NFTs: The future of the artworks transaction.

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I hereby declare that the work submitted is mine and that where I have made use of another’s work, I have attributed the source(s) according to the Regulations set in the Student’s Handbook.

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Abstract

This dissertation is part of my Master of Art Law and Arts Management at International Hellenic University. The motivation for this research was given to me through the course Digitality and the Arts, where we mentioned various concepts but also the evolution of technology that has greatly influenced art. Living as an artist in this age of technology, it was impossible not to wonder not only how I could evolve my work and experiment with new media, but also how I could move it using digital technology. Day after day I see and hear more people occupied with NFTs, especially in the art world. For the last 5 years, I have been employed at the Art Thessaloniki International Contemporary Art Fair, something that makes it impossible for me not to be constantly updated about what is occurring in similar exhibitions globally.

There are already enough Art Fairs that have started introducing NFTs. I would like to thank my supervisor Dr. Themis Veleni for her mentorship, useful comments, understanding, and motivation throughout the research and writing process.

At this point, I would like to thank Dr. Irini Stamatoudi for the useful help with NFTs and copyrights of artworks.

I would also like to express my appreciation and sincere gratitude to my family who is with me in all my steps from childhood by being supportive and giving me their love selflessly. Moreover, I would like to thank my friends, who were with me during this beautiful journey.

**Keywords:** digital art, NFT, blockchain, digital platforms, artworks transaction

Pinelopi Akritidou
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Preface

Technology, and especially digital technology, has affected almost every activity of the individual in modern times. It was therefore inevitable to influence the field of art as well. There are many currents associated with this trend in every art form. For example, music was one of the first to adopt electronic media for its production and transmission, but other arts followed to a greater or lesser measure.

The visual arts in a large part are now expressed and circulated through digital technology. Various new currents emerged with the Techspressionism movement at the forefront, which is perhaps one of the most interactive but also the most growing. The digitization and the digital production of a work of art are followed in its entirety by its digital distribution. In this last part, the NFTs appear, and as it seems they play and will play a very important role.

So what are NFTs? Do they have a place in the environment of contemporary art? How much can they help each artist? Is it something that came to stay? For instance, is it something that has a future? How did it occur? What was the need for this? What technology is used to create them?

To these and some other questions that arose when I first learned about NFTs, I will try to answer this dissertation. NFTs are appearing in our digital age and seem to be directly related to digitality and the arts to such an extent that they may be one of the few derivatives of blockchain technology that will be able to be maintained in the future.

NFTs (Non-Fungible Tokens), concern the transaction, validity, and authenticity of works of art uniquely, limiting any legal disputes that prevailed in the past and concerning works of art. This is mainly due to the blockchain technology on which they are based, as well as a host of other applications. For example, cryptocurrencies, agreements, sales, etc. The objective of this dissertation is to get to know and analyze as much as possible the NFTs and the role they play in contemporary art.
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Chapter 1: Introduction

In recent years the technological revolution has affected many aspects of our lives. Digital technologies have contributed a lot to this, where they have allowed saving time and space, concerning analogue technologies. People today can not imagine that there will be a day when they will not have access to some form of digital technology. Blogs, podcasts, e-newspapers, or streaming of TV or radio programs, etc. are great examples (Mezei, 2010: 1-2).

The impact of technology especially digital in our daily lives tend to become part of ourselves. The facilities it provides push the person to an automated reaction to specific stimuli that it is unable to process, filter and limit. In short, technology becomes second nature and therefore follows the same rules of automation of our human dimension.

“Everyone knows the Mona Lisa and Michelangelo’s David – or do they? We possess so many reproductions of them that maybe we feel that we know these works, even if we haven’t ever visited Paris or Florence” (Freeland, 2001: 133).

“The artist Boykins recently sold the same pieces for thousands of dollars each, thanks to an emerging technology that brings upheaval to the rules of digital ownership: NFT or Non-Refundable-Tokens. NFTs— digital badges that are connected with assets that can be bought, sold, and negotiated — give the possibility to artists like Boykins to benefit from their work easier than ever before. “In the beginning, I did not know if this was trustworthy or legal”, Boykins says, who uses the digital server “BLACKSNEAKERS” and who has sold more than 60.000 dollars in artwork NFT in the last six months. “But to see digital art to be bought at these prices is quite incredible. It gave me the courage to continue” (Chow, 2021: n.p.).
Chapter 1.1: Background of NFTs

If someone hears the term CryptoArt a lot of different things can go through their mind. This year though, in 2021, it would not be weird at all if the first thing that came to one’s mind would be the NFT. This happens because this new form of technology combines the technology that bases on time – blockchain with art. So what is an NFT and where did it come from?

NFT or Non-Fungible Tokens are cryptographic tokens that have been created with blockchain technology, and more specifically are based on and designed on Ethereum. NFTs can be traded like Bitcoin, once they are first cut. What is important to note is that while Bitcoin can be exchanged, NFTs cannot. For example, if one wants to exchange some Bitcoin cryptocurrencies with another, then in this case both parties have an asset of the same value. On the other hand, when we say that NFTs are non-interchangeable, we mean that each discrete is original, that is, there is only one. Having one in one's possession, this unique piece-distinct, can at any time prove that he is the owner and in fact that he owns the property rights of the specific digital work. This is exactly what happened in the Beeple case with the well-known project "Everyday — The First 5,000 Days". Through the internet, anyone can see and enjoy this work, but the most important thing is that only one has it, the one who made the purchase of this particular NFT, which in turn is highly connected with the original digital project (Kugler, 2021: 19).

The first NFT or Non-Fungible Tokens first appeared in 2011 with bitDNS. The basic thought was to have a connection between a cryptographic credential that was created in the blockchain Namecoin with the sectors .bit.

Between 2012 and 2013, Coloured Coins were introduced, which offered a lot of the capabilities of bitcoin. A characteristic capability was that some metadata could be incorporated in Bitcoin transactions as a kind of registry for the storage of said information/data.

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1BitDNS is the cornerstone of compartmentalized internet. In this network, each user has the freedom to do whatever they want and the URL (Uniform Resource Locator) is decentralised. The purpose of BitDNS is to enable the merging of key public chains (CoinMarketCap, 2021: n. p.).
If we have a look back in history, the first time that Coloured Coins became famous was from a publication in 2012 from Yoni Assia. Sometime after that Meri Rosenfeld researched this topic.

The important thing is that Coloured Coins set the foundations for the creation of NFTs, as they offered the possibility to represent different assets like real estate, coupons, stocks, collectables, and more (Portion Blog, 2021: n. p.).

The story of NFT and its inventor Kevin McCoy began on May 3, 2014. As of today, the unique work of art "Quantum" is available for $7 million. He and his wife Jennifer have established themselves as world-class digital artists for many years. As McCoy says, it is a fact that NFTs have become an important part of art and it seems that they will continue to be for a long time. The Crypto Art category was initiated by cultural phenomena such as CryptoPunks, Rare Pepe, and CryptoKitties. These "works of art" were notorious for the virus network effect and the desire to pay a fortune to acquire these works. For example, the Rare Pepes is a meme with the character of a frog that has gained an intense fanbase over the years. That which started as a comical character named Pepe the Frog has since become a steady presence on the internet as one of the most popular memes. Also, the CryptoKitties NFT fell to the floor using ERC721. It is a virtual game that is based on blockchain allowing its players to adopt, breed, and trade virtual cats using Ethereum. The idea of NFTs arose from the so-called "colour coins" that were first issued on the Bitcoin blockchain from 2012 to 2013, from automobiles to real estate to stocks and bonds. The Spells of Genesis game developers were not only a pioneer in the issue of in-game assets on the blockchain via Counterparty but also one of the first to launch an ICO. The developers funded the development of Counterparty by introducing their in-game currency called BitCrystals. Counterparty has partnered with the popular trading card game Force of Will to

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2 It's a type of Ethereum. It has the potential to be available at a different value than another Token, especially if included in the same smart contracts. Its value may vary due to its rarity, age, etc. This standard serves as an API (Automatic Programming Interface) in smart contracts, especially for NFTs. A buyer has the right to transfer, for example, some distinct from his account to another (Ethereum.org, 2021: n. p.).

3 ICO (Initial Coin Offering) concerns the cryptocurrency industry. It is considered a basic principle, in case one wants to enter the process of creating a new cryptocurrency or raising some funds. It is essentially an application that helps him in this case (Initial Coin Offering (ICO), n. d.: n. p.).
postcards on the Counterparty platform. Entry into the ecosystem where they had no experience with blockchain or cryptocurrencies has shown the value of putting such assets on the blockchain. Memes entered the counterparty platform in October 2016. What started as a cartoon character called Pepe the Frog has grown into an internet sensation as one of the most popular memes. CryptoArt was born on the Rare Pepe Wallet, and this was the first time creators around the world could submit and sell their artwork. As the number of rare Pepe transactions increased, Larva Labs creators John Watkinson and Matt Hall created unique characters generated on the Ethereum blockchain. The project name Cryptopunks refers to experiments with Bitcoin in the 1990s and can be called a hybrid of ERC721 and ERC20\(^4\). Enter the ERC721 intended to be the standard for NFTs on the Ethereum blockchain. The Cryptopunks works are composed of 10,000 unique characters that were created in blockchain Ethereum. The partnership has generated a $1 million deal in a beautiful piece by CryptoArt called The Forever Rose. Mr. Abosh raised his stakes further when he started using the Ethereum blockchain and his blood combination in a project called "IAMA Coin". The portion has established itself as an NFT platform that connects NFTs, DeFis\(^5\), and DAOs\(^6\) that hold $PRT\(^7\) governance tokens for which the community is responsible (Portion Blog, 2021: n. p.).

\(^4\)This type is the basic standard, where it allows the user to use the API, as in ERC721, for tokens that exist in smart contracts. This allows the acceptance of tokens, so that there can be a transaction by a third party (Vogelsteller & Buterin, 2015: n. p.).

\(^5\)DeFi (Decentralized Finance), is about finance and some services, and is aimed primarily at those who want to get involved with Ethereum. It is an application that helps the circulation of electronic money and makes it easier and more secure (Decentralized finance (DeFi), 2021: n. p.).

\(^6\)DAOs (Decentralized Autonomous Organizations), essentially help you collaborate more easily with others, from one end of the earth to the other. In a sense, it is a business that operates online and is not managed by just one person. The treasuries it holds are open and accessible only to those who have received the necessary approval from the team. For each decision, the group votes (DAOs), 2021: n. p.).

\(^7\)Portion is one of the most well-known and trusted applications on the internet, which can bring together creators and buyers who use Blockchain technology. So they have a better chance of doing business, buying and selling, and owning works of art and more, with absolute solvency (Portion.io, n. d.: n. p.).
In 2018 and 2019, the NFT ecosystem grew even more. Over a hundred NFT projects have been implemented or are in the works. OpenSea, Rarible\(^8\), and SuperRare\(^9\), for example, are booming NFT markets. As the NFT market incorporates decentralized financial services such as betting, lending, and borrowing, we are seeing a rapid increase in NFT functions. Christie’s auction of Beeple NFTs “First 5000 Days” is a watershed moment for the NFT sector. The widely publicized sell-off marked the first time that crypto investors, crypto tourists, and arts organizations became aware of the NFT. NFTs have evolved into a phenomenon that cannot be dismissed. The Ethereum gas crisis, in which transaction costs were so expensive that users sought appropriate alternatives in projects like Near, Nervos, Cosmos, and Solana, pushed the team to consider measures to enhance performance. Moving NFT projects to the blockchain with lower fees and faster block times, such as xDAI\(^{10}\), has proven to be a popular alternative. Axiom Zen, the founder of Crypto Kitties, was acutely aware of the high expense of hosting Crypto Kitties on the Ethereum blockchain. To give a better user experience, they decided to adopt the FLOW\(^{11}\) blockchain. Enjin and Wax have also grown in popularity as NFT materials (Merville, 2021: n. p.).

Non-fungible tokens are one-of-a-kind and may be used to represent any digital asset on the Ethereum blockchain, making them rare, verifiable, and valuable. The introduction of NFTs has given artists and creators a new platform to display their work or collections. As a result, a revolution is sweeping the art world, allowing artists to create and commercialize their work while providing collectors with complete transparency into the authenticity and provenance of their purchases. Digital art, collectables, a creative extension of the music, a synergy between all three, or wholly new and uncharted compositions are all examples of NFT assets. Using NFTs, creators continue to push the boundaries of creativity in new and novel ways. Every time the NFT changes hands on the secondary market, the new owner and the price paid are immediately recorded on the blockchain, which is a decentralized digital ledger of

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\(^8\)Rarible is an NFT market platform (Rarible: NFT Marketplace, n.d.: n. p.).
\(^9\)SuperRare is a platform where you can buy or sell artworks. It is also based on Ethereum (About | SuperRare, 2021: n. p.).
\(^{10}\)xDAI is a genius amalgamation of POA’s sidechain, tokenbridge technology, and MakerDAO’s DAI stablecoin (Block explorers, 2021: n. p.).
\(^{11}\)Flow is a new generation blockchain and is used mostly in video games, applications etc (Flow: the blockchain for open worlds, n. d.: n. p.).
transactions that no one can change and that everyone can view. The notion is that by making these certificates of authenticity publicly viewable online, NFTs can ensure the origin of any item to which they are linked.

Chapter 1.2: Background of Blockchain

The history of Blockchain does not begin from 2008 as many believe, from Satoshi Nakamoto for the Bitcoin, but from 1980. Haber, a cryptographer, and Stornetta, who was a physicist, worked together as researchers at Bellcore in Morristown, New Jersey. Conducting years-long research, and with the development of technology, they discovered that by 1989 a big percentage of houses in the USA had a computer. And so 2 fundamental questions emerge. The first question was more theoretical and was about how an individual could use a file in their computer from their own home? The second question and the most important is how could we be sure even for those that we know from the past without it being necessary to ask for help and proof from a central regulating body that has the file in its possession or to save a file? And so they were led to a big problem they had to solve.

During their research, it was proven that it was very difficult for them to actualize and create a register that would be composed of digital files without the need for a central administrator.

When they were almost ready to throw the towel believing that they could not find the solution, Stornetta told Haber a crazy idea that came to his mind in one of his outings. The basic idea was the base structure of blockchain, but at the same time, the registry that will exist will also be encrypted. The records are connected inside from one square of exchanges to the following, and after that numerous associated duplicates of the record are conveyed, permitting for a record that requires a few believe in an calculation but not in a central administrator (Whitaker, 2019: n. p.).

In 1990 they finally presented their work and in 1991 they published it. From then on they registered their patent and legally they had the right to be called partners. In 2003, they finally got the marketing authorization from Bellcore and founded the company Surety.

To ascertain that the files that are created are also being stored Surety, every Sunday published in the New York Times in the section “Notices” an algorithmic code. This
code could only be checked by a computer scientist to ascertain if there is any violation.

Unfortunately, in 2004, the company lost its patent license. It was the first time in 2008, where the name Satoshi Nakamoto was heard. Their real name maintains until the time of this writing unknown, as there are enough suspicions that most likely they are a team and not a single person. Satoshi Nakamoto published research with the title “Bitcoin: A Peer-to-Peer Electronic Cash System”. This research described a peer-to-peer network, that would use an electronic currency, known to all bitcoin (FAQ-Bitcoin, n. d.: n. p.).

Basically, Nakamoto adopted the idea of Haber and Stornetta, only that he incorporated also the financial motivation. Even so, its path is so volatile that in 2010 there was someone who tried to make a transaction. And until then, 10,000 Bitcoin was equal to approximately 30$, in 2018 the price had reached 82 million dollars.

Blockchain technology has placed the foundations not only on a financial level but also on a social one. This makes utilizing conveyed records expanded with computational highlights such as cash (cryptocurrencies), programmable contracts (e.g., shrewd contracts), and organizations made of computer program (DAOs, or distributed autonomous organizations) (Wycislak, 2021: 1). Based on its structure that gives the possibility to all users to be equal, providing them safety and trust to the internet.

Chapter 1.3: How they are connected

An NFT – non-fungible token – could be a advanced resource that speaks to a real-world item like, for case, the Charlie Bit My Finger video that sold for £500,000 back in May (Conti, 2021: n. p.).

The distribution of NFTs happens through the internet, and usually, their transaction is done with cryptocurrency as their technology is the same. year after year they become more and more known and this is due to the big percentage in the distribution of digital artworks.

Here a fundamental question is set. Why would someone get in the process to buy an NFT, that in this instance an artwork, even though one could simply do a screenshot or simply download the image? because even if one does it they would not be the real
and sole owner. The privilege that the technology of Blockchain offers and as a result that of the NFTs, is that in this situation the NFT allows its buyer to own the initial object. “Not only that, it contains built-in authentication, which serves as proof of ownership. Collectors value those “digital bragging rights” almost more than the item itself” (Conti, 2021: n. p.).

Proponents emphasize that NFTs are traceable and each NFT contains a unique serial number or "fingerprint" (also known as a hash) that cannot be duplicated. Since the hash is an encryption key generated from a particular digital file, the hash matches only a particular copy of the content. The NFT owner can use the hash to verify that the NFT owns a copy of the generated linked content. In other words, an NFT is a property record for that match stored in the blockchain, and the property can also be transferred to another person stored in the blockchain. A complete record of titles, payment history, and information about the underlying asset could be securely stored in this new form of decentralized database called the Blockchain (Dreben & Pennington, 2021: n. p.).
Chapter 2: Digitality and its impact on arts

The evolution of technology during the 20th century was dramatic in all areas of human cognition. However, what accelerated this development was the influence of electronic science and the technology of computers and networks. The predominance of digital technology in the field of electronics over that of analogue is not so much due to its superiority as a technology but to the dramatically easier data processing that it offers and its extremely low cost (Karatzias, 2020-2021: 6). The rapid development of digital technology, of which computers are a part, has allowed its entry and enormous influence in all areas of human activity. All sciences, technologies, arts, but also every field of knowledge operate in our time based on digital technology.

As a result, a large part of the art is created, processed, and transmitted in digital form. Even natural works of art are easily transformed in our time into digital form so that they can be stored, reprocessed, and transmitted with frighteningly high speed. Almost every work of art is stored somewhere, in digital form, ready to be transmitted at the speed of light (optical fibres), from one end of the earth to the other. From the above, it is easy to conclude that digital works and the impact of digital technology on art will continue to grow in the immediate and possibly distant future.

Chapter 2.1: Art in human society, metaverse, and prosumers

Although this may sound outrageous, for quite some time now we have tended to depend on a computer or mobile phone and most recently on a watch that you look at other than your time, your emails, your phones, take pictures, etc. So the wristwatch has been transformed into a modern command centre sceptical. Timex has long offered remote communications between your computer and the observer. Nicholas Negroponte said that using digital media, human ears would be able to work as well as the ears of a rabbit. It is imperative that we realize that as time goes on, digital devices are likely to look completely different from what we know today. The commercialization of computers and their retail sale not only works with Radio Shack and Staples products, but can be extended to Saks as well as Nike, Levis, and Banana Republic. It is quite possible that in the future, CDs can be eaten, and if we think

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further we will be able to live in a parallel universe, now called metaverse, through a computer. In the future, computer screens may be sold by the gallon and painted, CD-ROMs may be edible, and parallel processors may be applied like sunscreen. Alternatively, we might live on our computers (Negroponte, 1995: 209-211).

Marshall McLuhan's famous quote, the medium is the message, is what seems to have provoked the reaction of rationalists over time, as he delves into the old problem of form and content and proposes a new, technological content. This content refers to the medium, i.e. the technological form. Content is, therefore, less important than the medium itself (McLuhan, 1994: 10).

The interaction of arts and technologies creates more and more new and complex forms, the combination of which is endless. Digital gadgets, created almost daily, make our lives easier by eliminating data processing speeds. Digital technology, along with the evolution of materials technology tends to make everything digital, even everyday utensils. Microprocessors are already functional pieces of clothing, accessories and other everyday objects. Industrial design, in addition to targeting functionality, is required to make new digital products more and more attractive and enjoyable to use as much as possible. The internet, from a means of communication and data exchange between people, has today become a network of everything. This was unthinkable and impossible just a few decades ago. Human communication with devices, objects and everything he uses, opened completely new horizons in human society. Today, we are talking about the so-called metaverse, meaning the technological universe that man created, and therefore we try to determine its place in it. Man is called to live from now on having one foot in physical reality and the other in metaverse, the technological universe he created. The speed of data creation, processing and distribution, through fibre optics and other technologies, terribly expands the volume of information we are called to process, resulting in the modern man being increasingly isolated in a narrow hybrid environment, which he creates.

Old divisions that existed in industrial society cease to exist, creating completely new socio-economic conditions that few can follow and process. Thus, the separation between producer-trafficker-consumer ceases to exist according to Alvin Toffler, and now their place is taken by the prosumer (producer and consumer) (Toffler, 1982: 316). This has been possible for the last twenty years, through the technology of 3d
printing, where every consumer can be a potential producer of what he will consume. The impact of this trend, especially on products produced in this way, tends to completely change the world of art as well. In the future, almost every intellectual creation, human or not, will have the need to secure the copyright of its creation, because everything is transformed at a frighteningly fast pace. The first trends in this direction were seen by the need to register the names of websites, blogs, etc., on the internet.

Consequently, the boundaries between art and other human activities are redefined daily, and classical art tends to have primarily historical value. The possession of classical works of art may also function as a means of accumulating value, due to the rarity and difficulty of participation by the general public in them, in the future.

Alice in Wonderland used to say that every day our world seems "weirder and weirder". In reality, however, it is not the world that is responsible for this catastrophe, but the way we see it. This phenomenon is called rear-view ism, as McLuhan calls it (McLuhan, 1994: 18).

And a very important question arises here. Are we facing a period when culture is changing radically, in terms of how it perceives things (McLuhan, 1994: 19)? McLuhan focused heavily not only on film but also on television. New media allows us to no longer think linearly, and this is because the data must be constantly updated.

Social critic Walter Benjamin also states that new media, and in particular cinema, increase our perceptual capacity through various techniques such as close-ups. To be precise, editing, or using fast cuts tends to change the way a person perceives patterns under normal conditions. He emphasizes that cinema can at this point be compared to surrealist painters such as Dali. The average viewer can more easily form an opinion and perceive some things even in Chaplin films than in a work by Picasso. "Movies are more democratic and everyone can understand their meaning" (Freeland, 2001: 135).

The number of moustaches given to the Mona Lisa is incalculable. But this is the least in front of other examples of serious digital manipulation that take place every day. We live in an age where expression is more interactive. It is now known that the largest gallery in the world is the internet. Anyone, and especially artists, with one click, can see for example the Louvre Museum at any time. But the most important thing is that a digital artist can create and exhibit his work in this space called the
internet. "While this may sound like the total neutralization of important cultural images - such as turning every Steichen into a postcard or turning every Warhol into a clip art - the point is that digital allows the process, not just the product, to be transmitted. This process can be the imagination and ecstasy of a mind, or it can be the collective imagination of many or it can be the vision of a revolutionary group" (Negroponte, 1996: 224).

*Chapter 2.2: Digital artworks*

Digital works of art, as a result first of digital image processing and then of pure digital design, follow in the footsteps of every development of digital technology. Understanding McLuhan's motto "The medium is the message" we easily understand how we passed from the physical reality of the last century to the virtual reality of our time (McLuhan, 1994: 9). Visual stimuli give us 70% of all the information our brain processes every day. This shows us how important the image is for man, especially in today's age of images.

Digital technology has influenced the visual and applied arts so much that in our time we are talking about virtual reality. Man's involvement, intentionally or unintentionally, in this new reality is so great that interaction is crucial to his behaviour.

The creation of new, completely imaginary forms (avatars) and images, which interact with us humans, give us a sense of virtual reality, adapted to the preferences of each of us.

Avatars, i.e. digital faces created by digital designers through digital images, made their first appearance in the late 20th century. Design computer tools, which are becoming more and more easily accessible to the general public, even allow the creation of these forms, resulting in more and more new forms, closer to each of us (Veleni, 2020-2021: 93). The interaction with them, drags man into more and more imaginary virtual spaces and worlds, resulting in his distance from physical reality. None of us knows the true limits of this interaction, nor whether this development will have a positive or negative effect. Digital artwork acquires a completely different dimension than a natural work of art, due to the significant use and interdependence of digital technology and man. The transition of society from mass (industrial society) to
individuality (information society), according to Alvin Toffler, necessarily brings with
the help of digital art, the redefinition of patterns and therefore of art forms (Toffler, A., 1982: 16).

The projection of physical reality in a virtual space through digital technology, brings
with it terrible changes of patterns, redefining the way people interact with each
other. From this interaction, through digital virtual reality, completely new social
structures are created and will be created, the form of which we cannot know in
advance.

Services, which connect the virtual with the real world, are constantly growing and
expanding. However, as Dougald Hine found in 2009, the virtual world could not
replace the real world, because most people are not in the mood to replace their
physical existence with a form of the cyber avatar yet. Meanwhile, technologies such
as social media have proven to be more successful, boosting discussions and human
relationships. Hine, the co-founder of the School of Everything, which connects those
who want to learn with those who want to share their knowledge, sees a strong
tendency for people to move away from spending their lives in front of a screen.
Instead, he notes, people are using the network, computers, and digital technology to
do more and more things together that they enjoy in the real world (Zagalo, 2015: 29).

Given the transition from the industrial society to the information society we are in
now, we must be prepared for major changes in every human activity, including art.
The work of art in the information society acquires a fluid entity that can be changed
by anyone who has the means and access to it, transforming it into something new
and completely different. Hence the desired timelessness and autonomy of a work of
art of the past receives extremely great pressures of change (Toffler, A., 1982: 186-
211).

Hegel once described imagining an ideal work of art. For him, a great piece of art
should be absolute, independent, unique, representing the image of reality as our
senses perceive it, an organic axiom completely filled with soul, an independent world,
a miniature, on a scale of of the world (Grau, 2003: 204-205).

Today, this does not apply to the work of art, but instead, its definition is redefined
daily. More and more new art movements are emerging trying to change the definition
of the work of art.
Chapter 2.3: Movements

Even though the relationship of blockchain with digital art is relatively new, the relationship of the economy with how we appraise something based on our feeling is investigated from the beginning of the history of contemporary but also of modern art. Crypto Art, offers to historians and researchers a wide field for research regarding technology, art, economics, and more in virtual space.

The term that exists regarding this union of the sciences with the arts usually is described with the term transdisciplinary. In the last years, especially with the appearance of technology, this combination is very common in artworks. According to the gallerist SuperRare Jonathan Perkins, “Crypto Art is a new idea in an ancient field” (Franceschet, et al., 2021: 402-405).

The opinion that has prevailed in the world of the artist is that Crypto Art gives them the possibility to attain and keep control of their artworks and have them according to benefits.

This new world offers artists the possibility to move in both the physical and the virtual world and experiment with much more freedom.

When an artist is involved with crypto art, one has the opportunity to associate with new artists, buyers, gallerists, historians, and more.

There are a lot of artists that have involved themselves with Crypto Art and some of them are quite known. For example, some of them are Beeple, Takashi Murakami, Damien Hirst, and more.

Historians T'ai Smith and Blake Finucane give us a better idea of what Crypto Art is. They are basically talking about the combination of technology, specifically blockchain, and digital art. This combination includes various sciences, such as economics, aesthetics, art, etc., something that has occupied the history of art a few times, especially in recent years. In fact, the term "transdisciplinary" has been coined, which is based on this very combination.

There are many artists and gallery owners who believe that Crypto Art has benefited them. This is because they can actually control the works and reap some financial benefits. For the artist, there is not only the possibility of experimentation, but every artist has greater ease and comfort in being able to attract a collector.
Crypto Art is inextricably linked to blockchain technology and for this reason, one of its key features is its decentralized character. In contrast to the centralized structure of the art channels of previous centuries, this decentralized character, expressed more through Crypto Art, clearly gives more outlets and opportunities to the contemporary artist. However, it does not only benefit the artists but also almost all the actors who participate in the channels of each art. Independence from the classical means of production for the creation of a work of art, and the adoption of digital in their place, offers unlimited possibilities in the creation and circulation of a work of art. A digital work of art, on the other hand, loses its handwriting or some of the dominant idiosyncratic features of the artist himself. The ability to reproduce, edit and distribute a work of art, at incomparably faster speeds today, compared to the past, helps the artist and all the actors of art to engage with each other, promoting decentralization (Franceschet, et al., 2021: 404). Since we are still at the beginning of the changes brought about by the modern information society and digital technology, we cannot determine exactly what form the art world can take. Nevertheless, from what has been done so far, we can assume that once the basic structures of the information society are formed, a fusion of all-new trends will gradually occur, creating a new elite of art, which will fatally restore some form of centralism.

The uncontrolled use of digital media creates opportunities for new forms of crime in the digital world, but they also have an impact on the real world. Real-world response mechanisms to these new forms of delinquency, although very slow, bring results through the imposition of new legal restrictions. This is primarily because under the Greek Penal Code and Article 14\textsuperscript{12}, a crime cannot be convicted before it exists. In this way, however, slowly but steadily, the new legal framework is created, which will include all the activities of the digital society, defining which of them are illegal. As it is easily understood, this is one of the negative points of the adoption and use of digital technology by the art world as well.

Of course, the positive elements of Crypto Art are what the art world should discover and use in order to make the most of it.

But, Crypto Art is not the only movement that has emerged in the last years. Another movement that has made its presence known is that of Techpressionism.

\textsuperscript{12}(FEK research, n.d.: n. p.)
An important artistic movement of our time concerning the influence of digital and electronic technology on art is the techspressionism movement. According to Colin Goldberg, techspressionism is the idea that the computer can be used not only to pick things that exist in real life but to develop ideas that are in my head and kind of build on some ideas of the abstract expressionist painters (Goldberg, 2015: n. p.).

Techspressionism is an artistic approach to using technology to express emotional experience. It is a 21st century artistic and social movement. It is a combination of the words expressionism and technology.

This new term is used by art historians to refer to artists who use digital media as a means of artistic expression to express their thoughts and ideas. The term Techspressionism distinguishes the creations of the visual and other arts in relation to digital works (Everbeta, n. d.: n. p.).

Expressionism is discriminated to techspressionism by the way the artist uses his subjective learns instead of the product of a corporate studio itself. The subjective perspective the expressionists presented the world creates a distortion to evoke moods and ideas to express their emotions than a physical reality. The 1st physical exhibition of techspressionism will be done by a core group of artists in 2022. Some of the most important artists and representatives of this movement are Frank Gillette, Michael Rees, Clive Holden, Steve Miller, Anne Morgan Spalter, Patrick Lichty, etc. But one of the most impressive artists of this movement is Uliana Apatina.

Colin Goldberg is an artist born in 1971 in the Bronx and raised on Long Island. He studied art at Binghamton University. Under the tutelage of professor Angelo Ippolito, he focused on process and materials rather than a product for the rest of his life. He moved to New York City after his graduation. His work advertisement and his studio location in the area of East Village inspired his artistic experimentation eventually called techspressionism. Goldberg’s method was the intersection of paint and digital print-making. During his effort to give a title for a self-produced show he created the term ‘techspressionism’ in 2011. Goldberg oriented the ideas behind his new form in words, The Techspressionist Manifesto (Vaculin, n. d.: n. p.).

He created the manifesto, because he thinks there’s resistance within the fine art community to some degree. That is happening, when it comes to computers and technology being placed within a fine art context, he thinks it’s a little bit like the way
of photography, that was early on where there were segregated photography galleries and fine art galleries. Now there’s certain spaces that specifically show technology-oriented work and a lot of mainstream galleries can shy away from that so for him it’s a way of kind of capitulating his feelings about technology and how it is a continuum of tools that people have used you throughout mankind’s existence up though the computer. But going back to the camera and drawing tools and so on forth so he doesn’t see the computers being that different from things that have been used in the past (Goldberg, 2015: n. p.).

Computer involved in his production but the viewer won’t know exactly how so he found that most of the questions were about the process how did he do that versus what is the work about, which Goldberg prefers (Goldberg, 2015: n. p.).

Chapter 2.4: NFTs and copyrights of artworks

It is important not only for an investor or an artist but also for the various art institutions or auction houses that are willing to negotiate with NFTs, to have a clear picture between the work of art they possess and the intellectual property rights. In fact, it is not uncommon for problems to arise, especially concerning the copying of works in their collection (Buskirk, 2021: n. p.).

It is striking that many young creators and not only, do not know exactly what copyright includes and how they can protect their work. Although copyrights include some restrictions and penalties in cases of infringement, they should not frighten creators (Buskirk, 2021: n. p.).

However, there has been a great deal of concern in the art world for several years now because of copyright ignorance not only of analogue reproduction but also of digital art and circulation. This does not concern just artists, as it is widely known that anyone can reproduce any image with their computer or mobile phone and not just once.

In this section, several laws and opinions that apply and prevail around the world will be listed (Stech-Torsen, 2015: n. p.). The World Intellectual Property Organization defines the Intellectual property as “creations of the mind: inventions, literary and artistic works, and symbols, names, pictures, and patterns utilized in business,” according to the UN organization dedicated to IP. The two most common types of intellectual property (IP) in most countries are: 1) Industrial Property; and 2) Copyright.
The definition of the phrase "industrial property" defined by the Convention of Paris for the Protection of Industrial Property, and is monitored by WIPO, is as follows:

“Agricultural and extractive industries, as well as all manufactured or natural products, such as wine, grain, tobacco leaf, fruit, animals, minerals, mineral waters, beer, flowers, and flour, are all examples of industrial property\(^{13}\). Industrial designs, which are the aesthetic features that shape the appearance of the industrial products, constitute industrial property” (Stech-Torsen, 2015: n. p.).

Trademarks, service marks, layout designs of integrated circuits, commercial names and designation, regional signs, and protection against unfair competition are all examples of industrial property. This type of property generally includes signage that conveys information to customers about the products and services they can purchase. Unauthorized usage of such signs, as well as misleading activities in general, are targets of this protection\(^{14}\).

However, copyright is legal terminology for the rights afforded by authors and artists for their works of literature and art. Among the works protected by copyright are literary works, such as manuscripts, dramas, operas, and reference works; databases; films; musical compositions and choreography; art; architecture; and ads; as well as technical drawings, maps, and other visual representations\(^{15}\) (Stech-Torsen, 2015: n. p.). Legal groups will be shown do not always provide shelter in ways that suit the ultimate embodiment of creative work. The ideal legal structure for all forms of art is still a long way off. The boundaries of the classifications have been – and continue to be – challenged by the infinite variety of creative expressions flooding societies and markets (Stech-Torsen, 2015: n. p.).

Intellectual property debates are beyond the focus of this thesis, but it is necessary to be aware of the language that is now circulating on these topics, particularly copyright. Internet-enabled digitized replication, distribution of copies and NFT's as well as the cross-border character of the Web, and the media's concentration on the matter of

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\(^{14}\) Understanding Industrial Property, WIPO Publication No. 895 (World Intellectual Property Organization, 2016: n. p.).

\(^{15}\) “Copyright and Related Rights”, WIPO (Copyright, n. d: n. p.).
copyright broadly have made intellectual property protection a hotly debated subject on both an academic and marketing model basis (Buskirk, 2021: n. p.). NFTs have lately been quite attractive not only because they are a trend but mainly because they can shape digital elements such as artwork, video games, videos, images, and more. However, several problems mainly concern the purchase and sale of NFTs. Until now, the NFTs sector did not include what the copyright law says. But that has changed, and it is now true and anyone interested in investing in NFTs should be well aware of their copyright and its parameters. So from the moment, one decides to acquire or market an NFT it would be good to know that the ownership and authenticity of each NFT, i.e. each asset it represents, can now be proven. When a gallery is buying and selling a work of art, for example, the gallery owner must provide a certificate of authenticity, which certifies that the work of art is authentic and comes from a particular artist. There are of course some cases where this process does not take place and the certificate is not provided. In contrast, in blockchain technology and specifically in NFTs, from the moment we refer to them, there is no way that the origin of each NFT is not certified. Although there are many proponents of NFTs, some are sceptical about reproducing them, claiming that anyone can download, copy and reproduce this image. So anyone can very simply press a button to take a snapshot and save the image from a work of art. This fact, therefore, puts a lot of doubts in the minds of potential investors regarding their reliability. But as Paul Kell, a cryptocurrency investor, put it, “you can take a picture of [a] picture, but you do not have what is under the picture” (Lewis, et al., 2021).

NFTs as mentioned above are essentially certificates of ownership that are highly linked to the so-called smart contracts, which of course are also based on blockchain technology. Ethereum, which is based on NFTs, is used for trading, contract planning, and application development. Tokens have not only been used for digital transactions but as it seems today they are now one of the most important uses of blockchain technology. If we look at it from their technical point of view, tokens are "digital information units in the form of lines of computer code" (Çağlayan Aksoy, et al., 2021: 3). These codes show what exactly is behind the token. If we look at it from a legal point of view, tokens are digital assets that can represent virtually any value that people have agreed upon and are secured by cryptographic protocols (Çağlayan Aksoy,
So far there is no official global classification of tokens. However, there is an informal categorization that includes the following: a) Assets such as houses, cars, goods, etc. b) Payment tokens such as cryptocurrencies, c) Asset tokens where we refer to security, investment, etc. which essentially includes digital assets. So there are exchangeable and non-exchangeable tokens. The exchanges are for example Bitcoin, where it can be exchanged with another or equal asset of the same category as SolarCoin.

On the other hand, NFTs are unique and therefore non-interchangeable. This is exactly why it makes them so valuable (Çağlayan Aksoy, et al., 2021: 3).

The copyright debate comes to the spotlight when an investor wants to buy a digital work on NFT or when an artist wants to convert work to NFT. According to WIPO, as mentioned above, the copyright belongs to the creator of the work. However, some of them can be transferred or given to any potential buyer.

But the downside to this blockchain technology is that it does not specify exactly whether the image the investor is buying is actually the original work or whether it is the artist seen in blockchain technology or if it is just a copy of another work of another artist. In this case, all those involved are in a difficult legal position as the copyrights of the works have to be clarified. A recent example is the story of a 12-year-old named Benyamin Ahhmed, who made 3,350 "Strange Whales". Immediately, these whales went viral and went on sale for up to 3 ETH ($ 6,000). One user, who showed great interest in this project, decided to do a little research before making any move. During his research, he discovered that there was a strong possibility that the work had been copied directly from another work, as Benyamin Ahhmed appeared to have used a four-year-old pixel image as a basis for creating the whales. When it became known that this was a possibility and therefore there was copyright theft, as he may not have been licensed to use the basic image, people who had already bought the whales began selling them, causing damage. not only in the reputation but also in the value of the specific project (Schmalfeld, 2021: n. p.).

If in this whole system of NFTs we are going to talk about copyright we are technically talking about ERC-721. This template shows what exactly the content that NFT represents contains. It is important to note here, not accessing the content of an NFT is not a real possibility, due to the fact that the content and metadata are captured.
directly in the blockchain chain. For this reason, it is possible to access from any access point and not just from a specific server. In addition, access by the NFT developer, website, etc. cannot be blocked (Çağlayan Aksoy, et al., 2021: 6).

Of course, in case the data is stored on a central server, it is possible to change the metadata or the content. This is very important.

An NFT is essentially metadata added to an original smart contract that is a digital view of any contract that relates to an original asset. However, an important question arises as to the ownership status associated with the asset. Here we have the forced distinction of assets into tangible or intangibles. In the case of a tangible asset, the chances of intentionally or unintentionally using it through NFT are relatively limited. This is because its criminal use is relatively obvious. But what about an intangible asset, such as copyright? In this case, restricting the use of an intangible asset through the NFTs must be specified whether it is done with the consent or not of the creator. The claim, for example, of the use of the intangible asset through NFTs with the justification of the communication purpose cannot, as enacted by WIPO, be valid without the necessary approval of the creator.

So when it comes to material goods then the situation is not that complicated. Perhaps the only restriction on the rights of use that might exist for the beneficiaries is that of making and reproducing the NFT (making available to the public), without the creator’s approval and if this was not stated in the franchise agreement (Çağlayan Aksoy, et al., 2021: 10).

Based on the data so far, it seems that a buyer-seller has the right to set his terms for the exploitation of an NFT. These terms can of course be somewhat restrictive and can separate NFT from the underlying artwork.

According to Directive 2001/84 / EC, the original works of the author but also their copies which should be numbered from the beginning as only then are considered “original works of art”, have the potential to become objects of resale and even with several high cost. This directive was created to supplement and cover any weaknesses of the Berne Convention. To be precise, it refers in detail to the right of attendance (droit de suite). This right is an "integral part of intellectual property” (Kotsiris, 2011: 376). Also, Directive 2001/84 / EC, on which Article 5 of Law 2121/1993 is based, and Article 6 thereof state that, in accordance with the Berne Convention for the
Protection of Intellectual and Artistic Works, this is possible if it does not conflict with the local law of the country of the creator. It follows that the creator may have requirements or rights for each resale, in addition to the initial sale which constitutes the inter vivos right. In case there is an intermediary, the responsibility for the copyright is distributed to the seller and the intermediary, regarding the collection of the amount (article 1, par. 1, 2, and 4 of Directive 2001/84). This paragraph refers, in a nutshell, to the creator’s authority in any resale of his work or copies, except for the first sale made by the creator. Although this right is not transferred alive and belongs to the property rights, it is inherited and its duration is for the life of the creator and is valid for 70 years after his death.

In resale, they can take part and be understood as sellers, either auction houses, or art galleries, or collectors, and generally anyone interested. The most important point is that it does not play a particularly important role if the resale price is higher or lower than the original selling price (Kotsiris, 2011: 196-201).

About NFTs in the resale part, there is the possibility that the resale right will be activated and the creator will receive the relevant fee. Of course, there is a basic condition for this to happen. The creator of the NFT must also be the creator of the original work, which of course exists outside the blockchain chain, and thus have the legal right to resell the specific work. If there is no correlation between the two files then the resale right can not be activated.

On the other hand, there is a new possibility in terms of resale that essentially bypasses the current legal framework. Special platforms have been created, which allow developers to get a "commission" for each NFT resale, defining this operation as a service. For example, one such platform is OpenSea, which gives the developer a 10% commission if the project is resold in OpenSea (Mezei, et al., 2021). At the same time, Ethereum reports that some NFTs pass the direct commission to their creators when

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\(16\) (Law 2121/1993 – Hellenic Copyright Organization, n.d.: n.p.)
sold. For example, the original owners of EulerBeats Originals\textsuperscript{17} receive an 8% commission on each sale (Non-fungible tokens (NFT), n. d.: n. p.).

\textbf{Chapter 2.5: Authenticity}

NFTs can be said from our data so far, that they are understood as computer files combined with some proof of ownership or authenticity. How is this connection made? Through blockchain technology. This technology ensures the uniqueness of each matching operation (Chow, 2021: n. p.).

As mentioned, the information generated in blockchain technology remains permanently there and cannot be processed. This is, as many say, the biggest advantage of this technology. This is because, in this way, each creator can prove that the depicted work is his or the buyer can prove the history not only of the transaction but also of the work. An encouraging fact, which somewhat reassures the most suspicious, is that some platforms have already started to provide certification services for NFTs, to make sure that the NFT in their possession corresponds to the original work of the artist referred (Çağlayan Aksoy, et al., 2021: 11).

In the process of buying and selling so that it becomes a creditworthy transaction, "smart contracts" play a very important role. Smart contracts are packages of code that complete the process of selling a purchase of a good, digital or physical, once it's delivery is certified through a predetermined digital process. They certify the uniqueness of the good and the inability to modify or copy it. Also, mainly due to blockchain technology, they are inviolable and non-reproducible. All NFTs are inextricably linked to smart contracts. “In other words, the new money is crypto and NFTs are the digital goods you buy with your crypto money” (Yaeger, 2021: n. p.). NFTs provide solid proof of ownership and we can assume that in the future every digital or physical work of art will have an NFT associated with it. Ethereum is currently the

\textsuperscript{17}The Euler Record is a set that includes art and + music, algorithmically generated by the Euler number and the totient function in a limited edition. The Euler file has two sides, Enigma (27 NFTs) and Genesis (27 NFTs). EulerBeats Smart Contract extends the ERC-1155 Ethereum multi-point standard for the construction of non-interchangeable unique tokens and beyond. The badge is the work of art in itself. Everything needed to create new masterpieces is saved in the Ethereum blockchain. EulerBeats is, in essence, a meticulous digital package of rarity, instant liquidity, royalty, music and art and math. This makes it the first of its kind (About EulerBeats, n. d.: n. p.).
predominant cryptocurrency in transactions containing NFTs and smart contracts and is described as "programmable money" (Rennie, et al., 2019: 13). The possibilities that NFTs give us in combination with smart contracts and the prevailing blockchain technology are so many that we can not imagine them all since we are at the beginning of their development. NFTs are unique and rare because they have a unique ID and other metadata that are non-replicable (Çağlayan Aksoy, et al., 2021: 11). The uniqueness that is required and desired for digital works, so that they are not replicable, brings a digital work of art closer to the uniqueness of a natural work of art. However, and because NFTs can be created by someone who knows how to do it so that they are identical to some others, one can easily steal the proof of the authenticity of a work of art. This is why some platforms have already started using handmade certifications to avoid counterfeiting (Çağlayan Aksoy, et al., 2021: 11).

To avoid points of friction between the counterparties that touch on smart contracts, we use separation of them into external and internal contracts. External contracts contain all the information related to the settlement for the completion of a sale or other transaction (e.g. transfer) between the counterparties. Internal contracts, on the other hand, refer to the means of drafting external contracts, so that there are no misunderstandings between the counterparties. For example, language, syntax, legal status, and code, must be the same for the contracting parties (Demeyer, 2017-2018: 79-80).

Anyone who knows how to code a smart contract, using the appropriate language for it, can implement it. In essence, this is a type of transaction and therefore the position of a currency, to carry out the transaction, takes the so-called Gas\textsuperscript{18}. Gas cost for contract deployment are far higher, however. One limitation of smart contracts is its maximum size. This can not exceed 24KB, because otherwise it will run out of Gas. To overcome this problem, we can use The Diamond Pattern\textsuperscript{19} (Anatomy of smart contracts, n. d.: n. p.).

\textsuperscript{18} The Ethereum network cannot function without gas. It runs on fuel, just like a car does. The term "gas" refers to the unit of measurement for the amount of computational effort expected to undertake out special functions on the Ethereum network.

Because each Ethereum transaction necessitates the use of computational resources, each transaction necessitates the payment of a fee. The fee required to successfully complete an Ethereum transaction is referred to as gas (About EulerBeats, n. d.: n. p.).
Some dismiss the recent NFTs craze for art as a recent bubble. However, many artists who have posted their work on social media and various other platforms for years, believe that NFTs give them a chance to make a profit by posting their work, which has not been the case so far (Chow, 2021: n. p.).

Chapter 2.6: The role of social media

In recent years we have noticed that social media plays a very important role in our lives and fact in our daily lives. The most important thing is whether they have changed the way we communicate with those around us. There is a storm of information, every day, just opening an application. The ability to communicate with people, at any end of the earth, at any time is terribly easy, as, through the well-known applications Facebook, Instagram, Twitter, etc., you can send messages, make video calls or pick up the phone. Apart from all this, these applications, as well as many others, are of course not only used for communication media. Many use them to promote their lives or to see what others are doing in their lives, others use them for information, or as their professions or interests may require. But some use them because it is a tool to promote their work (Travis & von Lünen, 2016: 14-15).

Jim Ellis and Tom Truscott developed Usenet in 1979. Usenet was essentially a global messaging platform among its users. Social media is related to many types of media, such as television, radio, magazines, newspapers, mobile phones, the internet, etc. However, we can believe that social media as it is today, probably took shape about 20 years ago. It was the period when Bruce and Susan Abelson created the “Open Diary”. The so-called "Open Diary" was a social networking site, specifically a website, where essayists had access and could exchange views and articles (Wali, et al., 2020: 21-22).

Is the role of the World Wide Web (Internet network) - Internet, one-dimensional, and if not how many dimensions it can have?

Diamond Patterns are, in essence, a model for creating modular systems of smart contracts, which we can expand after their development. In this way, we can draw smart contracts, almost unlimited in size. Diamonds can be upgraded without the need to renew their existing functionality. In essence, some parts of a diamond can be added, removed or replaced, leaving others unaffected (EIP-2535: Diamonds, Multi-Facet Proxy, n. d.: n. p.).
The use of www only in communication and information archiving could be considered an arbitrary restriction, contrary to the current reality. Www is already used to process information, transmit data of any form, audio or visual, composing a digital world where every possible stimulation can be generated, processed, and transmitted (Zoi, n. d.: 22).

The creation and emergence of social networks as an evolution of www is a key point in the way Internet users interact. The ability to post several digital creations on these media implies the automatic abolition of the concept of property, a gap that comes with the emergence of copyright and NFTs. The hitherto known Facebook, Instagram, Twitter, etc., serve and perform different roles each, which is why they are adopted at the same time by almost all internet users. The process of participation and interaction within these networks results in the creation of social groups with common characteristics, easily accessible by various organizations and companies, forming groupies, which follow specific trends fanatically. The influence of groupies on their members is so strong that they can be guided. The influencers, who emerge through the communication conditions of these groups can very easily manipulate them in any direction they want. Therefore, the adoption of forms or works of art by internet groups is dramatically influenced by influencers. It is possible that in the future, the acceptance or not of new art forms, whatever they may be, will be determined by the new elites of influencers.
Chapter 3: Artworks Transactions

Media distribution or in other words content apportionment, is a type of media content sharing that includes “audio, image and video” (Bhowmik & Feng, 2017: 1-5). Traditionally, the process of distributing content between media was done by the physical exchange of documents on paper, CDs, DVDs, etc. Today, the most common process of distributing content between multimedia is based on the cloud services of the Internet or the peer-to-peer process between computers. These modern processes ensure great functionality and accessibility, as well as efficiency. A content distribution network (CDN) is a distributed network of dedicated servers for delivering bulk media content to interconnected Internet devices. However, cloud data networks are preferred over conventional data networks. This is due to the lower cost and simpler infrastructure. Standards developed by multimedia data traffic, such as MPEG, have been applied to the Internet for the most successful content distribution. A new method of producing and distributing content through a multimedia file has been proposed using multiple videos, audio, and subtitle tracking and citations, including added metadata. However, the security of the data as well as the complete format of the contents was not ensured in any of the above ways. For example, a change in the indexes that refer to content could make it inaccessible and therefore unmanageable by multimedia or Internet devices. The newly established blockchain technology, on which NFTs are based, plays a big role in achieving the above goal (Bhowmik & Feng, 2017: 1-5).

Electronic Transactions, in order to be as secure as possible, mainly use the Ethereum platform and rely on blockchain technology. These transactions, in order to take place, require the payment of some commissions (fees), which as mentioned above are Gas. The amount of Gas required to make a transaction is defined in the smart contracts, which include the terms of the transaction and details on where, how and when they will be paid. This information can also be referenced in metadata. In fact, the more Gas required for a transaction, the higher the priority for the miners, who process and complete the transaction using the Ethereum platform (Ethereum Glossary, n.d.: n. p.).
Chapter 4: Possible threats, risks and dangers

Although NFTs have been gaining popularity since March 2021, many are sceptical about their future acceptance by the wider community, rather than by individual users (Çağlayan Aksoy, et al., 2021: 1).

The future will show if it is a temporary excitement, a bubble that is about to burst or something that will change the way we trade. As modern man lives more and more in two worlds, physical and digital, he is forced to adapt his actions to the ever-growing, digital world. Physical transactions, such as the exchange of goods and currencies, but also trade itself in all its forms, tend to be digitized day by day. We are at the beginning of digital transactions, which are constantly gaining ground.

The old legal framework of the industrial society is now cumbersome and not easily adaptable to the requirements of the information society. For this reason, it needs to be updated, as well as all the processes that change with digital technology.

The purchase and sale of digital creations with digital coins-cryptocurrencies, includes parameters that go beyond the transaction of physical or intellectual property. The complexity of the legal and commercial framework required has already begun to emerge and involve international bodies, organizations, agencies and courts. Within this newborn digital transaction framework, there are many dangers and threats to all digital creations, whether they be cryptocurrencies, files or multimedia. Even social media is involved in the process of defining this new legal digital framework. Due to the different speeds of development of digital products, goods and services from country to country, it is extremely difficult to adopt a common framework at this early stage of development. This results in the emergence of multiple risks of exploiting the gaps that exist in the various applicable legal frameworks of different countries. For example, the courts of one country, which is in the process of developing digital products, may find an activity such as copying some digital products illegal while in another it is legal. The list of all possible risks could include a unified legal digital framework, which is far from being realized in the near future, but also from the purposes of this work.
However, one of the main dangers to the art world associated with NFTs is whether cutting an NFT is an act of reproduction or communication to the public. In order to reach a conclusion, we need to look again at the separation of on-chain and off-chain NFTs (Çağlayan Aksoy, et al., 2021: 8). In on-chain NFTs, NFT includes the original image, which is the work, and therefore, it is easier to have the right to communicate with the public. While in off-chain, this is not the case. However, there is an off-chain NFT link to the original work via a public URL, which points to the original image address. To find out exactly what is happening in this case, one must refer to the decision of the case Svensson, CJEU\textsuperscript{20} (Çağlayan Aksoy, et al., 2021: 8).

However, there are disagreements regarding the cases in which such a connection is made with the consent of the creator.

In some cases, similar legal problems of this nature are solved by the platforms we use to create NFTs, such as OpenSea, otherwise, they will have to be settled through a smart contract or by identifying the valid ones in the metadata (Çağlayan Aksoy, et al., 2021: 9).

Infringement, in the modern digital environment, has its own forms and everything new that appears creates conditions for its safe or not exploitation. The artist, as the creator of a work of art, can not know the legal guarantees required for the proper distribution of his works, except to turn to specialized legal advisers. In most cases, legal proceedings are initiated after there has been delinquency in the exploitation of an artist’s work and after his appeal to a court.

At this point, we might wonder if digital creation, processing and transfer of works of art is ultimately a threat to existing forms in the physical world. Of course, the conclusion we could reach depends on the percentage of participation of the artist, but also of all the factors of creation and distribution of works of art, in the modern digital environment. That is, it would be tempting to consider the digital world as a projection and extension of the physical.

This is true of any activity in the physical world, which can have an impact on the digital world. Ultimately, the question of whether or not the digitization of more and more parts of the physical world and its activities is a threat to it depends on the outcome. Many actions in the digital world could harm the physical, and they already

\textsuperscript{20} Court of Justice of the European Union
do. Nevertheless, society's growing familiarity with the digital world is limiting the consequences of these actions, mainly due to the experience gained, but also the legal limitations that it entails (Zagalo & Branco, 2015: 31).

For example, digitizing and publishing works of art on display in a museum or gallery could be seen as a positive or negative act for them; The answer to this question is not at all simple, because on the one hand the works of art of the museum or gallery become known to a wider global audience, using digital technologies and social media, but on the other hand it could dramatically reduce the need to visit their place. A possible reaction could be to be able to access the museum's contents, only after some kind of subscription, in order to ensure a minimum income, which would compensate for the loss of visits to the museum. On the other hand, this reaction would limit accessibility and result in the restriction of the potentially interested public (Ch’ng, et al., 2013: 342).

In this way, however, those who are willing to pay the subscription, in order to have access to the content of the museum, are also those who are really interested in its content, i.e. the target group of the museum.

The multiple bubbles that are created in the field of digitization and digital distribution of works of art, due to the late interest of a certain audience, are certain that at some point they will burst without this meaning that the underlying activities will disappear. For example, some or all cryptocurrencies may disappear and be replaced by what is and will be created by central banks, but the technology behind them, blockchain, will remain. Thus, the transformation of new and therefore illegal digital technology products will give way to legal digital products, which will be produced by competent organizations.

The question, however, of what is a work of art or not, remains the same, and of course, it can be answered only by those who deal with art. Of course, the ease of access to various digital creations can and does create bubbles, which do not meet the definition of a work of art and are expected to burst (Frye, 2021: 3-6).
Chapter 5: Dissertation Questionnaire

The main aim of this questionnaire is to define whether the public is aware of NFTs, and in particular people who are more closely associated with the arts. Even if they have heard of NFTs, how willing are they to go through the process of making or buying them? To be precise, through this process questions such as:

- Do they know what NFTs are?
- Have they heard or seen about NFTs?

The people who took part in the research were mostly artists or have come into contact with art in some way. The questionnaire was also sent to people who are not artists, in order to collect data from both sides, in order to have a more comprehensive view as to whether or not NFTs are known only in the art world. In this questionnaire, 50 people participated. The format in which it was published was also it’s final. Its completion time was measured at about 5 minutes. Google Forms was used to create the questionnaire. The questions that make up the questionnaire are 30, some of which are multiple-choice and some of which are essays. Some-multiple choice questions allow more than one answer. There were no restrictions on gender, nationality, age or education.

To find people who would answer the questionnaire, the form was uploaded to Facebook, not only to my personal account but also to various groups, such as the one of the School of Fine Arts of the Department of Fine and Applied Arts. It was also uploaded to the Facebook group conversation of, MA in Art Law and Arts Management, and was emailed to my contacts. All were informed of the academic aims of the research, and many of them republished the questionnaire. Sharing the form on Facebook proved to be the most effective method. Below are the results of the questionnaire.

Of the participants, 78% were ages 25-34, 10% were between 18-24, 4% between 35-44, 6% between 45-54 and 2% over 55. 70% of individual respondents were women, 24% were men and 6% chose not to identify their gender. Their educational level was 60% with a Master, 24% have a Bachelor, 8% have attended college, 1% are in High
School, 6% have a PhD. Interesting is the percentage of 59.2% where they are artists and the remaining 40.8% are from other professions.

Question No1: What is your age?

What is your age?

Question No2: What is your gender?

What is your gender?
Question No3: What is your level of education?

What is your level of education?

- High School: 60%
- College: 24%
- Bachelor: 8%
- Master: 6%
- PhD: 8%
- Other: 0%

Question No4: Are you an artist?

Are you an artist?

- Yes: 59.2%
- No: 40.8%
Question No5: Which social media platform do you mainly use?

![Bar chart showing social media usage]

- Facebook: 20 (40%)
- Instagram: 43 (86%)
- Twitter: 3 (6%)
- Others: 2 (4%)

Question No6: Do you use any digital platform for the promotion and the dissemination of your artworks? If yes please name which.

Do you use any digital platform for the promotion and the dissemination of your artworks? If yes, please name which.

- Artsy: 1 (2%)
- Instagram: 10 (20%)
- No: 11 (22%)
- Opensea, mintable: 1 (2%)
- Vimeo: 1 (2%)
- Yes: 2 (4%)
- facebook: 1 (2%)
- no: 8 (16%)
- Instagram: 1 (2%)
Question No7: Do you know what NFTs are?

Do you know what NFTs are?

- Yes: 76%
- No: 24%

Question No8: Have you ever seen a related article or advertisement about NFTs (Non-Fungible Tokens)?

Have you ever seen a related article or advertisement about NFTs (Non-Fungible Tokens)?

- Yes: 63.3%
- No: 10.2%
- Maybe: 26.5%

Question No9: If you know please describe them.
Question No10: What are the main reasons you would go into the process of doing NFT? (Please select the main 3)

Question No11: Do you think it is very important that large museums and auction houses present and buy NFTs not only of works of art but also of various other objects?
Question No12: Do you think NFTs are a good way to promote any artworks?

Question No13: Do you think advertisement in social media is a good idea to promote NFTs?
Question No14: Are you in favor of NFTs?

Are you in favor of NFTs?

- Yes: 49%
- No: 10.2%
- I am not quite sure: 40.8%

Question No15: I think NFT is just a temporary thing, a trend, and it will burst like a bubble.

I think NFT is just a temporary thing, a trend, and it will burst like a bubble.

- 1 (0.6%)
- 2 (14.7%)
- 3 (47%)
- 4 (12.2%)
- 5 (0%)
Question No16: COVID-19 was a good opportunity for NFTs to be acknowledged by more people.

Question No17: NFT is an easy case for anyone to deal with it.
Question No18: NFTs open a new path in the art market.

NFTs open a new path in the art market.

Question No19: It is safer to sell my Artwork using NFTs rather than any other conventional way.

It is safer to sell my Artwork using NFTs rather than any other conventional way.
Question No20: NFTs can contain smart contracts that give the artist, for example, a cut of any future sale of the token.

With NFTs artwork can be “tokened” to create a digital ownership certificate that can be bought and sold.

With NFTs artwork can be "tokened" to create a digital ownership certificate that can be bought and sold.
Question No22: Anyone can copy and save NFTs and digital artworks.

Question No23: With NFT the artist can retain the copyright of his work so that he can continue to produce and sell copies.
Question No24: The NFT buyer holds a "token" proving that they own the "original" work or a part of it.

The NFT buyer holds a "token" proving that they own the "original" work or a part of it.

Question No25: NFTs provide more opportunities for artists to exhibit their artworks.

NFTs provide more opportunities for artists to exhibit their artworks.
Question No26: Even if I like the idea of NFTs I am afraid to expose myself to the digital world.

![Bar chart showing responses to the question: Even if I like the idea of NFTs I am afraid to expose myself to the digital world.]

Question No27: I feel that learning and getting involved with NFTs is a waste of time.

![Bar chart showing responses to the question: I feel that learning and getting involved with NFTs is a waste of time.]

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Question No28: I am afraid using NFTs is might prove risky in terms of money loss.

Question No29: How do you react when you hear about or see NFTs?
Question No30: I believe that NFTs are the future of the art world and the transaction of artworks.

In conclusion, according to the above questionnaire, we find that 59.2% of the participants in the questionnaire are artists. This helps us to have a better result in terms of some more specific questions regarding the promotion and operation of NFTs. On the other hand, the remaining 40.8%, who are not artists helps us to see aspects of NFTs, which perhaps the most enthusiastic active artists do not see. This can be seen in many questions, as there are many who were reluctant to either go through the process of creating or buying an NFT. They are also not at all sure about whether a smart contract can enable an artist to receive a percentage of each resale of his work. This shows us 40%.

Also, what this survey showed us is that 76% may think they know what NFTs are, but in details like if anyone can copy and save NFTs and digital artworks, 52% were divided. Even in question 24, on whether the buyer owns a "token" proving that he is the owner of the "original" project, 36% did not know exactly. But while there was a significant 34% who seemed to agree completely and know that this is indeed the case. Of course, 38% do not know if NFTs are the future of the art world and the transaction of artworks. But this is a question that no one can answer for sure because no one knows what will happen in the future.

The artists, when it comes to questions related to the art world, seemed to agree with 32-36% that NFTs open a new path in the art market. On the other hand, it makes sense for many of them to be afraid, which is why in question 19, “It is safer to sell my
Artwork using NFTs rather than any other conventional way, 62% answered neutrally. This shows us, like other questions, that it would be good to be better informed, especially in the art world, about some legal issues, such as copyright. Of course, in order to do this, the founders of Ethereum and NFTs must first finalize the legal rights and obligations of each artist on their platforms in a simpler and simpler way, as they are so far finalized in smart contracts, something which seems to scare potential creators.

Advertising can also help in this, since the largest percentage of respondents, 86%, use platforms such as Instagram, and are regularly updated and informed.

There are many questions that need to be answered in time, to see if all this is a bubble or not. At the moment we are trying to see how the future is being rised. Large museums and auction houses have already started buying and selling NFTs. The first auction house to release NFTs was Christie’s. Whether the NFTs will change the data to date, no one knows.
In conclusion, we can say that the derivatives of multimedia art already play and will play a very important role in art production in the future. The connection of the works of art of the physical or digital world with the world of the market (physical and digital) in general, cannot be understood without the institutional existence of NFTs. As can be seen from the answers to the above questionnaire, a very small percentage of 10-20%, seems to know what NFTs are and how they work. This percentage corresponds to both artists and non-artists. From this, we conclude that NFTs are still in an early stage of development. Therefore, we can consider the ignorance observed about them to be justified. The rapid transmission of information, however, through the internet, social media, and live, seems to lead to their rapid knowledge and use. The participation of institutional centres and organizations, which aim to exploit the great potential of NFTs, in the modern information society, is what will give them the framework in which they will be able to develop and prevail. The above work aims at the fundamental acquaintance of NFTs, from the world of artists. The sooner one realizes the enormous importance of NFTs in the contemporary art world, the smoother their use of it will be. Given that we are in the early stages of the development of NFTs, and their knowledge and use is not the mainstream, it is reasonable to expect a lot to be done and changed, until they are accepted by a large portion of the art world. The war that almost all derivatives of blockchain technology undergo such as cryptocurrencies, NFTs, etc., is due in large part to the ignorance of the majority of people about them. The emerging trend of concentrating and controlling the derivatives of blockchain technology, from established centers such as central banks and institutions, shows us the direction of centralization that will exist in the future. For example, the desired and desired by them, replacement or substitution of cryptocurrencies, by stablecoins. The possibilities that digital technology gives us are limitless, and their impact on the real world, positive or negative, is extremely dramatic. Specifically, for the art world, we could imagine and envision, even the stock market of art, something that until now was impossible. In other words, art, through NFTs or other digital tools, could become a stock market in which the value of works of art would be shaped by the law of supply.
and demand, which applies to all commodity exchanges. This would unlock the potential of the art world to the fullest, but at the same time reduce the risk of multiple bubbles. If that happened then we would all be in for a rude awakening. This will happen because the work of art from consumer and investment goods, in the sense of accumulation of value, will be transformed into a purely economic good, which will obey the laws of the stock markets. The future is what will show us what will eventually happen in the art market, which will be influenced by digital technology, like all other markets (Moutsopoulos, 2021: 529-530).
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Appendix

In this section the reader may find the following:

- The dissertation questionnaire
- The answers of the dissertation questionnaire

The dissertation questionnaire:

1. What is your age?
   - Under 18
   - 18-24
   - 25-34
   - 35-44
   - 45+

2. What is your gender?
   - Male
   - Female
   - Prefer not to say

3. What is your level of education?
   - High School
   - College
   - Bachelor
   - Master
   - PhD
   - Other

4. Are you an artist?
   - Yes
   - No
5. Which social media platform do you mainly use?
   - Facebook
   - Instagram
   - Twitter
   - Others

6. Do you use any digital platform for the promotion and the dissemination of your artworks? If yes, please name which.
   - Yes
   - No

7. Do you know what NFTs are?
   - Yes
   - No

8. Have you ever seen a related article or advertisement about NFTs (Non-Fungible Tokens)?
   - Yes
   - No
   - Maybe

9. If you know please describe them
   ...........................................................................................................................................
   ...........................................................................................................................................

10. What are the main reasons you would go into the process of doing NFTs?
    (Please select the main 3)
    - I have already created some pieces of digital Art and want to turn them.
    - I am an Artist and want to catch this new trend of dealing and selling my pieces of Art.
    - Some Artists around me already use them.
    - I am already involved in blockchain technology and capable to create them.
    - I have seen a lot of ads on social media and I'm thinking about it
I already have some material that I can convert to NFT and I want to see how it will be promoted

There are already several artists that I like and deal with NFTs and I think about it too

11. Do you think it is very important that large museums and auction houses present and buy NFTs not only of works of art but also of various other objects?
   ○ Yes  ○ No  ○ I am not quite sure

12. Do you think NFTs are a good way to promote any artworks?
    ○ Yes  ○ No  ○ I am not quite sure

13. Do you think advertisement in social media is a good idea to promote NFTs?
    ○ Yes  ○ No  ○ I am not quite sure

14. Are you in favor of NFTs?
    ○ Yes  ○ No  ○ I am not quite sure

15. I think NFT is just a temporary thing, a trend, and it will burst like a bubble.

    1  2  3  4  5
   Strongly disagree  ○  ○  ○  ○  ○  Strongly agree

16. COVID-19 was a good opportunity for NFTs to be acknowledged by more people.

    1  2  3  4  5
   Strongly disagree  ○  ○  ○  ○  ○  Strongly agree

17. NFT is an easy case for anyone to deal with it.

    1  2  3  4  5
   Strongly disagree  ○  ○  ○  ○  ○  Strongly agree

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18. NFTs open a new path in the art market.

1 2 3 4 5
Strongly disagree  ○ ○ ○ ○ ○ Strongly agree

19. It is safer to sell my Artwork using NFTs rather than any other conventional way.

1 2 3 4 5
Strongly disagree  ○ ○ ○ ○ ○ Strongly agree

20. NFTs can contain smart contracts that can give the artist, for example, a cut of any future sale of the token.

1 2 3 4 5
Strongly disagree  ○ ○ ○ ○ ○ Strongly agree

21. With NFTs artwork can be "tokened" to create a digital ownership certificate that can be bought and sold.

1 2 3 4 5
Strongly disagree  ○ ○ ○ ○ ○ Strongly agree

22. Anyone can copy and save NFTs and digital artworks.

1 2 3 4 5
Strongly disagree  ○ ○ ○ ○ ○ Strongly agree

23. With NFT the artist can retain the copyright of his work so that he can continue to produce and sell copies.

1 2 3 4 5
Strongly disagree  ○ ○ ○ ○ ○ Strongly agree

24. The NFT buyer holds a "token" proving that they own the "original" work or a part of it.

1 2 3 4 5
Strongly disagree  ○ ○ ○ ○ ○ Strongly agree
25. NFTs provide more opportunities for artists to exhibit their artworks.

   1     2     3     4     5

   Strongly disagree   ○○○○○   Strongly agree

26. Even if I like the idea of NFTs I'm afraid to expose myself to the digital world.

   1     2     3     4     5

   Strongly disagree   ○○○○○   Strongly agree

27. I feel that learning and getting involved with NFTs is a waste of time.

   1     2     3     4     5

   Strongly disagree   ○○○○○   Strongly agree

28. I am afraid using NFTs is might prove risky in terms of money loss.

   1     2     3     4     5

   Strongly disagree   ○○○○○   Strongly agree

29. How do you react when you hear about or see NFTs?

   ○ a. I see an article/video if the product or service is of interest to me
   ○ b. I see the article/video regardless of title or images
   ○ c. I keep scrolling because I do not want to see it
   ○ d. I do not click on the article/video even if it seems interesting

30. I believe that NFTs are the future of the art world and the transaction of artworks

   1     2     3     4     5

   Strongly disagree   ○○○○○   Strongly agree
The answers of the dissertation questionnaire:

Question No1:

What is your age?

- Under 18: 78%
- 18-24: 10%
- 25-34: 6%
- 35-44: 4%
- 45-54: 2%
- 55+: 10%

Question No2:

What is your gender?

- Male: 70%
- Female: 24%
- Prefer not to say: 6%
Question No3:

What is your level of education?

- 80% High School
- 6% College
- 6% Bachelor
- 6% Master
- 8% PhD
- 8% Other

Question No4:

Are you an artist?

- 59.2% Yes
- 40.8% No
Question No5:

Which social media platform do you mainly use?

- Facebook: 20 (40%)
- Instagram: 43 (88%)
- Twitter: 3 (6%)
- Others: 2 (4%)

Question No6:

Do you use any digital platform for the promotion and the dissemination of your artworks? If yes, please name which.
Question No7:

Do you know what NFTs are?

Question No8:

Have you ever seen a related article or advertisement about NFTs (Non-Fungible Tokens)?

Question No9: If you know please describe them.
Question No10:

What are the main reasons you would go into the process of doing NFT? (Please select the main 3)

- I have already created something similar: 8 (16%)
- I am an artist and want to catch up: 18 (36%)
- Some artists around me already did it: 24 (47%)
- I am already involved in blockchain: 10 (19%)
- I have seen a lot of ads on social media: 16 (31%)
- I already have some material that I can use: 15 (29%)
- There are already several artists doing it: 14 (28%)

Question No11:

Do you think it is very important that large museums and auction houses present and buy NFTs not only of works of art but also of various other objects?

- Yes: 46%
- No: 14%
- I am not quite sure: 40%
Question No12:

Do you think NFTs are a good way to promote any artworks?

- Yes: 48%
- No: 16%
- I am not quite sure: 36%

Question No13:

Do you think advertisement in social media is a good idea to promote NFTs?

- Yes: 77.6%
- No: 20.4%
- I am not quite sure: 2%
Question No14:

Are you in favor of NFTs?

- Yes: 49%
- No: 10.2%
- I am not quite sure: 40.8%

Question No15:

I think NFT is just a temporary thing, a trend, and it will burst like a bubble.
Question No16:

COVID-19 was a good opportunity for NFTs to be acknowledged by more people.

Question No17:

NFT is an easy case for anyone to deal with it.
Question No18:

NFTs open a new path in the art market.

Question No19:

It is safer to sell my Artwork using NFTs rather than any other conventional way.
Question No20:

NFTs can contain smart contracts that can give the artist, for example, a cut of any future sale of the token.

Question No21:

With NFTs artwork can be "tokened" to create a digital ownership certificate that can be bought and sold.
Question No22:

Anyone can copy and save NFTs and digital artworks.

Question No23:

With NFT the artist can retain the copyright of his work so that he can continue to produce and sell copies.
Question No24:

The NFT buyer holds a "token" proving that they own the "original" work or a part of it.

Question No25:

NFTs provide more opportunities for artists to exhibit their artworks.
Question No26:

Even if I like the idea of NFTs I am afraid to expose myself to the digital world.

Question No27:

I feel that learning and getting involved with NFTs is a waste of time.
Question No28:

I am afraid using NFTs is might prove risky in terms of money loss.

Question No29:

How do you react when you hear about or see NFTs?

- I see an article/video if the product or service is of interest: 34 (69.4%)
- I see the article/video regardless of title or images: 8 (16.3%)
- I keep scrolling because I do not want to see it: 5 (10.2%)
- I do not click on the article/video even if it seems interesting: 7 (14.3%)
Question No30:

I believe that NFTs are the future of the art world and the transaction of artworks.