, despite their lack of acquaintance with the newest technologies. In
particular, she stated:

> A gallery should maintain its own identity; it should evolve through time, understand
> the new needs, the changes in terms of paradigms or media, but should always keep its
> essence of **advisor** and **popularizer**. Thus, the role of the gallery is to offer a concrete
> help to collectors, accompanying them into the digital revolution and teaching them
> how to be autonomous[188].

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[188] Alfredo ZANINI, Davide ZANINI, Sandie ZANINI. Interview. Conducted by Laura Coppelli. 22
February 2022.

Zanini Arte's purpose is therefore to provide collectors with a concrete support, not only in technological terms - for instance, helping them configuring a wallet, or teaching them how to use online marketplaces[189] - but also in aesthetic and artistic terms. The issue of quality has been addressed multiple times throughout this dissertation as one of the main *criticisms* of Crypto-art, a "boundless sea"[190] where specific artistic knowledge and experience are becoming more and more essential in order to orient oneself towards the best investments both in qualitative and economic terms. Zanini Arte aims exactly at offering its historical and artistic competence for the sake of helping collectors in their Crypto experience.

Clearly, before concretely supporting the choice of investments, it is necessary to preliminarily introduce art collectors to Crypto-art in the first place, which might be still unknown or confusing to those who usually deal with radically different forms of art. To this extent, Zanini Arte offers an extremely interesting approach, which lies in the **interaction between physical and digital** and consists in a sort of *gradual transition* from one to the other. As a matter of fact, as Sandie Zanini claimed, the gallery is relying on artists who pair digital and physical artifacts, where the digital work does not correspond to a mere digital copy of the physical counterpart, but on the contrary consists of the latter's *evolution*, its "continuum"[191] in the digital world, with the aim of educating collectors to perceive the digital work as an *added value* to the physical artifact. As of today, besides Hackatao, other artists who respond to this interest towards the physical and digital combination and are represented by Zanini Arte are **Giovanni Motta** and **Renzo Nucara**.

In conclusion, Zanini arte firmly believes that physical and digital art can go hand in hand instead of competing against one another and that, just like contemporary art did not erase ancient art, they will coexist and mutually elevate[192]. This gallery's idea corresponds to a great example of successful integration between physical and digital which are both always characterized by an extreme research for quality — which is very much needed in the crypto field — and provides an idea of

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[189] *Ibidem*.
[190] CAMBI, *Dystopian Visions: a curated NFT digital art collection*, op. cit.
[191] Alfredo ZANINI, Davide ZANINI, Sandie ZANINI. Interview. Conducted by Laura Coppelli. 22 February 2022.
[192] *Ibidem*.

how physical art galleries could position themselves with respect to the digital realm in view of a future which will be "more and more phygital"[193].

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[193] Andrea CONCAS, *Crypto arte*, op. cit., p. 4.

3.3 The Artist's approach. Interview with artist Federico Solmi

Federico Solmi (Bologna, 1973) is a visual artist living and working in New York. His production ranges from more traditional media, namely drawing, painting, sculpture and performance art to innovative digital art practices such as **VR** and **video animation** which led to his entrance into the latest technological revolution of Crypto-art. Thus, his production constitutes an incredibly eclectic artistic work featuring the dichotomy of tradition and innovation, which is particularly relevant with respect to the analysis proposed in the present dissertation. Solmi's debut in the NFTs' field was actually a *natural progression* of his work, as it is possible to identify him as a **forerunner** of innovative artistic practices that were — only in recent times — labeled as *Crypto-art*. Despite the variety in terms of the use of media, Solmi's works of art have always shared the unquestioned presence of a **narrative dimension**, a *fil rouge* that bonds all of his works together and contributes to the establishment of an extremely consistent artistic output and career.

Solmi arrived in New York in 1999 with the aim of narrating the world surrounding him through an unconventional approach; starting from a research on drawing, he realized that the best medium to express his message was the one of **video animation**[194]. The experimentation on video animation carried out by Solmi was strictly related to his interest towards the world of **gaming**. Already back in 2003, Solmi had the intuition of how video games — which represent a constant reference-point for Crypto-art and NFTs, as formerly mentioned — could become *functional* to contemporary art's productions[195], demonstrating how the artist was ahead of his time and already an advocate of Crypto-art's main principles way before NFTs' implementation. His first video-animation — *Another Day of Fun* (2004) — was based on the artists' work on the popular video game **Grand Theft Auto** and enshrined a turning point in his production and career, as, from that moment on, he started building his own game assets[196], which were progressively introduced and presented in various cultural institutions and public squares all over the world, such as the impressive and majestic case of Times Square in 2019.

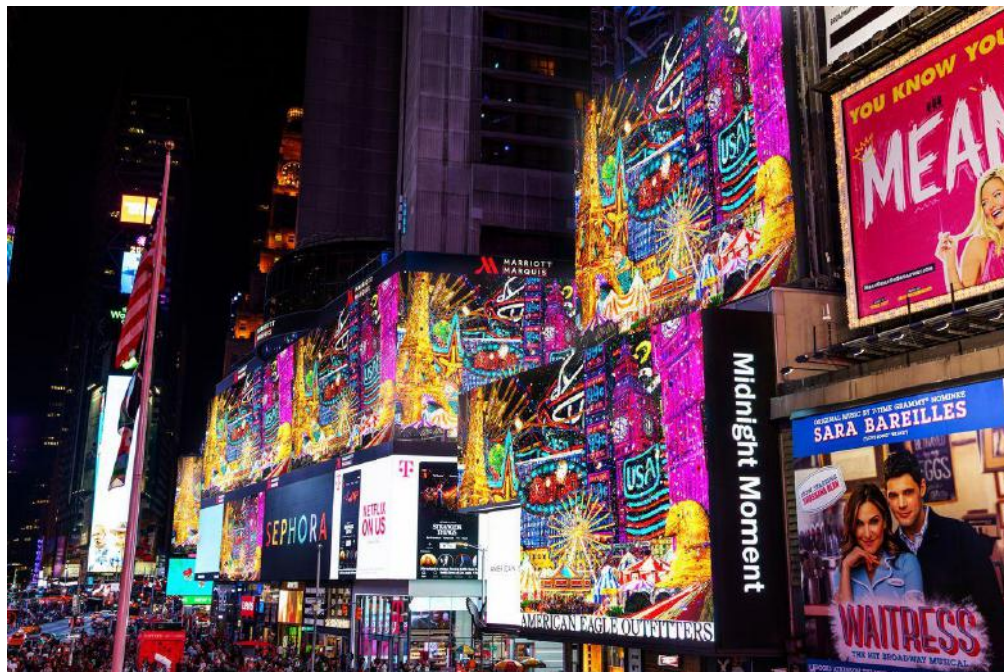[194] Federico SOLMI. Interview. Conducted by Laura Coppelli. 16 June 2022.
[195] *Ibidem*.
[196] *Ibidem*.

Figure 37 – **Federico Solmi**, *American Circus*, 2019. View of Times Square.
(Source: Artribune.com)

Basically, Solmi's art, both in terms of innovative media and imagery — which is distinguished by its eye-catching, impactful colors and aesthetics and its surprising and unsettling characters — turned out to be perfectly *suitable* for Crypto-art's artistic language and in complete accordance with Crypto-communities' preferences and aesthetic tastes. As a matter of fact, it was actually thanks to a Crypto-art's collector — who was also collecting Solmi's pictorial works — that Solmi concretely considered NFTs as an option for his production. Interestingly, it was a collector, an *active* element of the community, who first recognized Solmi's potential in the revolutionary crypto domain in 2019. In particular, the collector is known as **TokenAngels** and is considered the Italian "**whale**" of NFTs[197, 198]. In fact, despite being an established artist in contemporary art's domain — the latter often being rejected by Crypto-communities — Solmi gained immediate recognition among Crypto-communities, probably because they identified him as a **pioneer** in the NFTs'

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[197] Amelia TOMASICCHIO, *Interview with TokenAngels, the Italian whale of Non Fungible Tokens (NFT)*, Cryptonomist.ch, 2021.
[198] The term "whale" in the crypto domain identifies collectors who possess extremely large amounts of coins of a certain cryptocurrency.

realm, ensuring himself a spot in the **SuperRare**'s exclusive community, which is nowadays almost inaccessible.

Despite the perfect match between Solmi's artistic practice and Crypto-art, his NFTs do not correspond to mere transpositions of pre-existing works into the digital realm and the blockchain system, but instead they were the product of an intense process of evolution and innovation. For instance, the main challenge faced by Solmi with respect to NFTs was to limit his long narrations — which were basically films of four to five minutes — to the twenty/thirty seconds of video loops and animations. In this regard, Solmi stated:

> In just twenty or thirty seconds I had to create something impactful, direct and minimal. To me, this new way of working corresponded to a crucial moment of artistic growth. NFTs helped me reinventing a more essential and minimal world which I strongly desired and that was missing in my previous productions[199].

Therefore, his NFTs projects correspond to a further evolution of his work, thus confuting the stereotype according to which making NFTs corresponds to an easy and almost effortless activity and identifying the digital realm not only as a new sales area, but also as a *new space for artistic experimentation*.

If on one side Solmi's use of traditional media is strongly present also in his digital productions, at the same time his exploration of digital media such as animation and VR technology influenced his physical productions as well, giving life to a *reciprocal exchange* between tradition and innovation. As a matter of fact, after the encounter with digital media, his drawings started presenting characteristics which are typical of the digital domain. For instance, some of his latest drawings feature subjects which are represented as 3D models with "digital skeletons" — that only pertain to digital technologies — whilst being surrounded by a sort of *aura* which kind of reminds of sacred representations typical of traditional art, constituting a perfect combination of tradition and innovation, holy and digital.

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[199] *Ibidem*.

Figure 38 – **Federico Solmi**, **Melancholia (III)** Portrait of Elon Musk and Kim Kardashian, 2022. Soft pastels, white pen and ink, gouache on wood panel 60 x 84 x 1.25 inches, 152.5 x 213 x 3 cm.

Figure 39 – **Federico Solmi**, **Melancholia (III)**, detail, Portrait of Elon Musk and Kim Kardashian, 2022. Soft pastels, white pen and ink, gouache on wood panel 60 x 84 x 1.25 inches, 152.5 x 213 x 3 cm.

3.4 The Entrepreneurial approach. Interview with Andrea Concas

Andrea Concas is an Italian **Art Entrepreneur**, **teacher**, **speaker** and **popularizer**[200], whose multifaceted approach, starting from the establishment of his first startup's activity in 2016, has always revolved around **Art** and **Innovation**[201] with a particular attention to technology and digital platforms in the visual art field. His miscellaneous entrepreneurial activities include the Startup **ArtBackers** — the first online platform at a European level offering support for artists in the creation of great works of art accessible to everyone[202] — **ArtBackers Agency** — the first cultural marketing and communication agency supporting cultural institutions in the Web 3.0 domain[203] — and **Art Rights** — the first platform for artworks' online certification through Artificial Intelligence and **blockchain technology**[204]. Moreover, Concas is also the founder of **The AB Gallery** — a network of art galleries — **ProfessioneArte.it** — the first online community dedicated to art experts and their professional development[205] — and **ArteConcasBOT**, the first Art ChatBOT[206].

Among all these records and achievements, the most relevant in regard to this dissertation's topic is certainly **Art Rights**. Art Rights corresponds to the first platform created for the support, management and **certification** of works of art[207]. Since 2016, Art Rights has exploited blockchain technology in order to safely certify both *physical* and *digital* artworks, providing artists with a sort of "passport" of their works[208]. Art Rights basically *anticipated* the relevance of blockchain technology in relation to art, becoming a **pioneering platform** in terms of innovation in the art field. In particular, Concas' platform used to employ **Bitcoin** blockchain, specifically the TIMESTAMP's validation method[209], which made it possible to verify and demonstrate the exact time at which Art Rights' certificates were issued[210]. Clearly, Art Rights had to respond and evolve in the wake of the newest innovations and

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[200] ANDREA CONCAS, *Who is Andrea Concas*, Andreaconcas.com, n.d.
[201] Andrea CONCAS, *Crypto arte*, op. cit., p. 5.
[202] ART BACKERS, *About - Become an Art Backer!*, Artbackers.com, n.d.
[203] ART BACKERS AGENCY, *Art Backers Agency*, Artbackers.agency, n.d.
[204] ART RIGHTS, *Faq Art Rights*, Artrights.me, n.d.
[205] PROFESSIONE ARTE, *ProfessioneARTE.it*, Professionearte.it, n.d.
[206] ARTE CONCAS, *Arte Concas Bot*, Arteconcas.it, n.d.
[207] *Ibidem*.
[208] Andrea CONCAS, *Crypto arte*, op. cit., p. 71.
[209] Andrea CONCAS. Interview. Conducted by Laura Coppelli. 12 April 2022.
[210] ART RIGHTS, *Faq Art Rights*, op. cit.

improvements pertaining art and technology, especially NFTs and Crypto-art's "boom".

First of all — as Concas explained during the interview — the platform was updated and implemented with the possibility of creating NFTs; secondly, it expanded its target not only to artists — the initial recipients of the service — but also to collectors[211], who are now offered professional support in the management and valorization of their collections[212]. The decision of addressing Art Rights' service to collectors as well, was made with the aim of establishing a network, or better, a **community** of both artists and buyers interested in the Crypto domain. The notion of community — a cornerstone of Crypto-art's system — also lies at the core of Concas' latest project concerning Crypto-art, **The NFT Magazine**. As the name suggests, the project consists of a **digital magazine**, the first NFT magazine ever created, whose reading is reserved to the owners of an NFT, which also corresponds to the cover of the magazine itself[213]. Each month, the magazine's cover features major international Crypto-artists"[214], for instance, **Hackatao** — featured in the first issue of the digital magazine with a tribute to Lucio Fontana — or **Refik Anadol**, who were both already mentioned in the previous chapters of this dissertation.

What is extremely interesting and groundbreaking about The NFT Magazine's project is that the buyers of the concerned NFTs progressively form a community, a sort of "readers club", that actively participates in the decision making process related to the creation and the editing of the following numbers of the magazine. Basically, buyers obtain the exclusive *privilege* of becoming actual creators of the issues, deciding the artists they want to celebrate on the cover and the contents they want to be treated. Consequently, the magazine becomes a complex **tool** to achieve privileged knowledge and the community's exclusive benefits, which extend way beyond the mere idea of possession of a rare piece of art.

The NFT Magazine has achieved resounding success — considering that the first eight issues were all sold out — clearly establishing an **industry first** and an extensive revolution for the publishing domain, based on a great participating

[211] Andrea CONCAS. Interview. Conducted by Laura Coppelli. 12 April 2022.
[212] ART RIGHTS, *Collezionisti*, Artrights.me, n.d.
[213] Andrea CONCAS. Interview. Conducted by Laura Coppelli. 12 April 2022.
[214] THE NFT MAGAZINE, *The NFT Magazine homepage*, Thenftmag.io, n.d.

community[215]. The NFT Magazine is a long term project, which, as declared on the roadmap present on its website, is expected to extend to the physical domain as well, as when the first twelve issues will be sold out, they will be printed and sent to the collectors[216]. Therefore, in the long run, The NFT Magazine's project turns out to be perfectly in line with Concas' prevision of a future which will be increasingly "Phygital", a condition that combines both physical and digital assets[217]. In this regard, during the interview, Concas stated:

> We will move towards a **Phygital** future [...] in which sometimes physical and digital will be aligned, sometimes they will be separated, but it is necessary to acknowledge that NFTs are not only works of art, they are **tools** on which artists still need to further investigate. We cannot limit ourselves to think of Crypto-art's works as mere transpositions of a physical work of art in the digital realm[218].

In conclusion, Concas' visionary attitude has proven to be once again successful in interpreting new dynamics and innovations in the art field and will certainly continue to pursue this path in a future that continually presents new challenges which will lead to "new opportunities, new balances and new visions in the long term"[219], such original and unseen interactions between physical and digital assets.

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[215] Andrea CONCAS. Interview. Conducted by Laura Coppelli. 12 April 2022.
[216] THE NFT MAGAZINE, *The NFT Magazine Roadmap*, Thenftmag.io, n.d.
[217] Andrea CONCAS, *Crypto arte*, op. cit., p. 70.
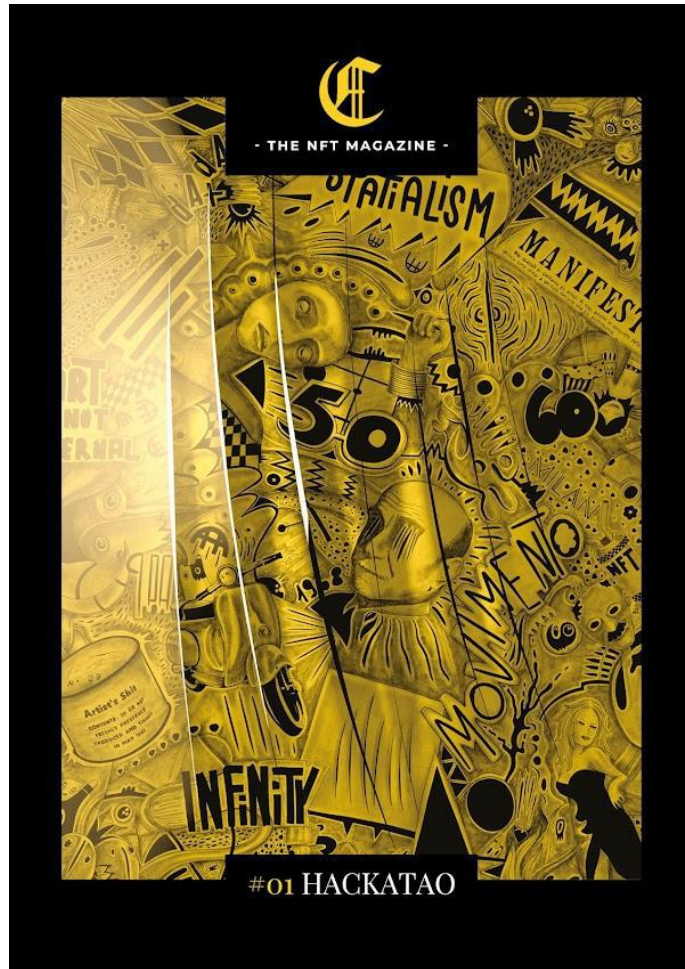[218] Andrea CONCAS. Interview. Conducted by Laura Coppelli. 12 April 2022.
[219] *Ibidem*.

Figure 40 – *The first issue of The NFT Magazine featuring Hackatao*

(Source: Opensea.com)

CONCLUSIONS

The aim of the present dissertation was to offer an overview of the phenomenon of Crypto-art and NFTs through a hybrid and combined approach of different disciplines such as information technology and aesthetics. The idea of a dual analysis was driven by the need of offering a comprehensive study on the phenomenon that did not take into account NFTs only as financial tools — the most inflated aspect in the domain of research — but also from an artistic perspective through an in-depth analysis of Crypto-art's aesthetic nature, which is often neglected.

The thesis was put into writing considering art experts, or cultural operators in general, as possible target readers. With this in mind, the first technical part was aimed at clarifying the main concepts related to blockchain technology and its functioning through a clear and accessible language with careful consideration of the terminology related to the Crypto domain, which is often a matter of controversy and confusion. The attention to vocabulary was pursued also in the following sections of the work, with the purpose of providing readers with a distinct definition of Crypto-art from an artistic point of view as well. Moreover, one of the main goals was to position Crypto-art in a wider context that also took into consideration the traditional art system, marking, throughout the whole work, the intersections between the two.

One of the main ideas supported in the present thesis is that Crypto-art's actual revolutionary aspect lies in the upheaval of the concepts of originality and copy in the arts' domain and its consequent democratization of aesthetic enjoyment, rather than in terms of artistic innovation. In fact, it was argued and proved that, despite often being characterized as a radical alternative to traditional forms of art, Crypto-art has more features in common with canonical art than other physical contemporary art practices such as installation art.

Finally, through the various proposed examples it is possible to infer that Crypto-art and the traditional art system have reciprocally influenced each other and that canonical institutions such as auction houses actually played an essential role in the upgrade of NFTs from a niche movement to a mainstream phenomenon. This

conveys the idea of the presence of a mutual exchange between tradition and innovation both from the artistic and systemic perspective.

The interviews to various actors of the cultural domain were carried out both with the aim of analyzing the art world's concrete response to NFTs' "disruptive wave" through the presentation of initiatives of excellence in the art's field, but also to open up points of reflections on possible future interactions between physical and digital, tradition and innovation.

In conclusion, despite still maintaining some separate dynamics, it is possible to foresee that in the future we will witness an increasing synergy between the physical and digital domains. Nevertheless, Crypto-art still has to face many present challenges, such as the environmental issue that paradoxically marks NFTs as an underdeveloped practice with respect to the world's current issues. Hopefully, the incredible speed at which technology evolves will allow Crypto-art to keep up with the times and continue its artistic experimentation in the perspective of a sustainable development.

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