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Non-fungible tokens: legal issues in an ever-changing ecosystem

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Introduction

The terrible pandemic era we lived in for 3 years has been the setting of the definitive explosion of one of the most relevant, and yet most discussed, phenomena in the fintech field, non-fungible-tokens also known as NFTs.

These represent the ultimate evidence of how the process of digitalization has become nothing but fundamental in our lives as human beings; early examples are the possibilities to check our e-mails, bills or documents online from our laptop or smartphone (always more and more included in our daily routines), culminated with the opportunity to access our online banking account in just a few seconds.

Non-fungible tokens represent a step-forward in this sense, making digital (but also real world) content even more appealing by associating it with one of the most highly requested features of any objects a consumer is willing to buy, that is unicity. However, this is not it, these tokens work as certificates of ownership and authenticity of the asset represented, this therefore enabling an improved safety and efficiency to the markets which they are adopted in.

NFTs' key point is that they are backed up by a blockchain, which is probably the most popular form of DLT (Distributed Ledger Technology), this guaranteeing safety and transparency to users, which will be found to be the fil rouge that connects the various and yet so different potential uses of these tokens; the capability of the blockchain to make buyers feel safe and protected, certifying what you are buying and from who, is something that we rarely saw related to similar items and is one of the most interesting aspects in the discussion.

In this way users are free to trust sellers and what they are buying exactly because the whole transaction process is backed up by a technology which is uncorruptible and consequently safe, this being a double strength since it both justifies their popularity and forms an "unlimited" set of scopes and uses.

NFTs can indeed be applied to worlds which are apparently distant from each other but whose associating factor is the need for a trustful document which, in most cases, certifies ownership; this led these tokens to be used initially in blockchain-based games (CryptoKitties case in 2017) and digital art, and then more recently started being applied to the most disparate sectors like metaverse and real estate. This variety of application, which is another major word when dealing with the topic, accompanied by the abovementioned safety feeling and by the users' capability of exploiting these NFTs'

characteristics to sell products that become exclusive, make these tokens a perfect asset of this era, with a significant part of the story that remains to be told given their evolution seems far from being ended.

The same variety which was just presented as one of the main benefits of non-fungible tokens can however present some downsides; NFTs' popularity indeed is positively related to a series of drawbacks that found in a missing legislative framework their apex. Their immense array of uses and features indeed tends to obstacle an adequate framing of these tokens from a normative point of view, with pieces of legislation at European Union level that either provide a vague regulation of the topic or even leave it completely out of their scope of application.

Considering their relatively new character which often is associated to low experience of users, mixing it with a general high volatility in prices that often reach millions of euros, we can easily infer how an adequate legislative framework should be a prerogative for the EU Lawmaker.

In the absence of ad-hoc pieces of legislation, what we will present in this thesis will be centered around the possible application of existing or upcoming EU directives and regulations to the topic, with an eye on the potential legal scenarios that may be delineated.

These considerations however will need to be backed up by an adequate assessment of the role and applications that these tokens are having in our society, with benefits and risks attached that have seen to be not so strongly acknowledged by most users who still have no clear idea of what these are and keep having a blurred view of the huge potential they share, this being way more common than we might think also due to the significant level of knowledge required to be able to move in the intricated Fintech world, not even mentioning the even more complex category of NFTs.

In order to provide an adequately deepened picture of the situation we are moving in, we must follow a step-by-step procedure so that we can discuss legislative linked aspects with a much more conscious approach.

The characterization of NFTs will be therefore initially discussed in chapter 1, with an eye on their categorization, bringing up relevant examples that can help visualize their relevance, while risks attached and possible issues will be faced in Chapter 2.

Subsequently in chapter 3, will be focusing on the legal matter; this being the cornerstone of the whole thesis, will be accurately deepened, with clear projections of how all the relevant existing pieces of legislations may apply to non-fungible tokens as well as

discussions of their implications. The respective sections will deal, inter alia, with a general framing of the NFT taken as a digital certificate/document, the management of royalties and copyright through these tokens, their VAT implications, possible application of Anti-money laundering Regulation, Markets in Financial Instruments Directive and eventually of the upcoming MiCA Regulation.

However, the topic remains quite new, therefore the fact that this thesis' belonging period is characterized by a legal framework which is the most far from being defined and by a mismatch between the evolution of the sector and the legislative procedure in terms of rapidity, must always be recalled.

These are crucial premises, particularly when analyzing the reasons behind the approach of this work which is necessarily based on rational hypothesis that try to forecast what could be the scenario once the EU Lawmaker will present an adequate set of provisions covering the topic.

The intent of the thesis, in addition, is that of evidencing a connection between the risks associated with these digital assets and the missing attention from competent legislative authorities, yes considering and presenting the difficulties the latter may face but always recalling the importance of an action from EU. Some countries, including Member States, are beginning to provide answers through legal sentences of domestic bodies or specifically created guidelines; nonetheless, the situation is still confused, and individual legislative measures may also create regulatory gaps among countries. The latter is a clear reason why a move from European Union is needed and some of the possible solutions that authorities may consider will be provided in this thesis, hoping that further clarifications will be given by competent authorities.

Chapter I

Blockchain and tokens, what are we dealing with

1.1 Some key concepts

Before the beginning of the real discussion, a brief introduction of the key concepts of “blockchain” and “token” will be provided to delineate important NFT-related points. These two terms, having a strong interactive relationship, play a crucial role in the digitalization process that is occurring since years, but keep being misused.

Here we report some points from an interesting paper by Freni et al. (2020)¹ which may give some context to our topic: «Once tokenized, every kind of value (in a broad sense) can be managed as a digital asset, whose unit of account is a dedicated virtual token. Such virtual tokens can be minted by any individual or organization that defines the set of rules governing them, such as the token features, the monetary policy, and the users’ incentive system» (Freni et al.: “Tokenization and Blockchain Tokens Classification: a morphological framework”, page 2, 2020).²

Such a description already evidences two aspects that will be discussed in a few lines: the first is the role of tokens as creators of manageable value, the other is how these can be potentially minted (created) by anyone with the latter being those which will be deciding on their features and specifics, thus introducing their extreme variability which will be seen to have large legislative implications.

The same paper, citing Easley et al. (2019)³ and Goodmant et al. (2004)⁴, states: « [...] just like the Internet enabled the free and fast circulation of digitized information, so the

¹ Freni, Ferro, Moncada: "Tokenization and Blockchain Tokens Classification: a morphological framework," IEEE Symposium on Computers and Communications (*ISCC*), 2020, pp. 1-6, doi: 10.1109/ISCC50000.2020.9219709. Available at: <https://helios-h2020.eu/wp-content/uploads/2020/08/FINAL-Freni-et-al.-Tokenization-and-Blockchain-Tokens-Classification-a-morphological-framework.pdf>

² Freni, Ferro, Moncada: "Tokenization and Blockchain Tokens Classification: a morphological framework," IEEE Symposium on Computers and Communications (*ISCC*), 2020, pp. 1-6, doi: 10.1109/ISCC50000.2020.9219709. Available at: <https://helios-h2020.eu/wp-content/uploads/2020/08/FINAL-Freni-et-al.-Tokenization-and-Blockchain-Tokens-Classification-a-morphological-framework.pdf>

³ D. Easley, M. O’Hara, and S. Basu, “From mining to markets: The evolution of bitcoin transaction fees,” *Journal of Financial Economics*, vol. 134, no. 1, pp. 91–109, Oct. 2019, doi: 10.1016/j.jfineco.2019.03.004

⁴ E. P. Goodmant *et al.*, “Media Policy out of the Box: Content Abundance, Attention Scarcity, and the Failures of Digital Markets,” *Berkeley Technology Law Journal*, vol. 19, no. 4, p. 1389, 2004, [Online]. Available at: <https://heinonline.org/HOL/License>

blockchain is allowing the “almost free”⁵ and borderless flow of digitalized value. The blockchain [...] introduced the concept of digital scarcity, as opposed to the digital abundance characterizing the Internet»⁶ (Freni et al.: “Tokenization and Blockchain Tokens Classification: a morphological framework”, page 2, 2020).⁷

This second citation, firstly evidences how blockchain technology can integrate with tokens and allow for circulation of digital value, then additionally highlights a key feature of the ecosystem in which we will be moving throughout this work which is digital scarcity creation.

Overall, we must recall that we are dealing with topics which are relatively new in their application (blockchain technology was created in 2008 but its extensive use just started, particularly in relation with tokens); thereupon, during this first analysis we will provide an overview of the background needed to build more accurate discussions on the core of this thesis which are non-fungible tokens. These indeed perfectly unify the concepts tokens and blockchain, thus implying that a description of the basics is foremost crucial, this always having in mind that the already mentioned new character of tokens and blockchain is even more recent for NFTs, currently part of an ongoing process.

Nowadays, contracts, transactions, documents, and certificates are elements that build the core of our society; however, the need to digitalize these data to keep it updated and easily accessible to users is a concept that may collide with another core necessity which is safety, and that’s precisely when blockchain makes its move.

Blockchain is a type of DLT (distributed ledger technology), meaning an «open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way» (Iansiti and Lakhani: “The Truth About Blockchain”, 2017)⁸, in plain words it is a distributed database that allows for transactions and related data to be recorded, kept safe and immutable as well as made accessible to anyone. It is

⁵ D. Easley, M. O’Hara, and S. Basu, “From mining to markets: The evolution of bitcoin transaction fees,” *Journal of Financial Economics*, vol. 134, no. 1, pp. 91–109, Oct. 2019, doi: 10.1016/j.jfineco.2019.03.004

⁶ E. P. Goodmant *et al.*, “Media Policy out of the Box: Content Abundance, Attention Scarcity, and the Failures of Digital Markets,” *Berkeley Technology Law Journal*, vol. 19, no. 4, p. 1389, 2004, [Online]. Available at: <https://heinonline.org/HOL/License>

⁷ Freni, Ferro, Moncada: "Tokenization and Blockchain Tokens Classification: a morphological framework," IEEE Symposium on Computers and Communications (*ISCC*), 2020, pp. 1-6, doi: 10.1109/ISCC50000.2020.9219709. Available at: <https://helios-h2020.eu/wp-content/uploads/2020/08/FINAL-Freni-et-al.-Tokenization-and-Blockchain-Tokens-Classification-a-morphological-framework.pdf>

⁸ Iansiti, Lakhani: “The Truth About Blockchain”, 2017, Harvard Business Review. Available at: <https://hbr.org/2017/01/the-truth-about-blockchain>

easy to imagine it as a series of different blocks, each one containing a given amount of data which, once completed, is “sealed” with a hash function, meaning a digital signature which must be validated by the computer nodes in the network.

What makes the blockchain so safe, besides the Proof of Work (PoW) which is the validation procedure using computing power to verify each transaction and add it to a block, is precisely the hash which is a type of cryptography based on a mathematical algorithm; each new block’s hash is based on the previous block’s hash, this meaning that any attempt of swapping blocks or modifying data would be detected.

What has not been mentioned yet is that there is no central organization that controls this technology, by over exemplifying we can say that integrity is ensured by the system itself through the validation procedure which implies that for a block to be added, a majority of nodes agreeing that that single block’s hash is correct is required.

Currently, one of the most frequent applications of the blockchain technology is related to the field of cryptocurrencies (with Bitcoin being the most renowned example), here this is used to keep record of the transactions in a safe and decentralized way; thereupon, as we will see, its uses also involve tokens and more precisely non-fungible tokens, with the related data being recorded.

This technology is still growing, experts believe the definitive implementation -to be intended as blockchain being adopted by most companies and sectors- will take place in a few decades. Nonetheless, what most agree upon is that blockchain is set to completely change our society by overcoming the lack of digitalization many sectors are currently facing, providing a safer and more transparent solution whose versatility is definitely a plus factor.

Tokens instead are a subset of the macro category of digital assets,⁹ they can be intended as a representation of value, or more generally as a representation of another element which could be physical or digital.

As Freni et.al (2020) explain, tokens are particularly interesting since they allow to «expand» and «partition» the concept of value by representing voting rights, copyright and many others abstract concepts besides concrete objects of the real world;¹⁰ this will

⁹ Defined as «non-tangible assets that are created, traded and stored in a digital format», see <https://www.gemini.com/cryptopedia/cryptocurrencies-vs-tokens-difference>

¹⁰ Freni, Ferro, Moncada: "Tokenization and Blockchain Tokens Classification: a morphological framework," IEEE Symposium on Computers and Communications (*ISCC*), 2020, pp. 1-6, doi: 10.1109/ISCC50000.2020.9219709. Available at: <https://helios-h2020.eu/wp-content/uploads/2020/08/FINAL-Freni-et-al.-Tokenization-and-Blockchain-Tokens-Classification-a-morphological-framework.pdf>

be also particularly relevant when we will deal with the main topic of this paper since the popularity of non-fungible tokens, we will see, also derives from the manifold of applications they can have.

A general taxonomy of tokens presenting those which we consider to be the most relevant (besides not including NFTs) can be outlined as: payment tokens, utility tokens and security tokens.

Even though the former typology identifies in Bitcoin its most famous example, we may mention most cryptocurrencies as falling in this category; these are meant to (and can only be) used as decentralized means of payment in a trade when buying or selling goods provided the two parties agree so,¹¹ all happening without intermediaries. In other words, payment tokens do the same job of fiat money like euro or dollar but in a “slightly” different way given that they are not backed or controlled by any government or authority and consequently countries have no power in using them as tools to control inflation or other macroeconomic factors. These can be thought as the simplest form of token among the three since, as instead we will see for the other two, payment tokens’ purchase does not involve the acquisition of any additional right for the holder besides the ownership of the token itself.

Utility tokens are more interesting at least in terms of features shared; actually, they can be thought of as vouchers given that their purchase implies the acquisition for the holder not only of the right of ownership of the specific utility token but also of additional rights which often involve the access to a given exclusive content, product or service provided by the token issuer’s platform.

An example is Smooth Love Potions (SLP) which is adopted in an online videogame called Axie Infinity; here by purchasing SLP, players have the right to access exclusive in game experiences which would be unavailable without that token.¹²

What must be clear is that utility tokens are strictly linked to the digital decentralized platform associated to the given token issuer, this meaning that, once used outside that virtual setting, the token becomes useless.

The last form of token in our classification is the security token, this can be viewed as a digital version of financial securities, meaning a financial asset whose value derives from

¹¹ Please, see <https://www.planetcompliance.com/what-is-the-difference-between-utility-security-and-payment-tokens/> for more.

¹² Please, see <https://crypto.com/university/utility-tokens-vs-security-tokens> for more.

an external asset and which may grant the holder its fractional ownership (just like shares), privileges as voting rights, dividends etc. but it may also imply obligations.

A token which can be defined as security token is certainly INX, whose platform allows customers to buy digital securities from a wide variety of businesses.

The similarity of these tokens with traditional securities is such that legislation tends to treat them as if they were the same, this eventually leads to a higher level of regulation on security tokens with respect to utility tokens that instead often tend to be unregulated. Additionally, what also differentiates these two is that security tokens can be seen as a more conscious investment with respect to utility tokens; this mainly derives from the strongest regulation applied to the former and to their issuers which generally distribute them through a security token offering (STO) which in many jurisdictions implies the issuance of an information disclosure document too (prospectus in EU). Instead, this doesn't happen with utility tokens whose sale is often affected by informational asymmetries between issuers and buyers with the latter often basing their offer price on hype, hoping an appreciation of the token will take place due to a wider adoption of the issuer's network.

Nonetheless, what is happening quite frequently now is the hybridization among these three categories, one of the most common is the one involving utility and security tokens an example of which is the Binance Coin (BNB). What unites these hybridizations is that the token brings together the strengths of each typology, this is indeed clear in BNB which is used to pay transaction fees on the Binance Exchange; basically the token when adopted on this exchange provides a discount on the actual transaction fees, the platform also redistributes a share of the profits to the BNB holders by «burning BNB tokens»¹³ consequently reducing the supply and increasing the Coin value.

The latter is an effective example since it brings together the strongest security token's characteristics (rights to dividends, ownership exc. are granted to the holder) and the common behavior of utility tokens' value whose increase is positively related to the platform's users' expansion.

The distinction provided above in the three plus one categories of tokens is crucial and becomes even more relevant when dealing with regulatory aspects in non-fungible tokens' ecosystem; indeed, we must be highly aware that different typologies imply also different forms and level of legislation for each token category. As a matter of fact, legal

¹³ Please, see <https://www.linkedin.com/pulse/hybrid-tokens-superior-utility-heres-why-thijs-maas/> for more.

provisions, as will be seen in chapter 3 when discussing the normative implications of NFTs, are largely built around taxonomies and classifications which are delineated following rational and accurate definitions of the subject matter. An anticipation of the problem, which will be clearer in a few lines, is therefore that the differentiation of tokens' typologies just provided actually does not furnish a transparent and undoubtful category where non-fungible tokens can fall in, and this constitutes a high obstacle to their legislation.

1.2 Definition of non-fungible token and main features derived

With tokens and blockchain that have been defined, we are now able to analyze NFTs in a much more conscious way, knowing what a token is and what can a blockchain-based character imply shall also allow us to understand that the collocation of the subject matter of this thesis in this intricated setting, is not that straightforward.

The focus of our discussion will therefore necessarily build up starting from a definition of non-fungible tokens, just to move then to deeper considerations on their features which will be retrieved directly from the definition itself.

The latter, when referring to non-fungible tokens, is however still lacking, at least if looking for a widely accepted one; therefore, we may provide two alternatives, these are both correct and simultaneously will pave the way to the introduction of different aspects consequently facing the most relevant points of the topic.

The first "definition" that may be provided is a short and straightforward one which can be retrieved by their name and sees NFTs as being tokens with a non-fungible and blockchain-based character, while the second is a more empirical one and defines these tokens as «certificates of ownership stored on a blockchain and associated to digital assets» (Bine et al.: "Regulatory Approaches to Nonfungible Tokens in the EU and UK", 2021).¹⁴

These delineations might sound confusing since they bring up an array of elements that basic users are not familiar with, thereupon the approach of the work must be based on a step-by-step approach that will allow to discuss the legislative matter (core of the thesis) having clear what are the main pillars of the whole question.

¹⁴ Bine, Robertson, Toms, Reeves, Vianesi: "Regulatory Approaches to Nonfungible Tokens in the EU and UK"- Skadden, Arps, Slate, Meagher & Flom LLP, 2021. Available at: <https://www.skadden.com/insights/publications/2021/06/regulatory-approaches-to-nonfungible-tokens>

First of all, NFTs are tokens, and these are non-fungible, therefore the point of departure must be therefore the necessary understanding of the context we are moving in; we are not dealing with an item taken as it is with its own attributes and properties, we are dealing with a token and thereupon with something that, as already anticipated, is not only quite articulated but which is used to represent something else. This makes an enormous difference, not only for the deriving variety of features attributed to these tokens but also for the NFTs-related pieces of legislation we will analyze in the upcoming sections of the work where legislators, issuers, buyers will need to be aware not only of the nature of the token they are regulating, selling, buying but also of the asset associated with that token. However, the main issue derived from this is that the asset represented may be of varying nature, it could be real estate, an artwork or a song and thereupon the identification of the most appropriate legislation covering NFTs is absolutely not immediate but, as the legal subject matter largely shows, the user must be highly liquid and dynamic to be able to deal with this topic.

As anticipated, for the moment the legislative perspective will be set aside and dealt in detail in the core of this dissertation while now the focus will be initially oriented specifically on the array of features that characterize NFTs, granting a detailed description of the points that significantly contributed to their popularity.

After having recognized the token facet, the second aspect that must be mentioned when it comes to properties derives directly from the definitions seen above, meaning the non-fungibility of NFTs; this is one of the most controverse parts at the center of continuous discussions on the legislative matter applied to these tokens.

In a nutshell, non-fungibility may be assimilated to the concept of not interchangeability, meaning the impossibility of two items to be equal and thereupon be traded as if they were the same; for a better understanding an example of the opposite will be provided, a casino chip for instance is fungible since it can be replaced by another identical casino chip, a further example may be a 10 euros banknote exchanged with another 10 euros banknote. Therefore, in plain words a fungible item is one for which there always exists one (or more) identical “twin” which our initial one can be exchanged with, meaning one with the same aspect, design, colors, value and properties.

A non-fungible token instead is built different precisely because it is non-fungible, it cannot be interchanged with another NFT, it is in other words unique, and unicity is an additional fundamental quality of these tokens deriving both from the specific identifying

code attached to them and from the asset or right these represent (which may be a unique painting from a famous artist, an exclusive watch etc.).

A further consequence of their uniqueness is that they enable the creation of «digital scarcity» as Arry Yu, chair of the Washington Technology Industry Association Cascadia Blockchain Council explained.¹⁵

Among the varying possible fields where these tokens can be applied, that of digital art certainly plays a relevant role in providing a clearer idea of what “scarcity creation” means. Indeed, it is in this sector, where anyone can have access to an image, copy it, print it, or duplicate it, that NFTs found one of their most frequent fields of application and made their move, significantly changing the “rules of the game”.

Buying a non-fungible token of a specific digital piece of art often means buying a digital certificate of ownership and authentication of something that is already accessible to anyone by simply using Google; the peculiarity is that such a token may imply an enormous spending as showed by the renowned case of the NFT of “Everydays-The First 5000 Days” by Beeple, which is a “record-braker” for this type of tokens, precisely because that given underlying becomes virtually attached to an NFT that makes it unique. Once analyzing what the latter’s purchase gave to the buyer, who paid nearly 69.3 million USD to obtain the acquisition of a jpg file of the work and a blockchain code certifying the authenticity of the underlying asset, together with some rights of display of the work, this may intuitively be perceived as a useless operation; however, this is justified by digital scarcity creation.

As an example, what the NFT brought to the Beeple’s work of art is indeed the possibility to attach to a virtual (and consequently easily distributed, copied or printed) piece of art, a unique identifying token that allows for a safe authentication and therefore simultaneously differentiates the original work from the thousands of identical images that anyone can print and display in their houses.

The ability of creating scarcity in the digital sector and in particular in that of digital art, is a key in understanding the importance that NFT have in terms of innovation; a field characterized by items to which a value could hardly be attributed due to their easy distribution or duplication, is now evolving to one where value is finally directly determinable as it happens with physical assets, and this in our opinion is already a reason to justify why these new tokens should not go unobserved.

¹⁵ Please, see <https://www.forbes.com/advisor/in/investing/cryptocurrency/what-is-an-nft-how-do-nfts-work/> for more.

In 2021, NFTs ended up generating a trading volume of more than 17 billion USD as a study developed by BNP Paribas-owned research firm L'Atelier shows;¹⁶ these are tremendously high values specifically if compared to the data regarding the previous year where “only” 82 million USD were generated. However, a legitimate question may arise on how users can be so confident on spending such high amounts of money in the trade of NFTs, in particular when thinking of sectors such that of art or collectibles which are renowned for the large presence of counterfeits and frauds.

This is easily answered through the introduction of an additional and certainly deserved mentioning feature of such tokens which is their ability of providing safety and transparency applied not only to transactions themselves but also to all the related data (ownership, authentication etc.).

This feature mainly derives from the blockchain-based character that these tokens share; the possibility of encrypting all the related data by storing it on the blockchain, allowing for an easier and safer certification of the work, thus impeding counterfeits to substitute the original asset, are fundamental processes that could already justify the NFTs' popularity.

When talking about blockchain technology and its NFTs' application it is necessary to make a distinction by pointing out the role of smart contracts which could go unnoticed to newbies.

Blockchain's function of provider of a «public proof of ownership» (Trevisi et al.: “Non-Fungible Tokens (NFT): business models, legal aspects, and market valuation”, 2022),¹⁷ of storing information indicated in an NFT's transaction as well as all the other processes of data management, are characterized by an automatization of the operations that takes effect precisely through the adoption of smart contracts.

These can be defined as computer programs working on a blockchain (most frequently Ethereum, but Solana and others support smart contracts too) which execute predetermined actions when specific events occur; it is important to denote the impossibility of these contracts to work as “thinking entities”, these will act autonomously only on the basis of an if-this-then-that relationship precisely as a vending

¹⁶ Please, see <https://www.cnn.com/2022/03/10/trading-in-nfts-spiked-21000percent-to-top-17-billion-in-2021-report.html> for more.

¹⁷ Trevisi, Visconti, Cesaretti: “Non-Fungible Tokens (NFT): business models, legal aspects, and market valuation”, Media Laws, 2022. Available at: <https://www.medialaws.eu/rivista/non-fungible-tokens-nft-business-models-legal-aspects-and-market-valuation/>

machine from which you buy your coke, if the right amount of money is inserted then the machine ejects the coke.

Smart contracts are largely used to execute automatic transactions between parties, a clarifying example might be an agreement between two parties in which one of the two agrees he/she will pay a given amount of money at 2 pm of a specific day to the other party; in this case the terms will be agreed and included on the computer code smart contract itself which will then be added on the blockchain and the transaction will be automatically executed.

When specifically referring to these contracts applied to NFTs the same procedure of information incorporation in the code takes place here too, the contract will be created once the NFT is minted, the code will include the details and features of the NFT as well as the associated rights and all this information will be added to the blockchain of reference for that specific token.¹⁸

What differentiates smart contracts' application to non-fungible tokens from their general use is that here they have a much more complex role implying not only the execution of automatic transactions when a token is sold but more importantly the storage of related data, the verification of authenticity and of the NFTs' ownership, consequently involving a safer conclusion of the deal. What smart contracts really implement to non-fungible tokens in plain words is the possibility of exponentially enhancing the safety surrounding the related transactions; terms are agreed beforehand, the related data and the certification itself is always transparent and open, anyone can have access to the information on the NFT on the blockchain, its owner and past history is deemed available data so that users can be always sure that those data are real, thereupon legitimately be confident of what they are buying and that no manipulation occurred given the incorruptibility of the system as a whole.

This technology is still growing, it can be reasonable to expect its definitive implementation will take place in a few decades; what is sure is that it will have a strong impact on intermediaries' role in most trades, involving not only NFTs but also real-world assets like real estate, causing most sectors to experience a dramatic increase in terms of automatization with significantly lower contribution by third parties or authorities needed.

¹⁸ Please, see: <https://cyberscrilla.com/nft-smart-contracts-explained/> for more.

An additional feature which has been barely touched upon up to now is the ownership granted by NFTs, we saw that these can be seen as “certificates of ownership”,¹⁹ thereupon, it becomes crucial to understand what the purchase of a non-fungible token implies in terms of ownership, even more having acknowledged the volumes of spending that they often generate.

As already mentioned, smart contracts on a blockchain act as cornerstones of the issuance and acquisition process; the creator of an NFT is setting all the properties, specifics, rules and rights’ attribution in the smart contract during the minting phase. Then, once minted, the PKI (Public Keys Infrastructure) is activated, this is basically constituted by two “keys”, the Private and the Public, both essential to the correct functioning of the interaction of owner and other users with the token itself.²⁰ In fact, once minted, the token is moved to a cryptocurrency wallet, the creator of the NFT will be the only owner of the Private Key which works as a pin to have access to it and make transactions; conversely, the Public Key can be obtained by anyone willing to know where the token is placed, in blockchain terms this can be thought of as an address.

What the owner of the token obtains is what is specified in the smart contract which also empowers him of concluding any transaction after obtaining the authorization granted by the Private Key.

In general terms, in case of purchase by a user of a token minted by another entity, the potential acquiror will obtain the NFT and the related rights; in this sense, it becomes crucial to be aware of what these rights imply. What is possibly even more important to keep in mind both from a legal but also more practical perspective is that the acquisition of an NFT doesn’t always coincide neither with the acquisition of the underlying asset (this being represented by the token) nor with the acquisition of copyright. In light of the easiness of reproduction and sharing of digital content which could coincide with the underlying asset, it is necessary to conduct a case-by-case assessment of what is included or not in the deal in order for the buyer not to incur in copyright law infringement and other financially disruptive conducts.

¹⁹ Bine, Robertson, Toms, Reeves, Vianesi: “Regulatory Approaches to Nonfungible Tokens in the EU and UK”- Skadden, Arps, Slate, Meagher & Flom LLP, 2021. Available at: <https://www.skadden.com/insights/publications/2021/06/regulatory-approaches-to-nonfungible-tokens>

²⁰ Please see <https://levelup.gitconnected.com/all-you-need-to-know-nft-wallets-custodial-vs-non-custodial-e4bdb0c50889> for more.

As another foremost feature of non-fungible tokens, indivisibility must be certainly discussed; when using this term, we usually refer to an object which doesn't allow for any partitioning and that is precisely what an NFT is also characterized by.

From a general perspective, when buying a non-fungible token, there is no possibility for the acquirer to buy just a fraction of it, he/she can either buy the entire token or not buy anything; the same happens for a concert ticket for instance, when you are willing to buy one you are perfectly aware that the purchase will imply you getting one ticket which is associated to a unique seat with a unique reference number (at least for that concert on that given date) and which will be reserved to the owner of the ticket only.

When it comes to NFTs, the same scenario can be delineated; in the act of buying one, the user must acknowledge the fact that that precise token won't be divisible, he/she won't be able to fraction it into smaller parts to distribute them to others for instance, he/she will therefore be the one holding the whole cake with the attached rights.

Nonetheless, there is a special case in which NFTs are actually "fractioned" which will additionally imply several differentiations in terms of EU regulation as will be seen afterwards; what we are referring to is the existence of fractional NFTs (F-NFTs). The latter may be assimilated to shares of ownership of a company in terms of functionality, meaning they allow for a bigger asset (the original NFT in our case) to be owned by several actors who behave just like shareholders with associated rights and privileges, who may see the price of their F-NFT go up or down according to the behavior of the single entire token. Fractionization is empowered through smart contracts where the owner of the single NFT decides the number of F-NFTs he/she is willing to create and the associated properties.

Despite these two categories of non-fungible tokens may be thought as being quite close in terms of functioning and applications, fractional NFTs must be considered as a separate entities; actually, these are treated in a completely different way from a legislative point of view and the mere fact that they are not an entire "item" but just a share of it, will be seen to imply several differences from the legislative perspective when comparing the measures applied to the two typologies.

In light of the significant amount of money we saw to be often required to afford an NFT which is causing the relative market to be perceived as elitist, what this process of "partitioning" allows is firstly a democratization of the tokens' ownership, enabling many

more users to have access to it by buying a share, this not forgetting about the higher liquidity in the crypto market generated.²¹

In this respect, what is worth mentioning is the development of secondary markets that will support the access of many more individuals to something which they would otherwise not be able to obtain such as an NFT representing their dream painting or digital piece of art but also luxury goods more generally which simply they could not afford in other ways.

An interesting example of the use of F-NFTs is the Unicly CryptoPunk tokens (uPunk), these simply are the fractional version of the renowned CryptoPunks (of which only 10000 exist); in a nutshell, what happened in 2021 was the issuance of 250 million uPunk tokens from an initial array of 50 CryptoPunks with the former being valued currently around 0.02 USD²² while the latter reached a peak of 23.7 million USD with the highest sale. It is interesting to note that through the fractionization process a link between the two tokens collection was established, owners of uPunks indeed obtained a right to bid to acquire a given CryptoPunk,²³ this meaning that in the case in which owners of 50% of the whole 250 million uPunks created, votes to unlock the collection of 50 CryptoPunks from which the latter were generated, each of these NFTs would be assigned to the highest bid.

It is evident that F-NFTs and NFTs share some similarities, nonetheless it is crucial to keep in mind that they are simultaneously far in terms of ownership granted, this is clear also in real world assets like shares when being the company owner or being one of its shareholders is completely different; however, the possibility to fraction non-fungible tokens can be a serious answer to the “missing democracy” feeling which was building around the NFTs’ ecosystem, thus their introduction sheds a light on several future possible implications of these assets.

In conclusion, we see that non-fungible tokens are much more than certificates of ownership; their features outline an articulated type of token whose analysis must be fully aware of its multifaceted structure in order to allow for a complete understanding of the subject matter.

²¹ Please, see <https://learn.bybit.com/nft/what-are-fractional-nfts/> for more.

²² Data taken at time of writing from <https://crypto.com/price/it/unicly-cryptopunks-collection>

²³ Please, see <https://learn.bybit.com/nft/what-are-fractional-nfts/> for more.

1.3 Classification

As can be easily inferred, the direct consequence of a high number of features listed is an equally significant number of possible applications; the discussion based on the most relevant definitions of non-fungible-tokens we provided above, brought up several themes that were useful to touch upon some key points concerning these tokens' uses both in real and digital world, however this clearly does not fully explain all the concepts that make up this intricate world and that is the reason behind the need for an analysis of non-fungible tokens from a more practical perspective that will give us a more precise classification of these tokens' different applications.

Something that was frequently mentioned up to now is that the most basic form of representing non-fungible-tokens is to consider them as digital representations of assets; quite intuitively this already opens the door for a set of uses that are the most far from being negligible.

Therefore, the continuation of our analysis will now focus on defining the different typologies of non-fungible tokens that will be seen to be strictly related to their possible application.

It must be highlighted that a satisfying classification of NFTs, preparatory to the creation of a legislative framework covering them, is hardly obtainable given the dozen of different factors (unicity, value, nature of the underlying asset, standards adopted in the minting phase, rights attached exc.) that should be considered; this would imply not only following an extremely long process bringing to a case-by-case assessment of the different features, but also it would bring us to a set of different categories that in some cases would overlap therefore ending up creating even more confusion to the reader.

Since this would actually be the exact opposite of the scope of this paper which, as said, needs to be based on clear and defined concepts in order to be adequately informative, the classification that will be provided in this section will consequently follow the one we consider to be the most exhaustive which happens to be also one of the most commonly used by popular NFT's marketplaces such as OpenSea as reported by Nadini et al. (2021)²⁴ but adding to it some categories which were missing in our view while being worth-mentioning.

²⁴ Nadini, M., Alessandretti, L., Di Giacinto, F. et al. "Mapping the NFT revolution: market trends, trade networks, and visual features" *Sci Rep* 11, 20902 (2021). Available at: <https://doi.org/10.1038/s41598-021-00053-8>

1.3.1 Art

The first typology identified according to this methodology is that of non-fungible-tokens used in the field of art, the role of NFTs in this sector has already been mentioned a few pages ago with the example of Beeple's "Everydays-The First 5000 Days" NFT; the latter was brought up as being the perfect example of one of the key features of these tokens, meaning digital scarcity creation.

The deeper the understanding of how things work, the more it becomes clear that art and artists find in non-fungible tokens the perfect ally in allowing them to financially exploit their works, something that they could not even imagine some years ago. Once minted the NFT representing their piece of art, their main profit is derived from the actual sale of this NFT, but that is not the end of it, the already mentioned relevance of smart contracts as cornerstone of the creation and management process intervenes again. In fact, if detailed conditions are specified in the smart contract, creators may also profit from the future re-sale of their opera to secondary acquirors that will provide them a payment in a way that could be assimilated to the royalties which we see applied to music for instance. In other words, anytime the NFT changes hands through an acquisition process between parties, the artist (creator) will get a percentage of that transaction.

Royalties' management will be faced in chapter 3 when analyzing legal implications, however an interesting example that may further clarify this mechanism is that provided by Trevisi et al. (2022);²⁵ here authors cite the case of French artist Jacques who decided to mint 191 NFTs, each representing one second of one of his songs (called "Vous") thus empowering his fans to gain ownership of a part of it. The project, besides the clear marketing purposes, accompanied by the willing of establishing a closer link with people supporting the artist, has also a financially relevant meaning since by selling these NFTs (each at a price of 0.065 ETH²⁶ which currently correspond to 78 EUR) he not only was able to obtain a considerable profit but, thanks to the smart contract on which these NFTs were based, the artist will automatically get royalties for any secondary sale of each token and fans will get parts of the profit that the song will generate.

²⁵ Trevisi, Visconti, Cesaretti: "Non-Fungible Tokens (NFT): business models, legal aspects, and market valuation", Media Laws, 2022. Available at: <https://www.medialaws.eu/rivista/non-fungible-tokens-nft-business-models-legal-aspects-and-market-valuation/>

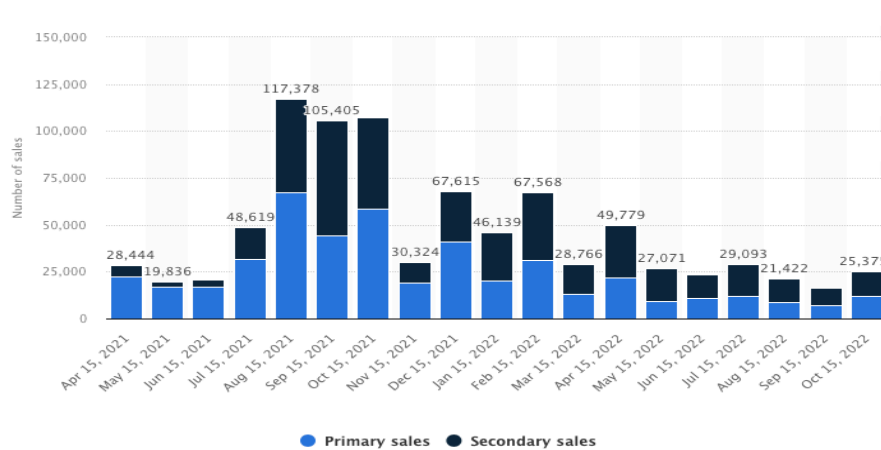
²⁶ Please, see <https://www.cointribune.com/en/columns/blockchain-music/own-a-piece-of-jacques-new-single-vous/> for more.

It is evident that sources of additional income as that implied by the payment of royalties, that do not come directly from the sale of the piece of art from the creator to the buyer as we (and artists) were accustomed to, represent a relevant boost to the growth of the digital art market and contribute to an overall increase of NFTs' secondary sales which at the time of writing (October 2022) reached the 70 billion USD in sales volume as popular crypto analysis network Dune reports.²⁷

It is of paramount importance to recall that when it comes to art, NFTs' application does not only limit to pieces of art intended as physical or digital pictures; music, videos and many other elements may be used as underlying asset.

What non-fungible tokens allow is precisely to monetize digital pieces of art that artists could hardly sell before these assets were born, this in turn is an explanation of the popularity reached by unique tokens in this field, testified by the graph provided below coming from the Statista Research Department showing the total monthly number of sales involving a non-fungible token in the art segment; in particular 12282 primary sales, and 13093 secondary sales were registered in October 2022 (Figure 1).²⁸

Figure 1: Total number of sales of NFTs related to the art sector, divided into primary (Light blue) and secondary (Blue) sales over a period going from 15 April 2021 to 15 October 2022.



Source: <https://www.statista.com/statistics/1235228/nft-art-monthly-sales-volume/>

What is interestingly inferred from this graph is that, besides the first months analyzed, the total amount of secondary sales is always significant in terms of size and often also reaches higher values with respect to primary sales. This finds a curious explanation which centers around the different probabilities of generating profits depending on whether the NFT is purchased through a primary or a secondary sale. As a report from

²⁷ Please, see <https://dune.com/queries/108492/219885> for more.

²⁸ Please, see <https://www.statista.com/statistics/1235228/nft-art-monthly-sales-volume/> for more.

Chainalysis²⁹ illustrates by citing transaction data from OpenSea marketplace, a primary sale of an NFT will result in a profit for the buyer only in 28.5% of the cases, whilst an NFT purchased on the secondary market will lead to a profit 65.1% of the times; this behavior can be explained by the higher tendency for sales concluded on secondary marketplaces to attract media attention, especially if the price reached is particularly relevant.³⁰

Consequently, creators are not the only ones benefiting from applications of non-fungible tokens to the art sector, buyers and sellers of NFTs in the secondary market are also involved. To these groups, art galleries must also be added; indeed, the possibilities of profiting from existing operas is being highly exploited by museums and other institutions. It is the case of the Uffizi gallery which recently decided to tokenize a Michelangelo work, the “Tondo Doni”, by minting a unique non-fungible token through a DAW (Digital Art Work) which was sold for around 240 thousand EUR, half of which were destined to the museum;³¹ the funds collected constitute a concrete monetary aid to the museum after the difficulties derived from the COVID-19 pandemic, the obstacles faced by European museums are testified by the words of Guido Guerzoni, professor at the Bocconi University-Milan, who declared: «Museums need revolution if they want to survive. In a year since the pandemic, European museums have lost 70% of their visitors and between 70 and 80% of their revenues».³² Further proof of application of this idea is provided by the British Museum which minted a collection of NFTs for the 200 artworks by Hokusai, with different levels of rarity that imply different numbers of editions.³³

To sum up, features such as the higher level of security and transparency generated by the blockchain-based character, together with the ability of creating digital scarcity that they showed, overall find in the art sector a key setting for NFTs’ potential that had an extremely positive effect on it; digital artists, users but also museums, galleries and auction houses are constantly increasing their investments in these tokens, thus legitimating the common thought that this market’s efficiency will be simultaneously enhanced by the growth in use of NFTs.

²⁹ Full report available at: <https://blog.chainalysis.com/reports/nft-market-report-preview-2021/>

³⁰ Please, see <https://tokenist.com/total-nft-secondary-sales-have-now-surpassed-15-billion/> for more.

³¹ Please, see <https://www.ilsole24ore.com/art/gli-uffizi-sdoganano-tondo-doni-versions-nft-AEuiMFK> for more.

³² Please, see <https://news.artnet.com/art-world/unit-london-digital-artwork-2074552> for more.

³³ Please, see <https://nonfungible.com/news/art/the-british-museum-is-auctioning-hokusai-nft-art-for-more>.

1.3.2 Gaming

When it comes to the gaming sector, it must be said that its most recent history is full of cases that show a dualistic behavior which has been characterizing it in the last years. In fact, this sphere, which could erroneously be considered simply as providing a hobby to most users, lately has been hiding instead a much wider scope; this sector is yet still partially committed to offer experiences based on fun and competition among players but simultaneously is mixing them with mechanisms of pay-to-win or play-to-earn (P2E) that imply several consequences on legal and technological terms.

Without going into technical details, on-line games became the perfect example to show the potential of digital platforms to build a sort of “closed economy” inside a virtual infrastructure (the game in this case), incentivizing users to spend real money to get in-game currency which is limited to that platform and can be used to get particular items which may have different purposes such that of helping them progressing (pay-to-win) in matches, provide additional content or simply give an aesthetically pleasing object that would modify the in-game player’s aspect. What frequently happens in this closed economy is that users, with the complete support of game creators, trade the items they bought among them, often also generating a profit, thus in this sense reinforcing even more the concept of closed economy.

Considering what has been presented until now, it becomes clear how such a scenario is a perfectly suitable setting for non-fungible tokens; this is precisely what the most recent history of these platforms tells us, with Axie Infinity and Alien Worlds representing just some of the most concrete examples of this phenomena.

In a nutshell, in-game assets (skins, land, weapons exc.) purchased by users can be converted in NFTs, assigning them a real-world value by making these tradable in open markets platforms via cryptocurrency transactions as any other token; this implies the potential for creating an industry that is no longer oriented only to gamers (intended as individuals that play just for fun), but also to investors, with users willing to buy in-game items and then sell them on platforms outside the game network once they have appreciated.^{34,35} A relevant example of this phenomenon is Axie Infinity, a game launched on blockchain that consists in buying creatures (called Axies) that are meant to breed, be

³⁴ Please, see <https://ieeexplore.ieee.org/abstract/document/9274085> for more.

³⁵ Please, note that often in-game items can appreciate through usage (experience) but also due to hype on the game itself as explained in this article: <https://www.ilsole24ore.com/art/nft-e-gaming-come-blockchain-cambia-regole-gioco--criptoarte-smart-tv-AE6JwM7>

used in battle and explore. One of the main implications of these creatures being represented by a unique non-fungible token, consequently acquiring the capability of having a certified ownership and be traded on open marketplaces as explained above, was that individuals started using the game as an income source; in particular, the process consisted in buying “cheap”³⁶ Axies, breed them by playing the game and then re-sell them at higher prices or earn SLP (in-game cryptocurrency to be exchanged then with other cryptocurrencies). From a given perspective it could be stated that the platform created new jobs, and this actually was true for some; however, unluckily it did not last long since in late March 2022 some hackers stole assets valued nearly 625 million USD from a subsidiary of Ski Mavis (the company running the game),³⁷ this brought to a sharp decrease in the number of players, causing many of the ones who invested in this practice (particularly diffused in Philippines) to get in debt,³⁸ simultaneously causing severe financial damages to the whole platform with AXS (Axie Infinity Shard), native governance token of the game, lowering its USD valuation from 70.94 USD on March 29, 2022 to 51.8 USD on April 2022, currently (October 2022) at values around 10 USD as shown in Figure 2.

What happened with Axie Infinity is something that may involve also other online games which base their functioning on cryptocurrencies and NFTs, this shall warn users on the instability that governs these markets. The idea behind the play-to-earn gaming is aiming at unifying the two worlds of work and digital entertainment which is undoubtedly a remarkable purpose, nonetheless this example should be indicative of some of the existing benefits and downsides that may be implied by a non-fungible-tokens’ application to this sector which, regardless of these issues and of the evident decreasing trend this has experienced in 2022 when compared to previous years, still constitute one of the largest percentages particularly in terms of volume in NFTs’ sales.

³⁶ Please, note that the lowest price was 93 USD as for October 2021, according to: <https://www.ijres.org/papers/Volume-10/Issue-1/Ser-3/H10013840.pdf>

³⁷ Please, see <https://www.nbcnews.com/tech/crypto/axie-infinity-hack-leaves-players-shaken-still-loyal-rcna23379> for more.

³⁸ Additional information on this can be found at: <https://coingeek.com/axie-infinity-left-thousands-of-filipino-players-in-debt-and-now-they-are-leaving-the-game/>

Figure 2: Trend in Axie Infinity Shards (AXS), the native token of Axie Infinity network, a sharp decrease in price expressed in USD is particularly evident in the last days of March 2022.



Source: <https://www.coindesk.com/price/axie-infinity/>

1.3.3 Real estate

Another pointful application of these tokens regards real estate, the latter representing an additional ideal example of how non-fungible tokens' features can be fully exploited, thus enabling the opening of further and completely new perspectives on future uses.

What we saw up to now is that NFTs tend to work effectively when we are dealing with asset's representation, being them digital or real-world items; in particular, the strongest benefit granted by these unique assets was denoted as being the trustfulness derived from their blockchain-based character (as seen within the digital art field's borders).

When it comes to the real estate business, it becomes of vital importance firstly to set up the main points that characterize most transactions concerning the sector; deals' closing here tend to be quite lagged in time due to factors such as the presence of intermediaries, the relevance of the acquisition which is usually significant in monetary terms and the high degree of attention required to be put on the recent (and even more remote) history of the property in question.

Therefore, it should be quickly inferred that these components' complexity may bring to possible transactions' failures that directly impact on market efficiency; it is sufficient to think about having difficulties in getting reliable info in relation to house-safety conditions such as knowing when did the last checkup of the gas lines took place, to understand this point.

In this case, having an NFT associated to the property may constitute the most efficient solution to grant all the relevant information is kept safe, reliable and easily obtainable,

not even mentioning the possibility to program the NFT through a smart contract which is an aspect that could have a serious impact on the speed of execution of given, predetermined actions that may, inter alia, affect this sector.

An interesting feature of non-fungible tokens that has already been mentioned but could represent a real turning point for this type of asset's application, is the fractionization of NFTs.

As a matter of fact, what is finding tangible proofs in the real estate sector when it comes to non-fungible tokens is the division of a token representing the ownership of a property into different parts, consequently allowing for a sort of shares of the house or apartment in question to exist. This can be particularly useful in cases in which married couples are willing to split ownership of the house among them for joint mortgage purpose but may also find application to favor shared ownership for joint investors.³⁹

As a general guideline, a real estate NFT is minted by tokenizing all deeds related to a specific property; however, given this practice is relatively recent, there is no extensive literature covering the topic and suitable examples are not easy to be found. Some houses' deeds in the US were tokenized and sold (one in California through an auction whose highest bid was made in ETH, in an amount that was worth approximately 653 thousand USD), but again this is one of the few tangible representations of this newly born phenomena.⁴⁰

The obstacles to real estate's non-fungible tokens are many, including legislative issues that arise when dealing with these tokens' classification and with tax laws that can be difficult to set up, at least initially; nonetheless this surely represents one of their most interesting applications capable of ensuring safety, transparency and rapidity to a sector where these factors can be priceless.

1.3.4 Healthcare

Healthcare sector was at the center of many discussions during and post COVID 19 pandemic which tested extensively its stability and efficiency, this ended up highlighting several pitfalls this area had, with the main downsides that were particularly evidenced in many core functions of the whole process such as supply chain management and data management.

³⁹ Please, see <https://www.forbes.com/sites/forbesbusinesscouncil/2022/08/04/guide-to-using-nfts-in-real-estate/> for more.

⁴⁰ Please, see <https://www.apriorit.com/dev-blog/782-blockchain-nfts-for-real-estate> for more.

The former was exposed to several critiques principally linked to a lack of visibility that implied difficulties in keeping track of the quantities of medical equipment available and of the funds' use; just recall what was happening in Europe with the COVID 19 vaccines that were bought by each country government in quantities that often turned out to be excessive and ended up in a significant part being thrown away, counterfeit medical equipment was also frequently discovered causing additional troubles to an already confused situation.

Clearly, the pandemic era was an exceptional scenario that exposed all sectors to high risks which were never experienced before; however, it would be not so smart to waste the possibility to fix some problems whose presence was revealed by these dramatic events. The tokenization of medical assets may indeed be a key solution to the problem, by assigning a specific hash (and consequently a specific non-fungible token) to each item we would be able to immediately track their properties, origin and features, consequently enabling a prompt identification of counterfeits and an adequate record-keeping of inventories by healthcare organizations thus impeding excessive supply, avoiding waste and allowing for a rapid recognition of lacking sections (Musamih et al. (2022)).⁴¹

The other point raised was presence of downsides in the data management process, patients' information is probably one of the most valuable assets in this industry, their record management, besides important for the entity in question, is also crucial for the patient himself. However, despite this relevance, this type of data is often difficult to register due to fallacies in the healthcare system or may even be subject to a partial registration, letting out crucial details that may have a point in finding a solution to a given medical issue. Let's imagine how improved the diagnosis of a medical disease would be if all data on the patient (or on others with the same symptoms) was readily available to operators thanks to a system of data exchange through hospitals and medical organizations via NFTs; indeed, a further problem raised by Musamih et al. (2022)⁴² and exasperated by the pandemic, is the inability for an healthcare network to have either

⁴¹ Musamih, Salah, Jayaraman, Yaqoob, Puthal, Ellahham: "NFTs in Healthcare: Vision, Opportunities, and Challenges", IEEE Consumer Electronics Magazine, 2022. Available at: <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9850370&tag=1>

⁴² Musamih, Salah, Jayaraman, Yaqoob, Puthal, Ellahham: "NFTs in Healthcare: Vision, Opportunities, and Challenges", IEEE Consumer Electronics Magazine, 2022. Available at: <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9850370&tag=1>

access to medical records of patients that are held by others or, on the contrary, the possibility to share patients' information from an organization to a third party without his/her consent. Under this perspective, NFTs' adoption in the healthcare sector's data management would enable the tokenization of medical records and a safer handling of information which would be easily shared among networks if needed and authorized; conversely, in case of missing authorization, data on such a sensible subject matter would be safely stored on the blockchain.

The last aspect related to the healthcare sector on which NFTs may intervene is the integration with digital twins' creation, that is the setting-up of virtual representation of real assets which are then associated to specific NFTs; it must be noted that this may be exploited in several fields besides healthcare but the underlying idea of optimizing the physical assets' performance through a study of the digital twin would be the same. Again, the example brought up by Musamih et al. (2022)⁴³ suggests a pointful possible application of this type; having built a digital twin of an hospital and linked it to a non-fungible token could have avoided problems appeared during the pandemic through the research of an optimization strategy that may have tackled the overcrowding of these organizations and eventually helped reaching a more efficient management also of other structures thanks to the possibility of sharing the project attached to the token.

As can be easily inferred, healthcare is a peculiar field in which interests and the presence of country-specific methods of organization must be accounted for, even more so when discussing innovations like that of tokenization that could potentially revolutionize the whole sector; disparities in legal treatment of these entities among EU Member States must also be considered, nonetheless NFTs certainly represent a smart solution to past and possible future issues in such a fragile ecosystem.

1.3.5 Collectibles

Collectibles' sector includes an array of items that is extremely large, these go from more real-world-alike items like postcards to assets strictly belonging to the digital field such as sport videos, GIFs and various "creatures" that overall make up a huge market which has been often indicated as the largest in terms of volume of sales generated.

⁴³ Musamih, Salah, Jayaraman, Yaqoob, Puthal, Ellahham: "NFTs in Healthcare: Vision, Opportunities, and Challenges", IEEE Consumer Electronics Magazine, 2022. Available at: <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9850370&tag=1>

CryptoPunks and CryptoKitties, which have already been mentioned in this thesis (the former when fractional NFTs were discussed), are two of the most prominent symbols of non-fungible tokens in the collectibles area, but also of NFTs in general given the role of pioneers they had in their history.

CryptoPunks base their popularity on being one of the first NFTs created back in 2017, they are quite limited in volumes (only 10.000 exist), and this partially justifies their current price floor of 64.99 ETH (as of October 28, 2022)⁴⁴ which correspond to almost 100.000 EUR.

On the contrary, CryptoKitties build up a larger collection of items with more than 2 million tokens, some of which can be traded (particularly at the time of writing) at much lower prices with respect to CryptoPunks which can be contained in an interval going from 30 to a few hundred EUR;⁴⁵ however, for the sake of clarity, it must be stated that peaks in which some of these were sold for more than 800.000 USD have been observed too, but these keep being extreme cases which current trend can hardly confirm.

The two collections described above are both symbols of the digitalized collectibles era which NFTs are leading, CryptoPunks are NFTs representing 24x24 pixel images of unique characters, algorithmically generated, whose look (probably the most iconic NFT collection as of now) was largely influenced by the Punk groups in London underground. CryptoKitties instead are a set of NFTs representing digital cats which the user buys, breeds and collects through an online game based on Ethereum Blockchain, these cannot be destroyed nor replicated and are consequently unique; however, a cool feature that is worth mentioning is that two CryptoKitties can breed and create a new creature with traits that are the combination of the parents,⁴⁶ users may either start by buying two cats and then breed them or buy a single cat to cooperate with another user.

This said, going to the more technical aspect, the way both these tokens work in this specific but very large sector is therefore not so different from usual tangible collectibles that many of us used to collect when we were kids, being them cards, coins or other objects; these two examples, besides the undoubted subjectivity on which any judgement on the aesthetic of an item and the consequent value attributed are based, are collections of unique tokens, each with specific characteristics that make users more willing to get one over another simply because of their personal taste, additionally often creating the

⁴⁴ Data taken from <https://nftpricefloor.com/cryptopunks>

⁴⁵ Data taken from <https://nonfungible.com/market-tracker/cryptokitties>

⁴⁶ Please, see <https://nonfungible.com/market-tracker/cryptokitties> for more.

desire to obtain a full set of items to be the only owner of the entire collection. As the extremely high prices these tokens may reach may suggest, it is clearly hard for the majority of individuals to end up having a whole set of NFTs of such expensive and demanding collections but it is also simultaneously evident the psychological mechanism that is created in the human mind once these tokens get to a sufficiently high level of popularity, with individuals struggling to buy at least one of these tokens simply as others would do with any tangible collectible in the real world.

What the comparison among these two types of tokens also highlights is another crucial but “hidden” feature of non-fungible tokens, meaning the creation, through digitalization, of a market that can “democratize” the ownership of assets (particularly the most expensive ones),⁴⁷ in other words satisfying a larger portion of clients conversely to what may happen with physical collectibles. As can be easily inferred, people willing to spend almost 100 thousand EUR on a CryptoPunk are likely to be lower in volume with respect to those willing to get a CryptoKitties for a few hundred; thus the contraposition of a collection of tokens with a pretty limited number with another one having more items implies that a larger part of users with different financial capability and interests can be targeted, this ultimately evidences even more the potential of the digital world to include almost any kind of user in its target given the large variety of products offered which does not limit to a few products’ type.

As anticipated in this section’s introduction, collectibles-related NFTs frequently include also sport gadgets like videos, highlights but also more general merchandise. Examples can be found in the NBA or in the football ecosystems, where we are seeing an always increasing number of teams (even from the Italian Serie A) building partnerships with NFT companies issuing tokens associated with digital kits, highlights of the game and access to exclusive content; a concrete case is the renowned NBA top shot, a platform launched by NBA and Dapper Labs in 2020 which allows the trading among users of videos of highlights of the NBA in the form of NFTs. The latter is a project which has experienced a tremendous success in the beginning of 2021 with sales on the platform amounting up to 45 million USD according to a recent report published on “theverge.com”.⁴⁸ A more “European” example is the AC Fiorentina “VIOLA 9.5”

⁴⁷ Please, note that this concept can be assimilated to the one introduced when F-NFTs were discussed in paragraph 1.2.

⁴⁸ Full report available at: <https://www.theverge.com/23153620/nba-top-shot-nft-bored-ape-yacht-club>

collection where the official kit for the season 2021/22 was tokenized and made available for purchase in 95 unique NFTs to allow fans to «own a part of Fiorentina».⁴⁹

To sum up, items that can be collected may take almost any form, from the cheapest and apparently worthless jacket button to the most desired and expensive asset, this is what unites the real and digital worlds, and thus shows that by defining what NFTs did in the collectible's sector as something not new, we are not that far from truth. Nonetheless, what these tokens allow is the trading and collecting of digital unique items which otherwise would be treated as copies, precisely given their non-tangible character that does not admit a way to distinguish an original item from its copy or fake.

In other words, what non-fungible tokens add to this sector is the possibility to enlarge even more the set of collectible items by including digital assets that can now be distinguished, knowing which is the original and which is not. NFTs working as certificates of ownership providing the capability of ensuring the distinction of unique digital asset from the rest, are an additional example of creation of digital scarcity, which is precisely what we already defined to be a key feature of these tokens.

Moreover, as seen for the other sectors, one of their main advantages is their blockchain based character that grants a safe storage for data on the specific collectible, consequently enabling a more efficient authentication process which ends up tackling the lacking trust and transparency that characterize this market as well as the art one, as explained in the previous section.

1.3.6 Metaverse

“Metaverse” is a term at least as popular as “non-fungible tokens” nowadays, however, what also connects these two besides their popularity, is that the concepts behind them may be erroneously perceived as easy to understand while in reality hiding several more complex aspects.

We could define Metaverse by following the words used by Belk et al. (2022)⁵⁰ who, by citing Hollensen, Kotler and Opresnik (2022), delineated it as a «3D digital space» where «users can come together via avatars that resemble them and mimic their movements, so

⁴⁹ As the Fiorentina official statement, available at: <https://www.acfflorentina.com/it/news/tutte/extra/2021-07-30/acf-fiorentina-con-genuino-nft-per-connettere-mondo-digitale-e-reale>, states.

⁵⁰ Russell Belk, Mariam Humayun, Myriam Brouard: “Money, possessions, and ownership in the Metaverse: NFTs, cryptocurrencies, Web3 and Wild Markets”, *Journal of Business Research*, Volume 153, 2022, Pages 198-205, ISSN 0148-2963. Available at: <https://doi.org/10.1016/j.jbusres.2022.08.031>

that they can interact with each other and the surroundings, which also replicates the physical world» (Belk, Humayun and Brouard: “Money, possessions, and ownership in the Metaverse: NFTs, cryptocurrencies, Web3 and Wild Markets”, page 199, 2022).⁵¹

Thus, this might be intended as a digitally implemented 3D reality which emulates what happens in the real world by creating a virtual dimension in which users can undertake various actions. While technicalities on how to access these types of digital platforms are left outside the scope of this work (it sufficient to know the main roles here are played by virtual reality (VR) and augmented reality (AR)), on the contrary, Metaverse’ potential implications must be discussed always with an NFT-related approach as the recurrent methodology of this thesis.

The creation of an “alternative world” in which users can virtually buy land, build houses, play games, try on clothes, watch movies and basically perform almost any action that is usually “relegated” to the real world (with real consequences), causes the tendency of abandoning the fear of consequences that a given behavior may imply and leaves space to experiment things individuals could or would not try in the physical world for a variety of reasons that include both rational but also economically-related arguments.

To make it clear, let’s assume an individual is very passionate about cars but cannot afford to buy a real one, he could opt to purchase an NFT of his/her favorite brand which may even allow the disposal of the car in the Metaverse. This, assuming the NFT of the car goes for a cheaper price than the real asset, would potentially imply an extremely enlarged set of targeted customers that may find in the token a valuable asset, capable of satisfying their desire to get an expensive supercar without spending tremendous amounts of money; what some may argue is that getting the NFT of a car is not the same as getting the car itself, this is clearly one of the main pitfalls of tokens of this kind but the ability of digital worlds to get more and more immersive and “real” must also be taken into consideration, with virtual reality’ potential that cannot be underestimated.

At the time of writing, there is no actual evidence of this specific kind of application, however many examples of large car brands investing in the Metaverse and more generally in non-fungible tokens is something that is happening way more frequently than we might think. One of the most recent cases is the one of Ford which, on September 2022, was reported by the USPTO (United States Patent and Trade Office) attorney at

⁵¹ Russell Belk, Mariam Humayun, Myriam Brouard: “Money, possessions, and ownership in the Metaverse: NFTs, cryptocurrencies, Web3 and Wild Markets”, *Journal of Business Research*, Volume 153, 2022, Pages 198-205, ISSN 0148-2963. Available at: <https://doi.org/10.1016/j.jbusres.2022.08.031>

law Mike Kondoudis to have registered various trademarks of their vehicles and brands with the intent of associating non-fungible tokens to virtual versions of cars, SUVs and others; moreover, the American brand has also been leaked to be willing to open an NFT marketplace.

This is an example which may be accompanied by what has been done by many other renowned brands in the automotive sector recently; to see the bigger picture, brands like Lamborghini, Bentley, Nissan and Toyota, have been investing in this field too, with the former, as an article from Ledger Insights reports,⁵² that has announced a new set of NFTs, following the two collections respectively created in 2020 and 2022, which implied a set of digital stamps and 5 digital space keys.^{53,54} We see how these examples, even though not being strictly related to the Metaverse, show how car brands are moving and getting closer and closer to the non-fungible tokens' world, thus making more plausible future investments of these industries in the Metaverse field, just like Ford is doing.

What is happening with the American vehicles manufacturer may help us presenting further examples clarifying the relevance of the Metaverse intended as field of application for non-fungible tokens; Gucci, Louis Vuitton and Balenciaga are just a few of those luxury clothing brands which are getting increasingly closer to this kind of digital infrastructures, with less "elitist" brands like Nike that are also moving towards this direction. The Oregon-based colossus announced its first NFTs collection in 2022 which will be released with RTFKT, a sneakers brand Nike acquired in December 2021; the launch regards several digital sneakers named "Nike Cryptokicks" that are based on the most popular silhouettes of the brand.⁵⁵ Together with this project, Nike has also launched a new physical hoodie dubbed Rtfkt x Nike AR Genesis that embeds an NFT of the digital version of the real item which can be worn by the owner's avatar in the Clone X RTFKT platform.

As already specified and inferred from what has been said with reference to cars and clothing brands, Metaverse, when combined with non-fungible tokens, opens several possibilities for a wide variety of businesses. The possibility to create a digital reality

⁵² Full article available at: <https://www.ledgerinsights.com/lamborghini-road-trip-nft/>

⁵³ Please, see <https://www.ledgerinsights.com/lamborghini-releases-blockchain-collectible-of-huracan-sports-car/> for more.

⁵⁴ Please, see <https://www.ledgerinsights.com/lamborghini-nfts-space-keys-linked-to-space-exploration/> for more.

⁵⁵ Please, see <https://hypebeast.com/2022/4/nike-rtfkt-nft-virtual-sneaker-news-info> for more.

attributes creators and brands with the power to modify the virtual space and implement almost any feature they can think of; such conditions allow many other sectors to potentially be associated to the Metaverse besides those already discussed in this section, as digital real estate and events for instance.

As concerns the former, it must be premised that owning a digital real estate property directly implies a huge amount of additional options of use for the owner, that may cause an easy appreciation of the property; thus, the discussion on NFTs related to real estate in the Metaverse is probably even deeper in terms of application with respect to the one undertaken in the previous section of this thesis which was instead specifically intended to study the same concept applied to the physical world only. This said, we have several digital platforms or games on which the user can purchase virtual land or buildings (Decentraland, The Sandbox, exc.), the process usually implies the acquisition of an NFT with cryptocurrency, which certifies the ownership and authenticity of a specific piece of land; the acquired asset will then belong to the owner who will be able to dispose of it within the platform. The acquisition is often seen as an investment given the extremely high values these assets can get to, this is due to two reasons: the value of the asset itself (fil rouge with real-world properties) and the possibility for it to appreciate, as already anticipated, through events, concerts, games or marketplaces that can be “hosted” on that land, as reported by Armstrong (2022).⁵⁶

Decentraland is an example in this sense; this is one of the main games or metaverses, based on Ethereum Blockchain, in which the user explores a world which is continuously evolving and has as its cornerstone three tokens: LAND, Estate and MANA.⁵⁷

As concerns the latter, this is a fungible token which can be seen as the cryptocurrency to be used within the game, LAND and Estate are instead completely different types of tokens which are created to be unique; these two are clear examples of NFTs since they basically represent parcels of digital land in Decentraland, either merged and not,⁵⁸ that the user can acquire by using MANA.

It is foremost notable the possibility for owners of LAND or Estate to host events on their property as well as organizing many other activities, thus again enlarging even further the array of possible companies or businesses that may be interested in investing in

⁵⁶ Armstrong A.: “How to Buy Real Estate in the Metaverse”, Entrepreneur.com, 2022. Available at: <https://www.entrepreneur.com/science-technology/how-to-buy-digital-real-estate-in-the-metaverse/432480>

⁵⁷ Please, see <https://www.gemini.com/cryptopedia/decentraland-defi-ethereum-based> for more.

⁵⁸ Please, note that two (or more) adjacent pieces of LAND can be merged in Estate.

Decentraland or in any other Metaverse game capable of granting an adequately high mainstream exposure, consequently leading the company to a profit also in terms of advertisement. In this sense, the move made by Rarible, one of the most popular marketplaces for NFTs at the moment, who opened an art gallery on a piece of land in Decentraland called “Rarible gallery” in which several digital artworks are displayed, is self-explanatory.

By summarizing, we have already seen what these tokens can bring to real world properties and now we are able to conclude that, by comparing their use in real-world and digital real estate, these show several similarities; starting from the safety and transparency of the transaction concerning the relative ownership, to the general informative relevance that these tokens may have in enabling a check on all the aspects and details related. Together with these points, also some discrepancies can be found, one main advantage of Metaverse real estate is that the owner, as well as friends or associates can access the virtual space immediately, completely omitting any occurrence like traffic or travel time which could obstacle them;⁵⁹ this, in addition to the possibility of exploiting the property in ways that are not common to the physical dimension, contributes to set defined boundaries separating the two dimensions.

However, in some cases these two are getting closer and closer, with Metaverse’s real estate being designed as exact virtual representations of real-world ones or physical houses being sold together with an NFT representing ownership rights on their digital copies. A case showing the phenomena is surely the MetaReal mansion in Miami; the property, set to be listed for auction in 2023, is defined by creators as «A real-world new construction in Miami, FL that includes a digital twin in the Metaverse»,⁶⁰ the digital copy will be built on Sandbox.

In conclusion, the Metaverse can represent a strong contender to the other NFTs’ possible uses analyzed in this thesis for the award of their most relevant application. Overall, the amount of features discussed, despite being surely large, provides explicit proofs of what is the subject matter in place; its future evolution, being it an ever-developing technology, underlies the importance of considering also the fact that many of these tokens’ uses in the Metaverse can arise in the upcoming years. It cannot go unobserved for instance, the current lack of connection among different metaverses (the disposal of a piece of land

⁵⁹ Please, see <https://www.entrepreneur.com/science-technology/how-to-buy-digital-real-estate-in-the-metaverse/432480> for more.

⁶⁰ As official website, available at <https://www.metaresidence.io/>, reports.

bought on Decentraland is restricted to that platform, and the same holds for the other types of assets) which, in particular considering the ability of associating to the given item a universally recognized character of reliability and safety that NFTs share, could be solved by potentially enabling the crossover of digital assets to be used simultaneously on different metaverses. The latter should be taken as an optimistic forecast that shows no actual evidence in practice; however it is not so unrealistic to think about a possible unique multiverse englobing all the different metaverses under a single platform where each asset is associated with a unique non-fungible token and blockchain granting a decentralized control of the whole process.

What is sure is that the answers in monetary terms are being extremely positive, with forecasts for the Metaverse market that see it hitting the enormous volume of almost 600 billion USD by 2027,⁶¹ thus implying the almost direct and consequent enlargement of the NFT market associated to these platforms.

1.3.7 NFTs as investment instruments

Considering what has been presented until now, it should be foremost clear that non-fungible tokens keep on building a huge market that is characterized by a large number of applications and high monetary values. Under a global perspective, the growth on the financial side has been extremely sharp, in particular data on sales volume generated by art, collectibles and gaming related non-fungible tokens show that the most significant increase was generally observed in the second half of 2021, with peaks of daily sales amount of respectively 29, almost 220 and 54 million EUR generated on a daily basis by these three sectors.⁶² These data, combined with an undeniably high potential for future applications that eventually could bring even more participants in the field to invest funds, overall can create the perfect scenario for investments and speculation, the possibilities to find an NFT with good financial performance in such a developed array of fields tend to increase due to a direct positive correlation with the enlargement of the market itself, consequently allowing users to get a profit from trading the various tokens in addition to gains generated from minting and selling in primary or secondary markets.

⁶¹ Data taken from <https://www.prnewswire.com/news-releases/at-44-8-cagr-metaverse-market-size-to-hit-usd-596-47-billion-by-2027--says-brandessence-market-research-301425171.html>

⁶² Data taken from <https://nonfungible.com>

The use of NFTs as investment instruments is thus not as utopic as may be thought, a recent study by Schaar and Kampakis (2022)⁶³ interestingly analyzed what would have been the consequences of investing in CryptoPunks, based on an observing period going from 1 June 2018 to 31 May 2021 for a data set of more than 11000 transactions. These NFTs, as already specified in this thesis when collectibles applications were discussed, have reached a 100 thousand EUR price floor in 2022, thus highlighting a more than significant valuation. As the paper just cited shows, CryptoPunks would have been a really performing investment in the 3 years observing period, with an average monthly return of 34.19% and a standard deviation of 61.76%;⁶⁴ to assess the relevance of these results it would be useful to compare them with S&P 500 index, which on the same observing period showed an average monthly return lower than 1.5%,⁶⁵ and the same would hold when considering other assets' performance, precisely as Schaar and Kampakis effectively did. Their study, by using several types of assets as comparative measure in the observing period, left absolutely no doubts on which asset outperformed the other, with similar findings obtained by Kong et al. (2022).⁶⁶

The punk-alike unique tokens' behavior was compared to that of other digital assets like Bitcoin or Ethereum which showed respectively 7.61% and 9.40% average monthly return, consequently distinguishing them completely from CryptoPunks in terms of performance. Despite the significance of these results, the more traditional assets like T-Bills or 10-Year US bonds, showing respectively a 1.22% and -0.40% values for the same measure, were those that highlighted the most significant gap with this NFT collection.⁶⁷ It is crucial to note that this financial trend is not relegated only to CryptoPunks but instead is also common to further types of NFTs as other studies have found; it is the case

⁶³ Schaar and Kampakis: "Non-Fungible Tokens as an Alternative Investment: Evidence from CryptoPunks", The JBBA, 2022. Available at: https://scholar.googleusercontent.com/scholar?q=cache:wMGNE8eazjMJ:scholar.google.com/+nfts+as+investment+&hl=it&as_sdt=0,5

⁶⁴ Schaar and Kampakis: "Non-Fungible Tokens as an Alternative Investment: Evidence from CryptoPunks", The JBBA, 2022. Available at: https://scholar.googleusercontent.com/scholar?q=cache:wMGNE8eazjMJ:scholar.google.com/+nfts+as+investment+&hl=it&as_sdt=0,5

⁶⁵ Individually computed from data taken from https://ycharts.com/indicators/sp_500_monthly_return

⁶⁶ Kong, De-Rong and Lin, Tse-Chun: "Alternative Investments in the Fintech Era: The Risk and Return of Non-fungible Token (NFT)", (August 30, 2021). Available at: <https://ssrn.com/abstract=3914085> or https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3914085

⁶⁷ Schaar and Kampakis: "Non-Fungible Tokens as an Alternative Investment: Evidence from CryptoPunks", The JBBA, 2022. Available at: https://scholar.googleusercontent.com/scholar?q=cache:wMGNE8eazjMJ:scholar.google.com/+nfts+as+investment+&hl=it&as_sdt=0,5

of Decentraland LAND NFTs for example, studied by Dowling (2022)⁶⁸ which turned out to have a lower, but still significant average monthly return of around 9% based on a smaller period going from March 2019 to March 2021 and a lower number of observations (4936 transactions).

Non-fungible tokens additionally share other features that make up a good investment instrument besides the variety and the financial performance measures just provided; as the already mentioned study by Scharr and Kampakis found, correlation in returns between CryptoPunks and the other assets analyzed (T-Bills, Ethereum, Bitcoin, 10-years US bonds, exc.) is relatively low, thus suggesting these could constitute a useful aid when willing to diversify a portfolio.⁶⁹ Values such as the -0.44 correlation between CryptoPunks and T-Bills, 0.36 with 10-years bonds in the US and with Bitcoin, as well as a 0.26 with Ethereum, could however be considered also under a different perspective; in particular, building a strategy around these tokens, based on the positive correlation existing among them and the two cryptocurrencies analyzed, could result in a profitable method, this being partially justified by the fact that NFTs are largely purchased via these new virtual means of payment.

Despite the usefulness of the above-mentioned studies, two considerations must be taken: first, it should be borne in mind that the papers refer to a period ending more than one year ago, thus final conclusions on the validity of NFTs as investment instruments should be obtained when having also more recent data in order to be able to see the bigger picture. Secondly, the observing period includes the COVID-19 pandemic, one of the hardest times since 2000s; the latter can be indicative, especially when reviewing data testifying the explosion that these tokens had in the various sectors, with art, collectibles and gaming as main players. The fact that these tokens have reached such a popularity within a period characterized by high economic uncertainty should be reassuring on non-fungible tokens being considered as safe instruments by market participants.

⁶⁸ Dowling, M.: "Fertile LAND: Pricing non-fungible tokens", Finance Research Letters, Volume 44, 2022. Available at: <https://doi.org/10.1016/j.frl.2021.102096> or <https://www.sciencedirect.com/science/article/pii/S154461232100177X>

⁶⁹ Schaar and Kampakis: "Non-Fungible Tokens as an Alternative Investment: Evidence from CryptoPunks", The JBBA, 2022. Available at: https://scholar.googleusercontent.com/scholar?q=cache:wMGNE8eazjMJ:scholar.google.com/+nfts+as+investment+&hl=it&as_sdt=0,5

Additional evidence of this growth in the last two years is provided by Nadini et al. (2021)⁷⁰ whose work effectively contributes to define the size of this increase by implementing an NFT market analysis which features an impressive growth starting from July 2020 «with total volume exchanged daily surpassing ~ 10 million US dollars in March 2021» (Nadini et al.: “Mapping the NFT revolution: market trends, trade networks, and visual features”, page 2, 2022).⁷¹

This study interestingly also emphasizes the various contributions of sectors like art, gaming, collectibles and Metaverse in this positive trend, describing the former as being the one who dominated the market in terms of volume not only in its early phase but also subsequently when, since July 2020, it took the lead with around 71% of transactions volume arising from this sector, thus testifying the primary role that was already attributed to this segment in the appropriate section.

Overall, the growth observed in these years could however seem contrasting with what is instead the most recent trend in the market; indeed, things slightly change when we get to analyze the more recent performance on a sector basis.

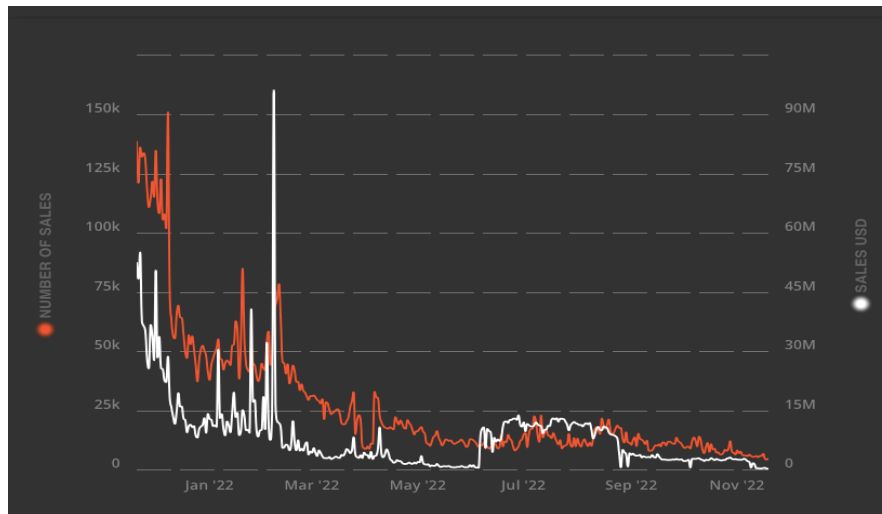
Results obtained with data taken from “nonfungible.com”⁷² show how art, collectibles and gaming-related NFTs’ markets have been doing lately, overall defining highly volatile segments, which find in the gaming sector the one who suffered the most evident downturn since the end of 2021 as shown in Figure 3.

⁷⁰ Nadini, Alessandretti, Di Giacinto et al: “Mapping the NFT revolution: market trends, trade networks, and visual features” Sci Rep 11, 20902, 2021. Available at: <https://doi.org/10.1038/s41598-021-00053-8> or <https://www.nature.com/articles/s41598-021-00053-8>

⁷¹ Nadini, Alessandretti, Di Giacinto et al: “Mapping the NFT revolution: market trends, trade networks, and visual features” Sci Rep 11, 20902, 2021. Available at: <https://doi.org/10.1038/s41598-021-00053-8> or <https://www.nature.com/articles/s41598-021-00053-8>

⁷² Please, see full data available at: <https://nonfungible.com>

Figure 3: Sales amount measured in USD (white) and number of sales (red) generated by gaming-related NFTs, with a daily moving window and an observing period of 1 year (from 20 November 2021 to 19 November 2022).

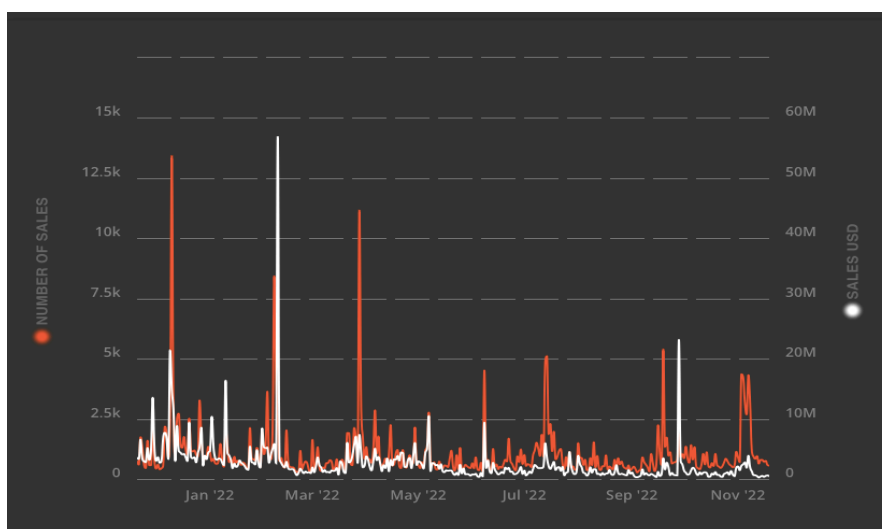


Source: <https://nonfungible.com>

The graph effectively highlights the decrease in daily sales generated by NFTs (in white) which is easily evident in the first months of observation and foremost clear when comparing the starting value of 52 million USD registered on November 20, 2021, with the ending value of 200 thousand USD of one year later. Moreover, it is interesting to note the positive correlation that exists between the two measures (sales generated and number of sales) which however shows a peculiar behavior on February 7, 2022, with sales amount reaching the maximum value for the period (nearly 96 million USD) and number of sales instead remaining at average value (around 65 thousand).

As said, the decreasing pattern in the former measure is common also to other sectors, in particular in terms of volatility in values observed; nonetheless, the decrease suffered during 2022 in the values considered is not as significant as the one experienced by the gaming sector, at least when comparing it to art. As concerns the latter sector (Figure 4), the decrease in values is less evident, with a starting 3.3 million USD of sales amount generated and an ending value of less than 600 thousand USD for the same measure; interestingly, the maximum sales amount (56 million USD) is reached 2 days after the day in which the corresponding peak was hit in the gaming sector.

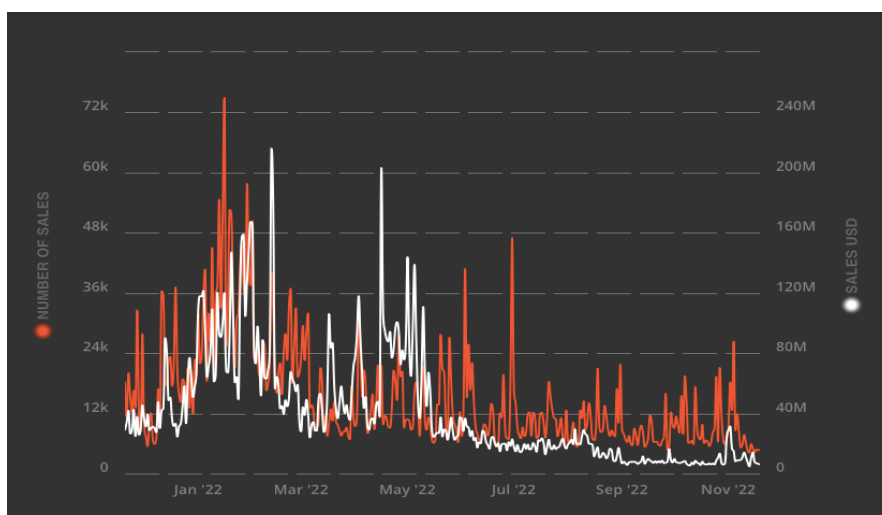
Figure 4: Sales amount measured in USD (white) and number of sales (red) generated by art-related NFTs, with a daily moving window and an observing period of 1 year (from 20 November 2021 to 19 November 2022).



Source: <https://nonfungible.com>

When analyzing collectibles (Figure 5), data shows values that are almost 10 times higher than those of art and 5 times those of gaming in terms of sales volume; the decreasing trend here is more evident with respect to that in art, but less relevant when compared to the gaming sector.

Figure 5: Sales amount measured in USD (white) and number of sales (red) generated by collectibles-related NFTs, with a daily moving window and an observing period of 1 year (from 20 November 2021 to 19 November 2022).



Source: <https://nonfungible.com>

Moreover, the always increasing number of buyers and sellers that characterized the NFT market trend in late 2021 and continued also in 2022 as certified by a Chainalysis report of May 2022⁷³ which shows that 950000 unique addresses transacted with NFTs in the

⁷³ Chainalysis: “NFT Transaction Activity Stabilizing in 2022 After Explosive Growth in 2021”, 2022. Available at: <https://blog.chainalysis.com/reports/chainalysis-web3-report-preview-nfts/>

first quarter of the year (with an increase of more than 300 thousand with respect to last quarter of 2021), suffered a significant stop later in 2022.

According to “nonfungible.com”,⁷⁴ since April 2022 the number of unique addresses who bought or sold an NFT dramatically lowered, with monthly values barely hitting 100 thousand for October and November of the same year.

Two factors should however be considered when discussing the decreasing trend explained above, particularly in relation to the possibility of adopting NFTs as investment instrument: the relatively new character of these tokens and the current economic uncertainty.

The fact that NFTs were born just around 2017, with a boom experienced two years later, the deriving insufficient number of studies or data on the topic, overall compose a scenario in which sources of instability are feasible. Additionally, fluctuations as those observed in the art and collectibles’ sectors may also be justified by the current global obstacles our society has been facing, COVID-19 pandemic, Ukraine war and recession are certainly themes that in general cannot go unobserved when analyzing the financial relevance of an asset.

On the contrary, several recent papers and articles should be reassuring of the prosperity NFTs will be experiencing in the next years; in this sense it may be useful to consider an interesting report by Grand View Research (2022)⁷⁵ which indeed testifies positive forecasts for the future in NFTs’ market, with a compound annual growth rate (CAGR) of 33.9% within 2030, that will bring the segment, valued at around 11.3 billion USD by the global research firm Verified Market Research (VMR) as reported also by Jenkinson (2022),⁷⁶ to an overall expected value of 19.57 billion USD according to BlueWeave Consulting by 2028⁷⁷ and consequently becoming a key player in the digital field.

Thereupon, it is clear that the data just reported, together with the hundreds of potential new applications that NFTs may have, based on the increasing number of companies that keep on approaching this new world, is indicative of the role these tokens may play as

⁷⁴ Please, see full data available at: <https://nonfungible.com>

⁷⁵ Grand View Research: “Non-fungible Token Market Size, Share & Trends Analysis Report By Type (Physical Asset, Digital Asset), By Application (Collectibles, Art, Gaming), By End Use, By Region, And Segment Forecasts, 2022 – 2030”, Grand View Research, 2022. Available at: <https://www.grandviewresearch.com/industry-analysis/non-fungible-token-market-report>

⁷⁶ Jenkinson: “NFT market worth \$231B by 2030? Report projects big growth for sector”, Cointelegraph, 2022. Available at: <https://cointelegraph.com/news/nft-market-worth-231b-by-2030-report-projects-big-growth-for-sector>

⁷⁷ Please, see <https://www.blueweaveconsulting.com/press-release/global-non-fungible-token-nft-market-size-to-reach-usd-20-billion-by-2028> for more.

investment instruments, with legal implications that may derive which will be analyzed in chapter 3 of this thesis.

In conclusion, the scenario described overall may rationally create a significant interest on the investors' side, with risk lover individuals potentially be more willing to exploit the current instability and fluctuations that characterize the NFTs' market. These newborn tokens can be effectively used as investment instruments, as shown by results obtained by the studies of Schaar and Kampakis (2022)⁷⁸ and Kong et al. (2022);⁷⁹ however, fluctuations observed in last months suggest, together with a confused and still developing legislation of the subject matter, that these must be treated carefully.

⁷⁸ Schaar and Kampakis: "Non-Fungible Tokens as an Alternative Investment: Evidence from CryptoPunks", The JBBA, 2022. Available at: https://scholar.googleusercontent.com/scholar?q=cache:wMGNE8eazjMJ:scholar.google.com/+nfts+as+investment+&hl=it&as_sdt=0,5

⁷⁹ Kong, De-Rong and Lin, Tse-Chun: "Alternative Investments in the Fintech Era: The Risk and Return of Non-fungible Token (NFT)", (August 30, 2021). Available at: <https://ssrn.com/abstract=3914085> or https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3914085

Chapter II

A dive into possible issues related to NFTs

2.1 Volatility and the derived uncertainty

The analysis provided in the previous chapter, besides enouncing the immense variability of the scope of application in which these tokens may fall in terms of sectors or areas of work, was aimed at providing an overview of the potential that NFTs share. Their features, in all sectors analyzed, are quite evident and so should be their relevance; however, despite these tokens' relatively recent birth date, some issues have already emerged and an analysis of these can be preparatory to effectively discuss their legislative implications while already highlighting some of the reasons why this should be a “hot” topic in competent authorities' considerations.

A first “problem” that might be worth mentioning is the uncertainty that characterizes this whole ecosystem which may also be observed in relation to the inner value of these tokens. As already anticipated in the section related to their possible application as investment instruments, NFTs are characterized by an extremely volatile behavior in terms of prices, this is partially due to their unicity which, as it happens for other unique objects like paintings, tends to base the valuation of the item on the subjective importance that each user attributes them which is not easily predictable; nonetheless the latter may also be influenced by the new nature of these tokens which, due to the low historical data, causes them to be considered in view of what they can represent in future.

In other words, the future application of NFTs in any field, whether significant or not, has a severe relevance on how potential investor perceive them since the evaluation is largely based on what will be the future of these assets.

Consequently, markets for each sector specific NFT tend to show highly volatile trends that have been already discussed in the previous chapter where an unstable behavior was evidenced when comparing 2021 values in sales amount and sales numbers with those of the following year.

Volatility of these assets has just started to be studied, with ad-hoc papers by authors like Wang (2022)⁸⁰ analyzing the relationship in volatility spillovers among NFTs' media

⁸⁰ Yizhi Wang: “Volatility spillovers across NFTs news attention and financial markets”, International Review of Financial Analysis, Volume 83, 2022. Available at: <https://doi.org/10.1016/j.irfa.2022.102313>

attention and financial markets; this work concluded that NFTs have a completely unique behavior when compared to other assets' categories establishing also a really low correlation with them, moreover Wang's findings on NFTs' volatility imply that the majority of it is attributable to endogenous shocks, thus highlighting once again their potential in portfolio diversification.

Further analysis on these tokens' volatility can be found in Cho et al. (2022),⁸¹ the paper is based on historical data of 8 different NFTs' collections in a period going from their launch to March 31, 2022. All the collections show a really high volatility, but what is even more interesting is the analysis of the possible sources of this behavior which is provided by the authors; the list of causes includes: the extreme illiquidity of non-fungible tokens whose sales are not uniformly distributed in time but rather tend to behave quite irregularly, and the relatively low number of sales of each unique token, with most of them being sold just once after the launch of the collection and then kept in the new owner's wallet.

The same paper additionally provides the 12-months realized volatility⁸² for the various collections analyzed, showing results that are perfectly indicative of what we have been discussing in this section; CryptoPunks, the renowned non-fungible tokens which constitute one of the cornerstones of the history of this ecosystem, are here presented as having a 12-months realized volatility of 1,140 % (highest among the collections analyzed, with the minimum of 291% registered for Aurory, NFTs from a Solana blockchain based game) which, when compared with the 14.95% value registered for S&P 500 in the same observing period (up to March 31, 2022), tends to clarify the size of the issue.⁸³

When analyzing these findings, we must recall the lack of a sufficiently deep historical dataset that may suggest that empirical results are not as indicative of what will be the future evolution of these tokens, even though proofs of above average volatility were obtained also by Mazur (2021)⁸⁴ which interestingly found out that volatility in NFTs is negatively correlated with returns.

⁸¹ Cho, Serneels and Matteson: "Non-fungible token transactions: data and challenges", 2022. Available at: <https://arxiv.org/pdf/2210.07393.pdf>

⁸² Reportedly computed as: standard deviation of the daily log return times the square root of the number of trading days of 252. Cho, Serneels and Matteson: "Non-fungible token transactions: data and challenges", 2022. Available at: <https://arxiv.org/pdf/2210.07393.pdf>

⁸³ Cho, Serneels and Matteson: "Non-fungible token transactions: data and challenges", 2022. Available at: <https://arxiv.org/pdf/2210.07393.pdf>

⁸⁴ Mazur: "Non-Fungible Tokens (NFT). The Analysis of Risk and Return", 2021. Available at: <https://ssrn.com/abstract=3953535> or <https://dx.doi.org/10.2139/ssrn.3953535>

What we can do is to take into serious considerations these studies and use them as a significant aid when analyzing what is happening (and what did happen) in the non-fungible tokens' trend, as well as guidelines to project what will come up in the near future. However, as we go on in our discussion, non-fungible tokens are exposing increasing evidence of their potential; high volatility here, as presented in the previous chapter when describing NFTs as an effective investment instrument, must not be intended exclusively as a detrimental feature since it can become strongly beneficial to specific trading strategies. Nonetheless, it is crucial to recall that a high volatility, and the deriving uncertainty, can be seen also as sources of risk, with consequent need for EU competent authorities to consider this aspect and eventually provide requirements and rules that can mitigate it.

2.2 NFTs and safety, the broken link problem

One of the main features that is common to all sectors analyzed in chapter 1 is NFTs' ability of constituting a granted safe and trustful certificate of ownership; uncertainty however, can arise also from their inner functioning which may show some downsides that are indicative of further risks attached to them, thus evidencing how NFTs' role goes well beyond that of simple "drawings" or "cool images", while already highlighting the importance of a legislative framework which will be discussed in a few pages.

A first issue in this sense can be linked to these tokens' ability of granting authenticity of the underlying asset (or right) to which they are attached over the long term, this may lead to several difficulties like the so called "broken link problem".

In this context, what has been presented as one main advantage, particularly when applied to expensive items like cars, real estate or paintings, meaning the ability of providing a digital proof of ownership which is safe and transparent, may find some pitfalls when required to ensure validity over longer periods of time.

In particular, risks here lie with the platforms and marketplaces on which NFTs are stored and with methods used, rather than with the blockchain on which they are based, this being foremost clear if analyzing the art sector for instance.

Dash (2021),⁸⁵ besides offering an interesting critique to what NFTs became used for which is way different from what they were meant to when initially created, also provides

⁸⁵ Dash: "NFTs weren't supposed to end like this", The Atlantic, 2021. Available at: <https://www.theatlantic.com/ideas/archive/2021/04/nfts-werent-supposed-end-like/618488/>

a useful reflection on this point; the author explains that what most NFTs' miners are doing now is what he was doing back in 2014 when he launched his first NFT on his own blockchain-based system (Monegraph) together with artist Kevin McCoy, and this is not optimal.

The point is that that process consisted in not storing the digital work in question (certified by the NFT) on the blockchain, this mainly due to lack of storage reasons, while instead including a link or a code that could readdress the user to the actual image or work;⁸⁶ surprisingly, this is what most platforms are doing still today, examples are OpenSea, Rarible, Nifty Gateway, which are not storing images but just a «media file linked with a code on the blockchain» (Kshetri: "Scams, Frauds, and Crimes in the Nonfungible Token Market", page 63, 2022).⁸⁷

Such a practice, besides being extremely convenient, is also highly dangerous if we stop and think about its future possible implications in a negative scenario.

As Dash (2021)⁸⁸ rightfully suggests, the issue with this way of treating non-fungible tokens is that the link to the digital work which is attached to the unique token (often paid thousands of euros) will then base its validity and verifiability over the long term on a website which may not be existing in the future; therefore any malfunctioning, or misuse by the owner of the web domain in question can lead to a dead link, here is where the broken link problem generates.

Conversely, when thinking about the physical counterpart of non-fungible tokens, meaning real-world and handwritten certificates of ownership and authentication, the risk for them to become invalid in the future is much lower precisely because they are physical, and they exist as independent entities that do not require a secondary platform or website to access them; once verified by a trustful authority, the authenticity of the item is valid and will be so as long as either the proof of ownership or the item itself are lost.

A solution to the broken link problem may be the IPFS (InterPlanetary File System), which allows, as explained by Kastrenakes (2021),⁸⁹ the owner of the NFT to rely on a

⁸⁶ Dash: "NFTs weren't supposed to end like this", The Atlantic, 2021. Available at:

<https://www.theatlantic.com/ideas/archive/2021/04/nfts-werent-supposed-end-like/618488/>

⁸⁷ N. Kshetri: "Scams, Frauds, and Crimes in the Nonfungible Token Market" in *Computer*, vol. 55, no. 4, pp. 60-64, April 2022. Available at: <https://ieeexplore.ieee.org/abstract/document/9755212>

⁸⁸ Dash: "NFTs weren't supposed to end like this", The Atlantic, 2021. Available at:

<https://www.theatlantic.com/ideas/archive/2021/04/nfts-werent-supposed-end-like/618488/>

⁸⁹ Kastrenakes: "Your million dollar NFT can break tomorrow if you are not careful", The Verge, 2021.

Available at: <https://www.theverge.com/2021/3/25/22349242/nft-metadata-explained-art-crypto-urls-links-ipfs>

set of different domains among which just one hosting the content of the token is required for him/her to access it; additionally, the owner of the token is also entitled to pay a bill to keep the NFT online, thus establishing a strong link between him/her and the NFT's viability.

However, even IPFS is not problem-free as the just-cited Kastrenakes (2021)⁹⁰ explains, this structure has proven to be not perfectly stable, with several pitfalls found by the team of "Check My NFT". Additionally, excessive reliance on an IPFS causes NFTs' owners to live in "dominant" position from which they have control over the existence of the token's file, this may turn into an adverse scenario since life of their NFT will all be up to them, hence no chances of errors or assistance to refer to in case of problems conversely to what would happen with a general URL structure.

Therefore, the reasoning just provided should be useful to understand that non-fungible tokens may not always be considered as "untouchable" certificates given their incorruptibility may be lacking over the long term, if adequate measures are not taken; on the other hand, while there is no clear solution to the broken link problem (given obstacles to an IPFS's use are also present), it could be helpful to require owners to have a physical copy of what the smart contract implies so that virtual issues like this can be mitigated. Overall, the presence of this kind of security-linked problem may also be hindered by a significant answer on the legislative side, this potentially setting rules covering specifically the way in which the underlying asset is actually stored; however, besides the obstacles that may be encountered when dealing with these tokens from a regulatory perspective which will be discussed in the next chapter, this solution could become too technical thus leading us away from the scope of this thesis.

2.2.1 Loss or theft of the private key

NFTs' reliability, already described as depending on various factors, may also be endangered directly by further scenarios that can be strictly related to cyber criminals or users' negligence. When analyzing non-fungible tokens, the size of the amounts of money implied must always be considered, this being even more true when considering these are commonly known for their trustfulness. In particular, as it may happen with any other valuable asset, security and safety should always be treated as top priorities, both by the

⁹⁰ Kastrenakes: "Your million dollar NFT can break tomorrow if you are not careful", The Verge, 2021. Available at: <https://www.theverge.com/2021/3/25/22349242/nft-metadata-explained-art-crypto-urls-links-ipfs>

owner of the asset in question and by the platforms involved, this in order to grant value to the former and credibility to the latter.

We have already presented the blockchain-based character of these tokens as being the key pillar of their security, the relatively new technology was described as being hard to violate, granting the trusted and verifiable authenticity of the asset (the NFT in this case) thanks to a peer-to-peer system capable of detecting any modifications or suspicious malfunctioning in the structure.

Nonetheless, non-fungible tokens are not always completely safe, this is due both to their inner features of access and to pitfalls that may arise in platforms and marketplaces behind their management and trading (an example of which is the just discussed broken link problem).

As a matter of fact, in this ecosystem, risks also are attached to the process covering the access to the token; indeed, besides the safety and transparency features are usually granted by their blockchain-based character, it is all fun and games until we consider that, along with the extreme growth of the NFTs' market in the last years, cybercrimes, thefts or losses of credentials of access to wallets in which these tokens are stored have also increased.

When we talk about “credentials” in relation to NFTs, what should come immediately to mind is what we introduced when defining the features of the subject matter of this thesis, meaning the existence of two keys, one public and one private, together making up the PKI (Public Keys Infrastructure). These two serve the function of enabling the interfacing of the owner and other users with the token; specifically, they are used to access the wallet on which the NFT is stored, and therefore they are of vital importance when it comes to discussing these tokens' stability and safety as well as the related risks.

Following what has already been said, the public key is, as the word says, public, that means its sharing is indirectly thought as being one of its first purposes; therefore, issues and risks are barely connected with this mechanism which, in the overall view of the process can be seen as an address that links the token to a specific wallet.

Instead, problems are mostly related to the private key, the latter is one of the cornerstones of the stability of the whole infrastructure since it works as the exclusive way through which any movement inside the wallet to which the key is related is either granted and authorized, this consequently implying that its safety and that of the token are strongly related.

Unfortunately, given this crucial role they have, private keys may tend to end up in the wrong hands (someone which is not the actual owner), this is much likely to happen both due to negligence in storing them or because of cybercriminals' interest. Such an event is of critical relevance since it can bring the perpetrator to be able to perform a series of token-related operations including selling it or change the wallet in which it is located without any authorization required.

The point is that these data, despite their significance in the process, are not always kept safe by users who therefore can become the first responsible for losses that occur following a phone or laptop are lost for instance, while extreme events like fires or accidents causing the loss of access to the private key may also be frequent. In our view, what could be done to mitigate this risk is obviously to rely on the carefulness of owners in managing their keys of access, we may have several ways to do so like writing on paper or use a hardware wallet, even though these methods are not immune to damages too.

However, as anticipated, theft of this type of credentials by cybercriminals is also common, this can be largely due to structural weaknesses of NFT's marketplaces which are mostly build up on blockchain platforms that have shown some pitfalls from the security point of view.

As Rao (2022) highlights, blockchains like Ethereum and Solana lack of privacy enabling features given that «user identities, bids, transaction details, etc. are completely visible to the general public» (Rao: "Paras-A Private NFT Protocol", page 2, 2022);⁹¹ risks however may also be linked to the non-decentralization of NFT's marketplaces like OpenSea or Rarible, these lack of decentralization which causes them to suffer the non-presence of «peer review systems to identify and fix bugs» (Kshetri: "Scams, Frauds, and Crimes in the Nonfungible Token Market", page 61, 2022).⁹² As the latter author cites, a related case took place in September 2021, when 42 NFTs with a summed value of more than 100 thousand euros were stolen following a bug in OpenSea market.

Cybercriminals are exploiting the most brilliant tricks such as establishing a relationship with the owner of a token and use fear or pity to mislead the victim; additionally, file containing viruses may also be sent by the perpetrator in order to have access to a digital

⁹¹ Rao: "Paras-A Private NFT Protocol", Cryptology ePrint Archive, pages 1-22, 2022. Available at: <https://eprint.iacr.org/2022/976.pdf>

⁹² N. Kshetri: "Scams, Frauds, and Crimes in the Nonfungible Token Market" in *Computer*, vol. 55, no. 4, pp. 60-64, April 2022. Available at: <https://ieeexplore.ieee.org/abstract/document/9755212>

wallet as happened to a renowned NFT artist in June 2021 who saw his 40000 Axie Infinity tokens (approximately worth 4 million EUR) being stolen by an hacker.⁹³

An interesting project presented by Rao (2022) tries to provide a solution to the lack of privacy in NFTs' marketplaces by introducing a protocol capable of granting invisibility of NFTs when transacting by providing only a reference as well as hiding «seller and bidder identities, the bid values and the user wallet balances» (Rao: "Paras-A Private NFT Protocol", page 4, 2022).⁹⁴

The lack of legal provisions and general requirements for these platforms, aimed at regulating transactions of this kind, do not allow for a prompt solution to be found; ideas, like the protocol just discussed, despite ambitious, still remain ad-hoc solutions whose impact cannot be compared to that of a uniform set of provisions to be applied to the platforms involved, which would be instead more appropriate, both considering its potential and the size the NFT market is expected to reach in the next couple of years.

In this sense, as will be seen in chapter 3, legislative answers from EU Lawmaker may be found when examining existing pieces of legislation to be applied to NFTs, even if these are not directly aimed at covering entirely the category of non-fungible tokens while only affecting those entities dealing with tokens that satisfy specific requirements; concluding, the strong presence of thefts of this kind should clarify that risks attached to these tokens also exist.

2.2.2 Impossibility of getting back the NFT when lost

As Doan et al. (2021)⁹⁵ explain, a further problem in case of stolen or lost credentials or private key, besides the sale of the token by the perpetrator, can be the consequent impossibility for the original owner to retrieve ownership of the NFT due to the decentralized and immutable character of the blockchain on which these tokens are based.

⁹³ N. Kshetri: "Scams, Frauds, and Crimes in the Nonfungible Token Market" in *Computer*, vol. 55, no. 4, pp. 60-64, April 2022. Available at: <https://ieeexplore.ieee.org/abstract/document/9755212>

⁹⁴ Rao: "Paras-A Private NFT Protocol", *Cryptology ePrint Archive*, pages 1-22, 2022. Available at: <https://eprint.iacr.org/2022/976.pdf>

⁹⁵ Doan, Rasmussen, Snyder, Sterling and Yeargin: "NFTs: Key U.S Legal Considerations for an Emerging Asset Class", Jones Day, 2021. Available at: <https://web.p.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=1&sid=519d07c8-b69d-4b64-a68e-453be5e3d5ce%40redis> or <https://www.jonesday.com/en/insights/2021/04/nfts-key-us-legal-considerations-for-an-emerging-asset-class>

Technicalities of these features are provided by Martins et al. (2020),⁹⁶ where deficiencies in the recovery mechanism of the blockchain are highlighted; the work explains how the immutability of this technology is simultaneously beneficial and detrimental since it grants safety but also impedes to fix eventual issues, as well as providing a potential solution to this scenario.

As a matter of fact, there are two methods of “modifying” the data recorded on the blockchain which are data redaction and transaction reversion, the latter is the one that could be closer to be intended as an answer to the problem since it consists in undoing given actions performed on the blockchain. However, this finds severe obstacles when being adopted to recover wallet access granted by the private key since it comes to alter the whole system which we know to have in its immutability one of his cornerstones.

As anticipated, Martins et al. (2020) provide a stimulating solution to a scenario in which a user may lose access to a wallet in which NFTs are contained; the idea is to enable the recovery of the token in case of account loss, account theft or chargebacks (i.e. «payment is made for any good or service and the payer believes that it did not receive what was agreed upon» (Martins et al.: “Recoverable Token: Recovering from Intrusions against Digital Assets in Ethereum”, page 2, 2020)).⁹⁷

The method uses a mechanism capable of identifying whether the dispute is falling in one of these three cases which then determines whether the recovery should be performed or not, this idea does not imply any change in the blocks constituting the blockchain and therefore officially does not alter its immutability but rather it works thanks to a smart contract containing all the tokens data on which the recovery takes place; the project was built to be working on Ethereum blockchain but authors claim it performs well also on others running EVM (TRON, Cardano exc.).

The one provided above is certainly an interesting solution to a problem that, together with the other NFT-related risks mentioned, may undermine the evolution of these tokens

⁹⁶ F. F. Martins, D. R. Matos, M. L. Pardal and M. Correia: "Recoverable Token: Recovering from Intrusions against Digital Assets in Ethereum", 2020, IEEE 19th International Symposium on Network Computing and Applications (NCA), Cambridge, MA, USA, 2020, pp. 1-9, doi: 10.1109/NCA51143.2020.9306738. Available at: https://www.gsd.inesc-id.pt/~mpc/pubs/Recoverable_Token_Filipe_Martins_final.pdf or <https://ieeexplore.ieee.org/document/9306738>

⁹⁷ F. F. Martins, D. R. Matos, M. L. Pardal and M. Correia: "Recoverable Token: Recovering from Intrusions against Digital Assets in Ethereum", 2020, IEEE 19th International Symposium on Network Computing and Applications (NCA), Cambridge, MA, USA, 2020, pp. 1-9, doi: 10.1109/NCA51143.2020.9306738. Available at: https://www.gsd.inesc-id.pt/~mpc/pubs/Recoverable_Token_Filipe_Martins_final.pdf or <https://ieeexplore.ieee.org/document/9306738>

in the future since number of users or companies intended to invest in NFTs is obviously negatively related to the risks attached.

Overall, we should interpret this as an additional proof, together with what proposed by Rao (2022),⁹⁸ of the need to consider the NFTs' world and the related blockchains as part of a relatively new ecosystem which can and must be refined, as well as backed up by an adequate regulatory attention. The focus of the discussion should indeed be mainly put on this point, rules, guidelines and legally binding provisions are crucial to ensure stability (in terms of safety) to a framework which presents features of monetary relevance and simultaneously shares such an impacting potential; as already specified, the legal implications in such a scenario will be subject of discussion in a few sections but we see how the analysis provided offers us to add concrete reasons behind the hypothetical need for legislative action.

2.3 Environmental problems derived from non-fungible tokens

Among the pitfalls that must be evidenced when talking about non-fungible tokens, their environmental implications are frequently left out and only considered by activists or experts.

This may be justified by the fact that this problem is mostly related to blockchain platforms on which these tokens are sold, rather than to token themselves and consequently critiques on this point are often moved in ad-hoc papers that cover specifically blockchain technology's implications.

As already mentioned, the aim of this thesis is, inter alia, to discuss the need for precise and effective legislation on non-fungible tokens; nonetheless, in order to perfectly understand the reasons behind such a conclusion, we believe it is crucial to have an overview of what the major flows are and, given the blockchain constitutes one of the cornerstone of the whole working process of these digital assets, we decided to include in our analysis a discussion on the environmental problems despite their apparently indirect legislative relevance.

As said, what non-fungible tokens are at the end of the day, is "digital certificates of ownership" which are based either on the blockchain technology (granting an updated

⁹⁸ Rao: "Paras-A Private NFT Protocol", Cryptology ePrint Archive, pages 1-22, 2022. Available at: <https://eprint.iacr.org/2022/976.pdf>

open digital ledger) and on smart contracts, these two parts combined however end up causing these tokens to generate a significant footprint that cannot go unobserved.

Their heavy environmental impact seems clashing with the current conditions of our planet, particularly in light of a general higher attention that most industries are paying to these aspects also considering that one of the strengths of NFTs is their future possible implications. The latter, besides attributing them the possibility to be treated as investment instruments and highlighting even further the need for ad-hoc regulatory measures, immediately weakens if some examples of the NFTs' environmental implications are provided; therefore it becomes crucial to highlight the problem with the purpose of enabling the exploitation of these instruments' benefits, without neglecting the environmental relevance, to grant an efficient use that doesn't hinder the next generations' future.

This said, the environmental problem related to NFTs basically relies on the Proof of Work (PoW) method which is the procedure performed by the node operator to check on the authenticity of the transaction occurred on the blockchain.

As anticipated, a deeper analysis of the overall mechanism behind the blockchain and specifically of the functioning of the PoW would require a technical explanation that not only does fall outside the scope of this work but could also create confusion on the reader therefore being detrimental to the proper understanding of the discussion. What must be kept in mind is that the Proof of Work relies on a series of computations performed by miners aimed at solving «arbitrary mathematical puzzles» (Napoletano and Broverman: "Proof of Work Explained", 2022)⁹⁹ that overall contribute to validate data and record it on a block to be added to the blockchain; these procedures require a huge computation potential that is proportionate to the block difficulty (Marro and Donno (2022)),¹⁰⁰ this in turn implies a high energy consumption and that is when the problem kicks in.

Authors like Akten (2020)¹⁰¹ and Lemercier (2021)¹⁰², cited by Marro and Donno (2022), are among those who raised the environmental problem by providing data that quantify the size of the issue; those provided by the former, with computation performed in

⁹⁹ Napoletano and Broverman: "Proof of Work Explained", Forbes Advisor, 2022. Available at: <https://www.forbes.com/advisor/ca/investing/cryptocurrency/proof-of-work/>

¹⁰⁰ Marro and Donno: "Green NFTs A Study on the Environmental Impact of Cryptoart Technologies", arXiv e-prints, 2022. Available at: <https://arxiv.org/pdf/2202.00003.pdf>

¹⁰¹ Akten: "The Unreasonable Ecological Cost of CryptoArt (Part 1)", Medium, 2020. Available at: <https://memoakten.medium.com/the-unreasonable-ecological-cost-of-cryptoart-2221d3eb2053>

¹⁰² Lemercier: "The problem of CryptoArt", Studio Joanie Lemercier, 2021. Available at: <https://joanielemercier.com/the-problem-of-cryptoart/>

cooperation with Kyle McDonald, focus on the Ethereum blockchain, this being the most widely adopted by NFTs' users.

What Akten (2020)¹⁰³ findings show is that, by analyzing around 80 thousand transactions relating to 18 thousand NFTs on SuperRare, a single transaction related to an NFT has a footprint of 82 kWh which implies emissions for 48kgCO₂ that is more than double the emissions generated by a single ETH transaction (which in turn were estimated to have a footprint coinciding with that generated by one EU resident's electric power consumption over 4 days).

A further problem highlighted by Akten (2020)¹⁰⁴ is that the above-mentioned footprint and emissions data are linked to a single transaction related to NFTs, while these tokens often imply several more actions (minting, bidding, cancelling, sales and transfer of ownership), thus evidencing values even higher when considering all the transactions involved, with data by the author showing an estimated average footprint of 340 kWh and 211 CO₂ emissions for each NFT, that is comparable «to a EU resident's total electric power consumption for more than a month, with emissions equivalent to driving for 1000Km, or flying for 2 hours» (Akten: "The Unreasonable Ecological Cost of CryptoArt (Part1)", 2020).¹⁰⁵

Undoubtedly, the relevance assigned to non-fungible tokens becomes subjective in light of these numbers; when some could argue that such high emissions are not justified considering the use that these tokens have in our society (implicitly considering the role of certificates of ownership in fields like art, collectibles or gaming as not essential), others may tend to disregard these values and focus more on the actual advantages that NFTs bring.

Personally, we place ourselves in the middle of these two perspectives: values on footprint and CO₂ emissions are definitely too high but instead of demonizing non-fungible tokens we perfectly acknowledge their wide variety of applications and potential future use in most sectors.

Solutions to this problem should therefore try to mediate between these two opposite perspectives to grant a future to these tokens which is also accompanied by adequate

¹⁰³ Akten: "The Unreasonable Ecological Cost of CryptoArt (Part 1)", Medium, 2020. Available at: <https://memoakten.medium.com/the-unreasonable-ecological-cost-of-cryptoart-2221d3eb2053>

¹⁰⁴ Akten: "The Unreasonable Ecological Cost of CryptoArt (Part 1)", Medium, 2020. Available at: <https://memoakten.medium.com/the-unreasonable-ecological-cost-of-cryptoart-2221d3eb2053>

¹⁰⁵ Akten: "The Unreasonable Ecological Cost of CryptoArt (Part 1)", Medium, 2020. Available at: <https://memoakten.medium.com/the-unreasonable-ecological-cost-of-cryptoart-2221d3eb2053>

environmental care; from the legislative side, measures limiting emission of these tokens and of the related transactions could be beneficial, but the process is still at the beginning therefore more practical solutions could be explored in the meantime.

2.3.1 The Proof of Stake (PoS)

As said, the problem just described mainly relies in the PoW and in the transactions related to each token, one of the most interesting answers which is actually finding application in many blockchains is the shift from a PoW to a Proof of Stake (PoS) system. The PoW mechanism was based on the fact that the miner building the block would be the one “winning the race”, which in turn implied that the highest computational power a miner had, the more likely he would become the winner; what happens with the PoS instead, is that the probability of building the block is not related to the computational power but rather to the economic stake each miner has in the network.¹⁰⁶

An interesting work explaining the functioning of the PoS is that of Bentov et al. (2016),¹⁰⁷ this identifies the system as being the answer to the question whether a decentralized ecosystem like the blockchain can be maintained safe with a mechanism that, conversely to what happens with PoW, does not exhaust physical scarce resources like «electricity and mining equipment erosion» (Bentov et al.: “Cryptocurrencies Without Proof of Work, page 1, 2016).¹⁰⁸

As explained by authors, the decision making power in the Proof of Stake mechanism is given according to the stake (in the form of coins) that each miner has in the system and which is used as collateral; this is based on the idea that, the higher the stake you own, the more you are suitable to keep the system safe (this also due to the fact that if errors occur, the miner’s stake will diminish).¹⁰⁹

¹⁰⁶ Bentov, I., Gabizon, A., Mizrahi, A.: “Cryptocurrencies Without Proof of Work”. In: Clark, J., Meiklejohn, S., Ryan, P., Wallach, D., Brenner, M., Rohloff, K. (eds) *Financial Cryptography and Data Security. FC 2016. Lecture Notes in Computer Science* (), vol 9604. Springer, Berlin, Heidelberg. Available at: <https://arxiv.org/pdf/1406.5694.pdf> or https://doi.org/10.1007/978-3-662-53357-4_10

¹⁰⁷ Bentov, I., Gabizon, A., Mizrahi, A.: “Cryptocurrencies Without Proof of Work”. In: Clark, J., Meiklejohn, S., Ryan, P., Wallach, D., Brenner, M., Rohloff, K. (eds) *Financial Cryptography and Data Security. FC 2016. Lecture Notes in Computer Science* (), vol 9604. Springer, Berlin, Heidelberg. Available at: <https://arxiv.org/pdf/1406.5694.pdf> or https://doi.org/10.1007/978-3-662-53357-4_10

¹⁰⁸ Bentov, I., Gabizon, A., Mizrahi, A.: “Cryptocurrencies Without Proof of Work”. In: Clark, J., Meiklejohn, S., Ryan, P., Wallach, D., Brenner, M., Rohloff, K. (eds) *Financial Cryptography and Data Security. FC 2016. Lecture Notes in Computer Science* (), vol 9604. Springer, Berlin, Heidelberg. Available at: <https://arxiv.org/pdf/1406.5694.pdf> or https://doi.org/10.1007/978-3-662-53357-4_10

¹⁰⁹ Bentov, I., Gabizon, A., Mizrahi, A.: “Cryptocurrencies Without Proof of Work”. In: Clark, J., Meiklejohn, S., Ryan, P., Wallach, D., Brenner, M., Rohloff, K. (eds) *Financial Cryptography and Data Security. FC 2016. Lecture Notes in Computer Science* (), vol 9604. Springer, Berlin, Heidelberg. Available at: <https://arxiv.org/pdf/1406.5694.pdf> or https://doi.org/10.1007/978-3-662-53357-4_10

Therefore, PoS main advantage is that it does not require an elevated amount of electricity (low footprint) and consequently lowers significantly the environmental impact of NFTs; some detractors argue that it would be almost impossible to apply given the size of the NFT market and of blockchains, however PoS has started being implemented in several blockchains, with Ethereum that has been substituted with a PoS-based blockchain called “Ethereum 2.0” starting from 2022 and showing an environmental impact reduced by 99% with respect to the original system.^{110,111}

For the sake of clarity, further solutions to the environmental problem have been presented, some of these are discussed in Marro and Donno (2022)¹¹² and are the layer 2 (sidechains and rollups) and carbon offsets; under the legislative perspective, we believe competent authorities could require blockchain platforms to adopt PoS or limit most transactions to time intervals in which the system is less crowded, however among the two, given also the decentralized character of blockchain technology, the Proof of Stake remains the more plausible solution and the recent investments by Ethereum confirm the firm belief in this proposal.

¹¹⁰ Marro and Donno: “Green NFTs A Study on the Environmental Impact of Cryptoart Technologies”, arXiv e-prints, 2022. Available at: <https://arxiv.org/pdf/2202.00003.pdf>

¹¹¹ Fairley: “Ethereum Plans to Cut Its Absurd Energy Consumption by 99%”, IEEE Spectrum, 2019. Available at: <https://spectrum.ieee.org/ethereum-plans-to-cut-its-absurd-energy-consumption-by-99-percent>

¹¹² Marro and Donno: “Green NFTs A Study on the Environmental Impact of Cryptoart Technologies”, arXiv e-prints, 2022. Available at: <https://arxiv.org/pdf/2202.00003.pdf>

Chapter III

Non-fungible tokens' legal framework

3.1 A step back

Until now, the “strength and weakness” analysis of non-fungible tokens which can be obtained by unifying the two previous chapters, served us as a preparatory consideration of what are their key characteristics, both in positive and negative terms; in this view, the analysis was based on a proactive point of view that allows the reader to understand the role of these tokens not only from a financial perspective but also from a social one.

The main benefits brought up by our analysis were the ability of creating digital scarcity (particularly relevant in fields like art), the transparency and safety granted by the blockchain technology on which these tokens are based which bring users to invest in a more trustful way, the enhanced efficiency they provide to the trading of items in different sectors, as a consequence of their role of digital certificates of ownership capable of recording all the history of the related asset in an encrypted data type (seen to be particularly effective for real estate, art and collectibles), and eventually their suitability as investment instrument given the exponentially increasing future potential and the high volatility and values reached (the Metaverse was a clear example in this sense). Such a list should reassure on the future adoption of these tokens that can surely be seen as an effective aid against the lack of transparency in transactions that concern many different markets as well as serving as instrument to ensure a more efficient process of verification and authentication of given assets, eventually allowing users to «transform, in fact, any asset, material or dematerialized, into a new proprietary form that can be bought and sold quickly and without the need for intermediation» (Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, page 46, 2022).¹¹³

However, given the legislative imprint that this work has, adequate emphasis was simultaneously put on the problems that non-fungible tokens share, some of which were already discussed in chapter 2 where, inter alia, NFTs' safety and their prices' volatility

¹¹³ Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, page 46, 2022.

were presented as core sources of risk that consequently suggested an increasing need for a legally focused analysis.

Once considering any kind of instrument or phenomena, what the legislator should do, in our view, is to try to forecast any kind of issue that the subject matter may evidence and act to provide an effective set of rules that solve the problem by delimiting which are the allowed uses/behaviors and which are not; however, when dealing with a relatively new theme like this one, some additional obstacles may present, thus possibly requiring the Lawmaker to provide further solutions in this sense.

The legislative framework, as will be explained in a few lines, is probably the most relevant downside of non-fungible tokens; as a matter of fact, these present features which do not allow for an easy set-up of rules and measures covering them since their unicity (which makes these tokens so desirable and valuable) is at the same time lowering the probability of identifying a common and single method of approach from a legislative perspective.

Difficulties of this kind are also accompanied by more practical obstacles that refer to the long procedures that characterize the whole legislative process; from submission of a proposal to its evaluation and approval, the time span can be significantly large as we will also see for what concerns the current legislation on NFTs in EU, thus making things even more intricately.

3.2 What is the current scenario? An anticipation of the problem

From the legislative perspective, non-fungible tokens in EU have no clear and defined legal structure that currently classifies or covers them, at least not in a uniform way. This constitutes an obstacle both to companies wishing to invest in these tokens and to their development as instruments capable of granting safety and transparency, simultaneously creating a framework where trade of assets of various typologies can take place with no need for any intermediary.

The consequences that may derive from a lack of pieces of legislation that specifically regulate these tokens, their issuer and related entities or platforms, can be many: this situation may generate concerns on the rights implied by an NFT's acquisition (with a particular eye on copyright specifically for NFTs-related to the art sector), doubts on royalties' management but also VAT issues, and a general need of clarifications or more accurate information that can often emerge from clients' experience. While a compromise

must be found between the lack of transparency and an excessive privacy granted to buyers and sellers that overall may favor illegal practices, the classification of NFTs is still subject of discussion among EU competent authorities; some of these issues have already found concrete demonstrations while others are still potential quandaries, however they are all useful to evidence the need for the EU Lawmaker to make a move in this sense.

As said, the evolutionary character of these tokens as well as their relatively recent birth date are clearly factors that did and still don't allow for the existence of a solid regulatory framework, this particularly considering also the reasonably extended procedures that characterize the legislative process; nonetheless, this scenario shares some similarities with another relevant one and allows us to open a brief discussion on what is happening on this perspective to the larger category of crypto assets, which could also potentially include non-fungible tokens.

A problem with crypto assets is that their variety does not allow for an easy delineation of the legislative borders within which we are moving, this since many different typologies, with an implied even larger variety of characteristics, exist and may fall in the large "crypto assets" space, this being even more true for non-fungible tokens that we saw to be potentially used in relation to artworks, Metaverse and even as investment instruments, thus evidencing the presence of a *fil rouge* among these two "macro-categories".

Therefore, we clearly see how variability in terms of features can be simultaneously either beneficial, since it opens tons of possible evolutions, and detrimental, by causing difficulties to the Lawmaker consequently impacting significantly on the development of the assets themselves.

By following the legislative approach that has been defined up to now when considering crypto assets, further similarities with non-fungible tokens can be evidenced.

In the absence of a defined regulatory framework, what happens with the former, but more generally also with any subject matter which is new and still unregulated, is described by Annunziata and Conso (2022);¹¹⁴ Lawmakers in European countries tend to base their work on identifying existing categories or cases in which these assets can fit so that to obtain their classification, and, despite the scarce results, this is a description that can apply also to what is happening with non-fungible tokens.

¹¹⁴ Annunziata and Conso: "NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art", Montabone, 2022.

With crypto assets, the three categories identified are payment tokens, security tokens and utility tokens; these have been already presented at the beginning of this work and coincide with those provided also by EBA (European Banking Authority) in its 2019 “Report with advice for the European Commission on crypto-assets”.¹¹⁵

However, this process, as described by the authors and by the aforementioned report, is not fully exhaustive since leaves out of the discussion the so called “hybrid tokens” on which the debate can be said, at the moment, to be far from concluded, especially where it is claimed to solve it by applying a generic criterion of “prevalence” of one or the other component. As a matter of fact, NFTs may easily tend to fall in this last, and not treated, category; this because they may simultaneously present some features that reconcile two or more types of tokens, thus already impeding a clear identification of an efficient taxonomy and creating a big obstacle to their future legislation.

As will be analyzed, the same problem also presents when leaving aside the crypto assets’ world while focusing on other possible classifications for these tokens; NFTs falling in “virtual currency” definition, which would imply application of relevant pieces of legislation in matters of safety (AML Directive), shows some limitations, the same holding for that of “financial instrument” that would cause them to be covered by MiFID II with consequent implications also for other pieces of law (as MAR for instance), with additional issues that can be presented when analyzing the upcoming MiCA Regulation Proposal text.

As anticipated, the problem is that these tokens have different forms and applications, which, combined with the smart-contracts on which their functioning is based that allow complex instructions to build up behind a “cool image” (to which these tokens are erroneously frequently assimilated), contribute to create items that can hardly be classified, if not on a case-by-case basis which however is never certified to solve the problem and cannot be considered an efficient solution.

A consequence of a missing defined regulatory framework is also the gap, at a normative level, that takes form between Member States who started acting in this respect and those who did not, this creating regulatory arbitrage possibilities that EU aims to avoid, overall hindering the development of businesses in the digital world.

¹¹⁵ EBA: “Report with advice for the European Commission on crypto-assets”, Box 1: Basic taxonomy of crypto-assets, 2019. Available at: <https://www.eba.europa.eu/sites/default/documents/files/documents/10180/2545547/67493daa-85a8-4429-aa91-e9a5ed880684/EBA%20Report%20on%20crypto%20assets.pdf?retry=1>

In this scenario, in order to understand how to move under the legal point of view and make sense of what are the current proposals and implications, our process of analysis must start from a general identification of the subject matter from a legislative perspective. However, just like the character of NFTs, we must always keep in mind, particularly in light of a missing definite regulatory framework, that our discussion on the legislative aspects related to these tokens is provisory and evolutionary, not intended to state facts but rather aimed at providing an overview of what the current situation on these tokens is, as well as hopefully predict what the future moves can be from a legal point of view through an analysis of the actual possible directions that the EU Lawmaker can take in the upcoming years.

3.3 NFTs as entitlement documents, hints from the Italian legislation

As said, before analyzing the relevant pieces of legislation in question, it should be helpful to understand how the subject matter can be seen from a legislative perspective, at least from an initial perspective.

In this view, the inner nature of non-fungible tokens which is that of being certificates granting ownership and authenticity of the underlying asset and possibly other rights (once specified) related to it, is useful to highlight a few crucial points.

The first step is to understand how certificates of this kind are treated at EU level, how these may be classified and consider them from a formal point of view; we anticipated before that non-fungible tokens are certificates capable of providing information on who were the previous owners and who is the current one, who is the creator, what is the register of the transactions in which it was involved, whether there have been modifications or not, and what are the rights the owner has.

It should be legitimately concluded that the capacity of the authenticity certified by the NFT to apply to all such data, is something that we can hardly find in other instruments and therefore using an existing legal classification to identify them is not that straightforward.

Contemporary literature can come to help, as explained by Fairfield (2021),¹¹⁶ from a mere conceptual point of view it would be possible to identify NFTs as title deeds; we must consider that most often what the NFT is containing is just a link that refers to the

¹¹⁶ Fairfield, Joshua: “Tokenized: The Law of Non-Fungible Tokens and Unique Digital Property”, *Indiana Law Journal*, Forthcoming, page 1283, 2021. Available at: SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3821102

underlying asset with the latter instead not being stored on the blockchain, this can cause issues that concern the usability of these tokens as the already mentioned “broken link problem”. What a token certifies is the ownership of the underlying, with the latter being stored in another place, precisely as a property deed confirms that an individual is the owner of a certain real estate which is located in a given place which is clearly not within the deed itself.

Therefore, it becomes useful to understand how documents of this kind are treated at EU level, acknowledging that NFTs’ certified right of ownership is indicative of the sensibility of the topic analyzed; ownership, indeed, often can be intended as «the set of exclusive rights over property» (Trujillo: “The surge of non-fungible tokens and its implications for digital ownership from an Internet governance perspective”, page 127, 2022)¹¹⁷ and is a fundamental right in most countries including EU, as certified by Article 17 of the Charter of Fundamental Rights.¹¹⁸

As concerns property documents under EU legislation, the pieces of law that must be considered are those of the single MSs since the Union’s approach was that of leaving legislative power to each member while stating the relevance of ownership, recognizing it as a fundamental right in the abovementioned text; in the most recent EU history in fact, supranational authorities have preferred empowering MSs’ legislation in the matter of property law as also testified by Article 295 of the EC Treaty that states: «This Treaty shall in no way prejudice the rules in Member States governing the system of property ownership»,¹¹⁹ thus highlighting again the role of countries forming the Union.

Before following this rule and focusing on a country specific approach, some clarifications over the concept of ownership are also required; as Trujillo (2022)¹²⁰

¹¹⁷ Trujillo: “The surge of non-fungible tokens and its implications for digital ownership from an Internet governance perspective”, *Rivista Italiana di Informatica e Diritto*, Pages 125-132, 2022. Available at: https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=0CAMQw7AJahcKEwiQsN_F_9D8AhUAAAAAHQAAAAAQAw&url=https%3A%2F%2Fwww.rivistaitalianadiinformaticaediritto.it%2Findex.php%2FRIID%2Farticle%2Fdownload%2F101%2F81&psig=AOvVaw3spoX6tkEA8FIkDediWrbs&ust=1674127089972439

¹¹⁸ Article 17 of the Charter of Fundamental Rights: « (1) *Everyone has the right to own, use, dispose of and bequeath his or her lawfully acquired possessions. No one may be deprived of his or her possessions, except in the public interest and in the cases and under the conditions provided for by law, subject to fair compensation being paid in good time for their loss. The use of property may be regulated by law in so far as is necessary for the general interest.* (2) *Intellectual property shall be protected.* » Available at: <https://fra.europa.eu/en/eu-charter/article/17-right-property>

¹¹⁹ Article 295 of the Treaty establishing the European Community, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A11997E295>

¹²⁰ Trujillo: “The surge of non-fungible tokens and its implications for digital ownership from an Internet governance perspective”, *Rivista Italiana di Informatica e Diritto*, Pages 125-132, 2022. Available at: https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=0CAMQw7AJahcKEwiQsN_F_9D8AhUAAAAAHQAAAAAQAw&url=https%3A%2F%2Fwww.rivistaitalianadiinformaticaediritto.it%2Findex.php%2FRIID%2Farticle%2Fdownload%2F101%2F81&psig=AOvVaw3spoX6tkEA8FIkDediWrbs&ust=1674127089972439

explains, ownership is an evolving concept that is hardly framed in one permanent legal structure, and this is even more true when dealing with ownership of digital assets given the recent examples of provisions to limit this type of right that are listed by the same author (citing Perzanowski and Schultz (2016))¹²¹ such as the licensing of this type of goods and usage of DRM (digital rights management) technology.¹²²

This already obstacles an effective delineation of non-fungible tokens which is preparatory to the construction of a legal framework covering them, thus further justifying the current turmoil; moreover, as a European Parliament study¹²³ reports, “ownership” in some MSs (France and Germany for instance) may refer only to physical objects, with further differentiation to be required.

This said, we will now focus on a country specific example of potential NFTs’ classification, this will not just allow us to follow exactly the EU approach on matters of property law that implies users to refer to Member State domestic legislation, but will also favor the application of a discussion methodology that will end up providing the reader with a possible guideline of what the future possible scenarios will be in regulatory matters given the potential impact that MS’s legislation can have over future EU Lawmaker’s decisions on the hopefully upcoming NFTs’ normative framework.

A possible approach is that obtained when analyzing the Italian legislation, which, besides the relevance it had in contributing to the overall legislative process in EU, can be considered as providing one of the most interesting examples of the potential conceptual legal identification of non-fungible tokens as entitlement documents, thus following Fairfield (2021)¹²⁴ view.

Annunziata and Conso (2022) provide an appealing hint on how these tokens, intended as documents certifying ownership and several rights to «enjoy a series of utilities

[adiinformaticadiritto.it/index.php%2FRIID%2Farticle%2Fdownload%2F101%2F81&psig=AOvVa_w3spoX6tkEA8FIkDediWrbs&ust=1674127089972439](https://www.adiinformaticadiritto.it/index.php%2FRIID%2Farticle%2Fdownload%2F101%2F81&psig=AOvVa_w3spoX6tkEA8FIkDediWrbs&ust=1674127089972439)

¹²¹ Perzanowski and Schultz: “The end of ownership: Personal property in the digital economy”, MIT Press, p. 11, 2016.

¹²² See more on this on Trujillo: “The surge of non-fungible tokens and its implications for digital ownership from an Internet governance perspective”, *Rivista Italiana di Informatica e Diritto*, 2022. Available at:

https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=0CAMQw7AJahcKEwiQsN_F_9D8AhUAAAAAHQAAAAAQAw&url=https%3A%2F%2Fwww.rivistaitalianadiinformaticadiritto.it%2Findex.php%2FRIID%2Farticle%2Fdownload%2F101%2F81&psig=AOvVa_w3spoX6tkEA8FIkDediWrbs&ust=1674127089972439

¹²³ Full study available at:

[https://www.europarl.europa.eu/RegData/etudes/STUD/2022/737709/IPOL_STU\(2022\)737709_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2022/737709/IPOL_STU(2022)737709_EN.pdf)

¹²⁴ Fairfield, Joshua: “Tokenized: The Law of Non-Fungible Tokens and Unique Digital Property”, *Indiana Law Journal*, Forthcoming, 2021. Available at:

SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3821102

connected to the underlying asset» (Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, page 43, 2022),¹²⁵ may be assimilated to title deeds under Italian property law.

The latter, as explained by the authors and pursuant to Article 2002 of the Italian Civil Code (Codice Civile) are defined as «documents serving only to identify the person entitled to the service or to allow the transfer of the right without observing the forms proper to the assignment», thus are separated by credit qualifications and become outside of the scope of provisions of Article 1995 and above of the Italian Civil Code regulating the performance of the service.¹²⁶

By comparing this definition to the one which can be built having acknowledged all the information on the features that non-fungible tokens share that have been discussed up to now in this thesis, it can be easily inferred that these tokens may actually fit in this category; in particular, their role of documents identifying their owner (as well as the various additional information) can be considered as a principal indicative function in this sense.

Consequently, such a classification under Italian Law would leave them outside the scope of crucial provisions like those from Article 1992 to 2002 of the Italian Civil Code, regulating and protecting the right of ownership which are applied instead to credit qualifications, solving only partially the problem of identification of these tokens. As explained by the authors,¹²⁷ the missing inclusion is mainly due to the fact that, once following this approach, NFTs lack of «abstractedness and incorporation» (Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, page 43, 2022)¹²⁸ while only working as identificatory documents, precisely as the title deeds which were defined above.

According to the same authors, in other words, when considering NFTs and their features, their classification as entitlement documents given their «function of digital certification and proof of ownership of the rights incorporated therein» (Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”,

¹²⁵ Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, page 43, 2022.

¹²⁶ Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, 2022.

¹²⁷ Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, 2022.

¹²⁸ Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, page 43, 2022.

page 44, 2022)¹²⁹ could be the most accurate, this given that such documents are not aimed at being distributed, whilst, just like NFTs, are used to identify the owner, thus definitely excluding non-fungible tokens from the provisions of the aforementioned articles of the Italian legislation.

In our view, the concepts behind this approach may also be correct, at least from a purely formal point of view non-fungible tokens do indeed serve this function and thus their eventual classification as title deeds can be right. What must be specified is that, as was seen in the previous chapters and as will be inferred from the next sections, these tokens do not always “just” share these features but can also be empowered with a much more complex character that may imply doubts on this categorization to legitimately arise; as an example, their frequently high and volatile values can provide these tokens with a strong financial attribute which could lead them to be hardly considered as title deeds.

In such a confused scenario where a precise regulatory framework is lacking, it comes intuitive to ask what would happen at the time of writing to an NFT of an asset that not only grants ownership but also some further specific rights to its owner, the same holding for one being treated as a financial instrument, in particular building up the hypothesis of a law, if existing, protection of users.

In other words, the Italian example is certainly worth noting, particularly in light of the cornerstone role that each country has in matters of property law, where Union relies mostly on domestic legislation; therefore, that from above must be thought as one of the possible points of view on the issue, while further (and different) perspectives can simultaneously be presented by discussing other countries’ approach.

For instance, as the abovementioned European Parliament study¹³⁰ reports, German civil law may treat this subject matter quite differently from Italy; in particular, NFTs here cannot be treated as property since they are not «tangible and spatially definable», hence they lack physicality. A recent UK High Court case¹³¹ is also brought up by the study, the latter indeed recently recognized an NFT as a “legal property”, therefore highlighting even more the gap created among different countries’ legislation.¹³²

¹²⁹ Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, page 44, 2022.

¹³⁰ Full study available at:

[https://www.europarl.europa.eu/RegData/etudes/STUD/2022/737709/IPOL_STU\(2022\)737709_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2022/737709/IPOL_STU(2022)737709_EN.pdf)

¹³¹ *Osbourne v Persons Unknown* (2022) EWHC 1021 (Comm).

¹³² Full study available at:

[https://www.europarl.europa.eu/RegData/etudes/STUD/2022/737709/IPOL_STU\(2022\)737709_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2022/737709/IPOL_STU(2022)737709_EN.pdf)

What we can infer from these country-specific examples is that, besides the different perspectives, the procedure usually applied to any kind of asset or instrument that implies to firstly identify the nature of the subject matter so that a classification and subsequent regulation comes easier, finds some difficulties when considering NFTs. Starting from its basic classification based on a conceptual consideration of the subject matter, this already encounters obstacles given its innovative and always developing character, it is therefore evident how the awareness that will be required when dealing with the topic must be particularly high. The problem with these tokens is that, even if framed under a “title deed” qualification (as could be done under Italian legislation), their role of certifying ownership and related rights to the owner is not limited to the usual assets to which entitlement documents are related but rather shares a much wider scope of application that ends up including fields, sectors and uses that may hardly fit under a single classification.

These obstacles are exacerbated by the missing substantive legislation on property law at EU level that would homologate provisions eventually improving NFTs’ management instead of forcing users to rely on a domestic legislation approach that creates regulatory arbitrage possibilities which end up being detrimental.

3.4 NFTs, copyright and related rights

Once having analyzed a possible view on the identification of non-fungible tokens focusing on the most conceptual part of the definition related to certifying ownership, it is now time to analyze these tokens from a different perspective that allow for further legal issues to emerge.

In the previous section of this thesis, some anticipations on the following challenges which NFTs would be forced to deal with were provided; their use as documents granting ownership underlies a significant and still uncovered matter which is that of the rights implied by the token.

When it comes to buying an NFT, which, besides being still at the beginning of its history, keeps happening more and more frequently, one of the main problems is the confusion that creates on these tokens’ related rights.

Often, what is commonly (and reasonably) inferred is that the purchase of a given token implies the obtaining of ownership of the asset to which the latter is related; this may be true in some cases but such a conclusion should, however, not be so immediate since, as

we will see, many situations in which the purchase does not only imply this type of ownership or underlies specific other rights to be exercised with the acquisition, can be encountered, each one implying different legal consequences that will therefore require further specifications.

As a general consideration, an NFT's purchase can be seen as the acquisition of a certificate of ownership of the underlying asset; as previously said, this may potentially legitimate the classification of such token as an entitlement document.

This said, main issues concerning related rights arise when considering the type of asset that can be associated with the token, consequently verifying its ownership and authenticity; indeed, this can take various forms, it can be a digital representation of an original (and often physical), a virtual, stand-alone asset, intended as a good that can be disposed of on digital platforms, which is not a copy or a derivation of an original, or eventually it may be a physical asset.

As concerns the first type of asset, this is where the more confusion often generates; this because, particularly when considering art-related NFTs and in light of the increasing applications that these tokens are experiencing, a non-fungible token which, once purchased, certifies ownership (and authenticity) of a digital copy of an existing original work, may imply several consequences under the rights' management point of view, specifically when these are not outlined clearly.

As said, the problem is more evident in the art sector, therefore an example of this phenomena may be given by the Uffizi and Cinello cooperation which brought to the creation of a digital copy of the renowned "Tondo Doni" by Michelangelo whose ownership and authentication are verified by an NFT. In this case, several critiques and doubts arisen, specifically on which rights the buyer of the token obtained with the purchase and whether this negatively impacted the image of the creator, of the artwork and of the Italian museum.

Discussions in Italy and Europe were precisely centered around doubts on the extent to which the owner of the token could reproduce the picture or whether he/she had any rights, including copyright, on the original work.

In this sense, first of all it is necessary to recall that, generally, copyright establishes once the work is created, with no formal request required, this being clearly specified in Article 5 of the Berne Convention and transposed in the TRIPS agreement (Art. 9) stating: «The enjoyment and the exercise of these rights shall not be subject to any formality; such enjoyment and such exercise shall be independent of the existence of protection in the

country of origin of the work. Consequently, apart from the provisions of this Convention, the extent of protection, as well as the means of redress afforded to the author to protect his rights, shall be governed exclusively by the laws of the country where protection is claimed». ¹³³ Copyright is intended as «the exclusive legal right to reproduce, publish, sell, or distribute the matter and form of something (such as a literary, musical, or artistic work)», ¹³⁴ therefore the eventual rights' transfer implied by an NFT's purchase would be many.

However, from a closer look, rights such as that of reproducing, publishing or distributing a given work are all covered by the 2001/29/EC Directive, in particular Article 2, 3 and 4 of this text define the principles covering the subject matter and set clearly that most rights will lie on the author; ¹³⁵ thus copyright holder would most likely be the author of the original asset from which a digital representation is taken. This is also supported by a transposition of the “corpus mysticum” and “corpus mechanicum” dichotomy (as described by Annunziata and Conso (2022)) ¹³⁶ to the NFTs' ecosystem, here the former (intended as the concept behind the work) can be seen as strictly related to the original opera, hence belonging entirely to the author as soon as the work is created, the latter instead is much more keen to be assimilated to the NFT itself, this being a digital expression of the original work, precisely embracing indeed the definition of “corpus mechanicum”. ¹³⁷

As just seen, according to EU legislation, the author is the only one authorized to, inter alia, allow for reproduction of his/her work, with 2001/29/EC Directive additionally imposing on Member States the duty of granting exclusive right to authorize distribution of the original work and of its copies to the author.

¹³³ Article 5 of the Berne Convention, available at: <https://www.law.cornell.edu/treaties/berne/5.html>

¹³⁴ Definition taken from Merriam-Webster dictionary, available at: <https://www.merriam-webster.com/dictionary/copyright>

¹³⁵ Article 2 of 2001/29/EC Directive on reproduction right: «*Member States shall provide for the exclusive right to authorise or prohibit direct or indirect, temporary or permanent reproduction by any means and in any form, in whole or in part: (a) for authors, of their works;*», Article 3 on right of communication to the public of works and right of making available to the public other subject-matter and Article 4 on distribution right: «*(1) Member States shall provide for authors, in respect of the original of their works or of copies thereof, the exclusive right to authorise or prohibit any form of distribution to the public by sale or otherwise. (2) The distribution right shall not be exhausted within the Community in respect of the original or copies of the work, except where the first sale or other transfer of ownership in the Community of that object is made by the rightholder or with his consent.*» Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32001L0029>

¹³⁶ Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, 2022.

¹³⁷ Please, see Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, 2022, for more.

Furthermore, the simple use of an image of an original artwork covered by copyright to mint an NFT attached to it would constitute copyright infringement since this can be classified as “reproduction” under Article 2 of the same Directive.¹³⁸

Copyright infringement can therefore easily take place in the NFTs’ scenario, breaches during the minting phase or illegitimate use of the token can often lead to legal consequences; the minting of so called “abusive” NFTs is indeed one of the main examples of copyright infringement that can arise in the scenario we are describing, criminals may exploit this lack of a precise regulation on the topic to mint abusive NFTs which are either copies of the original or are created without ownership of the legal right to do so. In nutshell, what can often happen, is that the creator of the token attaches a given digital artwork to it and then uses a name which reconciles potential buyers to believe either he/she is the original artist or that the attached digital asset is an actual work from him/her.

In this respect, an example may be provided by the case of the Serbian artist Milos Rajkovic who, in July 2021, probably unaware of the NFT’s world mechanism or existence, found out that 122 NFTs of his work had been minted and gone for sale on renowned marketplace OpenSea without any authorization by him, this therefore falling completely inside the copyright infringement category.

Similar situation for the digital artist Pest Supply,¹³⁹ who minted a series of NFTs whose underlying assets were digital artworks largely inspired by the Banksy style therefore creating in buyers a logical doubt on whether the two artists were the same person (also considering the usual anonymity that characterizes the renowned British artist). This eventually brought the former’s NFTs to generate sales for around 900 thousand EUR,^{140,141} since, once Banksy declared he did not entered the NFTs’ world, it was too late and tokens had already been sold.

¹³⁸ Article 2 of Directive 2001/29/EC, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32001L0029>

¹³⁹ Valeonti, F.; Bikakis, A.; Terras, M.; Speed, C.; Hudson-Smith, A.; Chalkias, K.: “Crypto Collectibles, Museum Funding and OpenGLAM: Challenges, Opportunities and the Potential of Non-Fungible Tokens (NFTs)”. *Appl. Sci.* 2021, *11*, 9931. Available at: <https://www.mdpi.com/2076-3417/11/21/9931/htm#B100-applsci-11-09931> or <https://doi.org/10.3390/app11219931>

¹⁴⁰ Valeonti, F.; Bikakis, A.; Terras, M.; Speed, C.; Hudson-Smith, A.; Chalkias, K.: “Crypto Collectibles, Museum Funding and OpenGLAM: Challenges, Opportunities and the Potential of Non-Fungible Tokens (NFTs)”. *Appl. Sci.* 2021, *11*, 9931. Available at: <https://www.mdpi.com/2076-3417/11/21/9931/htm#B100-applsci-11-09931> or <https://doi.org/10.3390/app11219931>

¹⁴¹ Please, see <https://www.theartnewspaper.com/2021/02/22/banksy-style-nfts-have-sold-for-dollar900000but-are-they-the-real-deal-and-does-it-even-matter> for more.

We can see how the advantage of these tokens of being “rapidly” attached to different kinds of assets may also transform into a possible source of detriment once misused since a user may exploit an artist work or name to mint and sell NFTs as long as the actual owner does not get to notice it and even once this happens, legal procedures may be quite long.

A special scenario which may also constitute author’s right infringement is also the minting of an NFT which substitutes (purposely or not) the physical asset. The latter is a borderline case, which, even though presenting many examples, still does not share a uniform legal provision; the problem here is that often the NFT replaces the physical item that is eventually destroyed.

Evidence of this phenomena can be seen in the project “The currency” by Damien Hirst or the “Morons” by Banksy, the latter was at the center of several arguments given that it was attached to an NFT which, once sold, completely substituted the original work that was burnt, probably aiming at increasing the value of the token. As said, the action generated turmoil given the relevance of the opera but also complaints were expressed concerning potential moral rights infringements. Note that these are: «the right to claim authorship of the work and the right to object to any mutilation, deformation or other modification of, or other derogatory action in relation to, the work that would be prejudicial to the author’s honor or reputation»¹⁴² as defined by a summary of the Berne Convention, and should lie on the author as well; in particular Article 6-bis of this text defines the relevant provisions in this sense, also stating that «the means of redress for safeguarding the rights granted by this Article shall be governed by the legislation of the country where protection is claimed».¹⁴³

In light of these provisions, it is evident that a sale of a non-fungible token minted and attached to a (digital) copy of an original work, like in the case of the renowned Michelangelo artwork, is not simultaneously accompanied neither by a direct transfer of copyright nor by a transfer of moral rights over the work to the buyer of the token, who therefore won’t be entitled in any way to reproduce, distribute or economically exploit

¹⁴² Please, see https://www.wipo.int/treaties/en/ip/berne/summary_berne.html for a summary of the text, while refer to Article 6-bis of full text, available at: <https://www.wipo.int/wipolex/en/text/283698>

¹⁴³ Article 6-bis (3) of the Berne Convention, available at: <https://www.wipo.int/wipolex/en/text/283698> Note, however, that art. 9 of TRIPS agreement completely excludes art. 6-bis of the Berne Convention from its provisions by stating: «*Members shall not have rights or obligations under this Agreement in respect of the rights conferred under Article 6bis of that Convention or of the rights derived therefrom*», available at: https://www.wto.org/english/docs_e/legal_e/27-trips_04_e.htm

the asset, as well as he/she will not be allowed to mint an NFT of an asset he/she has no authorization for.

The point is that if a clear boundary among the intellectual property (IP) rights attached to the digital representation, being it the underlying asset of the token, and those linked to the original asset from which the copy is taken, is missing, management of such assets may become quite challenging with implications that may affect both the real and the digital side. The main issue would most likely be the overlapping of copyright among the two forms of the same asset; even though the original (and often physical one) is the one to which most rights are attached, the nature of NFTs taken as certificates of ownership of an asset which may be a representation of one already existing, with the rights implied, could create some obstacles.

Indeed, we must recall that copyright implies the right of reproducing the asset, thus potentially printing or displaying it, using the image to create t-shirts, eventually endangering the heritage and credibility of the creator, may lead to severe consequences for both also under the financial perspective; think about a scenario in which unauthorized reproduction of an artwork takes place, let's imagine in the Metaverse, thus potentially establishing a source of income to the owner of the NFT while no specification on this was presented as a feature of the token in the smart contract. The key is precisely that ownership of the NFT and ownership of copyright are usually two separate roads, and the boundaries, as much as possible, should always be transparent and well set.

The general separation between tokens' sale and copyright transfer was confirmed also by the statement of the Uffizi Gallery, which following the turmoil caused by the sale of the "Tondo Doni" NFT for around 240 thousand EUR, clarified that among all the rights attached to the token there was none allowing the buyer to organize exhibitions of the image or similar events, therefore reassuring that the heritage firmly remained to Italy.¹⁴⁴ A further example of how NFTs' purchase often completely excludes copyright is given by the already mentioned case of the Beeple's "Everydays-The First 5000 Days", record breaker NFT which shares the same peculiarities saw for the "Tondo Doni" NFT when analyzing its contractual terms of sale.

Indeed here the buyer obtained ownership of the token containing a jpg file of the work as well as the possibility of proving its authenticity, but no ownership of copyright of the

¹⁴⁴ Please, see <https://www.tribune.com/professionieri-e-professionisti/politica-e-pubblica-amministrazione/2022/05/uffizi-vende-opere-nft-ministero-blocca-tutto/> for more.

art implied;¹⁴⁵ as the same artist explained referring to his work's sale and comparing it to the sale of a physical art work: «if you buy a (physical) painting, you just bought the painting»,¹⁴⁶ thus highlighting again the complete separation from copyright ownership of a usual token's purchase, while treating the NFT as a book, with the relative differences in terms of unicity, whose acquisition is absolutely separated from the obtaining of this kind of rights.

Furthermore, as we go on in our analysis, it becomes clear from our point of view that, at least on the legislative side, an NFTs-related rights' treatment following the provisions generally applied to artworks (also considering that art sector constitutes a large size of NFTs' application) will make sense; clearly, once treating tokens related to different sectors the same conclusion could not be that straightforward.

Quite obviously, such measures, if present, should be accompanied by an adequate knowledge and interest on the potential buyer's side, where the user should be aware of how the sale process works and be updated on what he/she is interested in buying (particularly when considering high spendings), the way the asset works and the rights implied, thus avoiding any negligence which cannot be considered within the duties of a third party; this overall could be also mitigated by the introduction of an informative document to be attached to each NFT, but this aspect will be treated deeply in the next sections.

The created confusion, mixed with the redundant missing regulatory framework that would instead be needed to serve as a guide when dealing with NFTs, still persists; this can impact negatively both on users and on the non-fungible tokens' ecosystem which can suffer a significant slowdown if legal issues keep arising. Indicative is the decision by the General Manager of the "Musei", Massimo Osanna, who, following the disorders generated by the "Tondo Doni" NFT's sale, blocked any contract stipulated among Italian museums and companies realizing digital copies of their operas, waiting for clearer provisions from competent authorities; this is a clear signal of what can be the negative effects of the scenario described, where lots of business opportunities are missed thus impacting even more on the gap that may create within Member States or foreign countries which may treat these aspects differently from a legal perspective.

¹⁴⁵ Please, see <https://www.cnbc.com/2021/03/26/digital-artist-beeple-common-misunderstanding-about-nfts.html> for more.

¹⁴⁶ Please, see <https://www.cnbc.com/2021/03/26/digital-artist-beeple-common-misunderstanding-about-nfts.html> for more.

The acquisition of a token, as said, most often leads to the transfer of the only right of ownership that the buyer can exercise over the underlying asset which is usually a unique digital copy of an existing asset; the latter therefore can be authenticated (and presented to be that precise unique digital copy) but no rights of general economic exploitation of the asset are transferred to the buyer and remain to the author (the same holding for moral rights), as long as the contrary is not specified.

Thus, the focus of our discussion should be put on this precise point, on whether and which rights are specified and included in the token's purchase, always recalling that accuracy is key; examples of NFTs involving rights' transfers that go above the simple ownership are in fact as common as the others.

An interesting EC article¹⁴⁷ published on the famous institution's website where NFTs are presented, finds in the Bored Ape Yacht Club (BAYC) NFTs a representation of this; BAYC NFTs are part of a collection, each certifying the ownership of the underlying piece of art, an artistic representation of an ape. The key point is that terms and conditions related to these tokens clearly state that the buyer of the NFT will be obtaining the complete ownership of the underlying asset (the ape), including copyright. The article reports part of these terms: «You Own the NFT. Each Bored Ape is an NFT on the Ethereum blockchain. When you purchase an NFT, you own the underlying Bored Ape, the Art, completely. Ownership of the NFT is mediated entirely by the Smart Contract and the Ethereum Network: at no point may we seize, freeze, or otherwise modify the ownership of any Bored Ape».^{148,149}

As we see therefore the main point relies on what the terms of sale reported in the smart contract state, therefore also under the copyright and related rights view, awareness is almost mandatory; attention must be even higher when dealing with NFTs whose underlying is a digital copy of the original, particularly because these are those which most likely will be subject to copyright, specifically while moving within the art sector's borders.

Moreover, the rule of thumb already presented, finds as its source the total differentiation among the original asset and the one attached to NFT, which may be its unique digital

¹⁴⁷ Please, see full article available at: https://intellectual-property-helpdesk.ec.europa.eu/news-events/news/making-sense-nfts-and-what-they-mean-ip-standpoint-india-2022-03-25_en

¹⁴⁸ Please, see full article available at: https://intellectual-property-helpdesk.ec.europa.eu/news-events/news/making-sense-nfts-and-what-they-mean-ip-standpoint-india-2022-03-25_en

¹⁴⁹ Please, see full terms available at: <https://boredapeyachtclub.com/#!/terms>

representation or be a specific edition part of a limited set, that most often is applied (thus again in a way recalling the “corpus mysticum” and “corpus mechanicum” distinction). This is evidenced by the same EC article mentioned above by making a clear distinction among the original work and the NFT based on it, by using the example of a book: «copyright of the book vests with the author and the publisher».¹⁵⁰

Additionally, Tonya M. Evans (law professor at Penn State University) provided a general guideline on the possible interpretation of copyright in the NFTs’ world which seems to share the same principles just described; Valeonti et al. (2021)¹⁵¹ report her statement declaring that the overall view of law on this subject matter «does not specifically identify digital or digitized works as copyrightable subject matter»^{152,153} since this covers «physical embodiments and those requiring the aid of a machine».^{154,155}

A special mention is deserved for underlying assets which are digital versions of physical existing ones for which the sale of the token is complementary to the sale of the real-world item, an example of this can be easily found by looking at the Metaverse’s ecosystem and the related NFTs, with tokens representing ownership of digital properties in the Metaverse that are perfect representations of existing houses in the real world, or again the Rtfkt x Nike AR Genesis project being one of the most famous proofs. The latter implied the creation of a digital copy of a real hoodie by the Oregon-based brand, which the user would get once purchasing the physical item.

In this case, the view from above could be misleading since here ownership of the token and of the related asset coincides with ownership of the physical item, therefore we could infer that lower copyright issues should exist; however, this is not completely true since the physical item remains an item created by Nike which still remains the author and therefore the holder of the copyright, unless differently specified.

¹⁵⁰ Please, see full article available at: https://intellectual-property-helpdesk.ec.europa.eu/news-events/news/making-sense-nfts-and-what-they-mean-ip-standpoint-india-2022-03-25_en

¹⁵¹ Valeonti, F.; Bikakis, A.; Terras, M.; Speed, C.; Hudson-Smith, A.; Chalkias, K.: “Crypto Collectibles, Museum Funding and OpenGLAM: Challenges, Opportunities and the Potential of Non-Fungible Tokens (NFTs)”. *Appl. Sci.* 2021, *11*, 9931. Available at: <https://www.mdpi.com/2076-3417/11/21/9931/htm#B100-applsci-11-09931> or <https://doi.org/10.3390/app11219931>

¹⁵² Valeonti, F.; Bikakis, A.; Terras, M.; Speed, C.; Hudson-Smith, A.; Chalkias, K.: “Crypto Collectibles, Museum Funding and OpenGLAM: Challenges, Opportunities and the Potential of Non-Fungible Tokens (NFTs)”. *Appl. Sci.* 2021, *11*, 9931. Available at: <https://www.mdpi.com/2076-3417/11/21/9931/htm#B100-applsci-11-09931> or <https://doi.org/10.3390/app11219931>

¹⁵³ Evans, T.M.: “Cryptokitties, cryptography, and copyright”. *AIPLA Q. J.* 2019, *47*, Pages 219–266.

¹⁵⁴ Valeonti, F.; Bikakis, A.; Terras, M.; Speed, C.; Hudson-Smith, A.; Chalkias, K.: “Crypto Collectibles, Museum Funding and OpenGLAM: Challenges, Opportunities and the Potential of Non-Fungible Tokens (NFTs)”. *Appl. Sci.* 2021, *11*, 9931. Available at: <https://www.mdpi.com/2076-3417/11/21/9931/htm#B100-applsci-11-09931> or <https://doi.org/10.3390/app11219931>

¹⁵⁵ Evans, T.M.: “Cryptokitties, cryptography, and copyright”. *AIPLA Q. J.* 2019, *47*, Pages 219–266.

Concluding, what can be derived is that, besides differences in each country's legislation, NFTs whose underlying asset is a digital representation of an original, can be assimilated to physical paintings in terms of copyright; hence when buying the token, the buyer is not getting copyright. However, given the extreme variability that characterizes the sector, a case-by-case assessment shall be required to detect peculiarities in the terms specified in the smart contract.

This said, two other assets' typologies remain uncovered: digital standalone assets and physical ones. Discussion on these categories will be briefer given their relatively lower number of adoptions and the smaller number of empirical studies on the themes, however the apparently simpler concepts that could be applied from a legislative perspective should not be misleading.

As concerns the first typology of underlying asset, meaning "completely" digital ones, it is legitimately plausible that these will be treated slightly differently from digital copies of existing physical or digital assets, whose potential provisions were specified before.

The buyer of the token in this case should obtain complete ownership over the asset represented, this being a unique digital item with no original asset that goes beyond the one to which the token is linked; the scenario could therefore be that of the Bored Ape Yacht Club (BAYC) NFTs presented above, where complete ownership was attributed to the owner in the terms of sale reported in their website, both stating terms of personal and commercial use declaring the owner has being granted by the company Yuga Labs LLC (creator of the token) rights of printing, using or displaying the purchased art according to the conditions provided.

In particular, some of these terms state that the owner is granted for personal use «a worldwide, royalty-free license to use, copy, and display the purchased Art, along with any extensions that you choose to create or use» and for commercial use «an unlimited, worldwide license to use, copy, and display the purchased Art for the purpose of creating derivative works based upon the Art ("Commercial Use")». ¹⁵⁶

Therefore, it can be inferred how in any case, the priority lies on what the terms of the contract specify on rights attributed to the owner, regardless of the category in which the underlying asset may be classified.

¹⁵⁶Please, see full terms available at: <https://boredapeyachtclub.com/#/terms>

If number of examples of digital standalone assets were few, when dealing with the last category (meaning physical assets to which an NFT is related) precedents are, if possible, even less.

The most unambiguous proof of this type of application for NFTs may be found in the already mentioned real estate sector, even though these digital certificates of ownership still find low adoption in the field, their potential impact has largely been presented.

Despite the lack of examples, some conclusions on the possible implications can still be obtained, if we think about an NFT linked to a physical asset like a house, we expect complete ownership over it to be transferred with the sale of the token, just like it would happen without it; NFTs in this case will have the larger impact as blockchain-based tokens capable of granting efficient and safe storage of information on the underlying, while copyright being obviously left out.

Concluding, non-fungible tokens' elevated rights involvement is certainly a topic that deserves attention on the legislative side, particularly from an EU perspective, given the common misjudgments and copyright infringement that can easily take place as we saw. In this respect, the Lawmaker may find himself having to decide whether to adopt the same procedures already in place in copyright law (that is leaving jurisdiction to each Member State and their domestic law) or create an ad-hoc legislative framework also considering the always increasing diffusion of these tokens that frequently embrace sectors where copyright ownership is not the only problem. Overall, it remains evident that copyright infringement is one of the most common issues related to these tokens; this, as well as moral rights, seem to be totally separated from NFTs' sales, at least initially, thus indicating that a case-by-case assessment would be the best option under specific circumstances and in general to obtain the more accurate picture of the case.

3.5 The management of royalties

The function of granting payments to the token's creator (or any other specified party) any time the NFT was sold has already been presented in chapter 1 of this thesis. As a matter of fact, however, the discussion there was mainly centered around the actual relevance of this feature that finds again in the blockchain-based character its principal source; what will now be evidenced are the legal issues linked with this peculiarity as well as a possible delineation of the measures involved, this always intended to provide

a useful overview of the problem with an eye on what the future potential framework can be.

When dealing with royalties it is crucial to note that these can be considered as full-fledged rights, and therefore protected by relevant pieces of legislation. According to Article 14-ter of Berne Convention: «The author, or after his death the persons or institutions authorized by national legislation, shall, with respect to original works of art and original manuscripts of writers and composers, enjoy the inalienable right to an interest in any sale of the work subsequent to the first transfer by the author of the work».¹⁵⁷ Here again, particularly in point 2 and 3 of the article reported in the reference notes, it is evident how each signing member is left with a certain level of freedom in terms of application since precedence is given to domestic legislation.

Furthermore, this is also stated in Directive 2001/84/EC which is the relevant piece of legislation at EU level in this sense; the directive firstly specifies what is intended for “resale right”,¹⁵⁸ then highlights how the Berne Convention eventually defines a scenario in which this right is optional for countries (recalling what specified in the latter), with provisions being applied «[...] only if legislation in the country to which the author belongs so permits».¹⁵⁹

It becomes crucial in this sense to follow what this Directive foresees and try to understand how NFTs may fit in this setting; these tokens are not specifically included in the list of assets to which the Directive 2001/84/EC applies but in our view they seem to fit well in the description provided by the Article 2 of this piece of legislation which defines works of art to which resale right applies as: «Copies of works of art covered by this Directive, which have been made in limited numbers by the artist himself or under

¹⁵⁷ Article 14-ter of Berne Convention: « (1) The author, or after his death the persons or institutions authorized by national legislation, shall, with respect to original works of art and original manuscripts of writers and composers, enjoy the inalienable right to an interest in any sale of the work subsequent to the first transfer by the author of the work. (2) The protection provided by the preceding paragraph may be claimed in a country of the Union only if legislation in the country to which the author belongs so permits, and to the extent permitted by the country where this protection is claimed. (3) The procedure for collection and the amounts shall be matters for determination by national legislation». Available at: <https://www.wipo.int/wipolex/en/text/283698>

¹⁵⁸ Recital 2 of Directive 2001/84/EC: «The resale right is a right of a productive character which enables the author/artist to receive consideration for successive transfers of the work. The subject-matter of the resale right is the physical work, namely the medium in which the protected work is incorporated». Available at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0084>

¹⁵⁹ Recital 6 of Directive 2001/84/EC: «The Berne Convention for the Protection of Literary and Artistic Works provides that the resale right is available only if legislation in the country to which the author belongs so permits. The right is therefore optional and subject to the rule of reciprocity [...] ». Available at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0084>

his authority, shall be considered to be original works of art for the purposes of this Directive. Such copies will normally have been numbered, signed or otherwise duly authorised by the artist».¹⁶⁰

Therefore, following this reasoning and locating NFTs inside this definition (given their unicity and assuming we are dealing with tokens whose minting was authorized by the author of the original asset) what we could conclude is that potentially these would be subject also to the other provisions of the Directive; however, we must be careful since a more accurate look gives some further hints on the possible classification of NFTs within this environment.

As reported by the already mentioned EP study,¹⁶¹ recital 2 of Directive 2001/84/EC states that: «The subject-matter of the resale right is the physical work, namely the medium in which the protected work is incorporated»,¹⁶² therefore the problem of physicality that was discussed also in relation to German property law when the copyright issues of NFTs were described, kicks in again; however, we must recall that NFTs may also be linked to physical art and more in general physical assets, therefore their complete exclusion would not be obvious.

Anyway, further obstacles to the inclusion of NFTs in this Directive's scope arise when analyzing Article 1, which, after having specified in paragraph 1 that «Member States shall provide, for the benefit of the author of an original work of art, a resale right, to be defined as an inalienable right, which cannot be waived, even in advance, to receive a royalty based on the sale price obtained for any resale of the work, subsequent to the first transfer of the work by the author», in paragraph 2 it further states that: «The right referred to in paragraph 1 shall apply to all acts of resale involving as sellers, buyers or intermediaries art market professionals, such as salesrooms, art galleries and, in general, any dealers in works of art».¹⁶³ Such a scenario would consequently imply either NFTs which do not meet these criteria to be left out from these rules governing resale rights (as it still happens for some art sales where no intermediaries are involved), or the eventual need to amend this Directive in favor of a complete inclusion of such tokens.

¹⁶⁰ Article 2 of Directive 2001/84/EC, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32001L0084>

¹⁶¹ Full study available at:

[https://www.europarl.europa.eu/RegData/etudes/STUD/2022/737709/IPOL_STU\(2022\)737709_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2022/737709/IPOL_STU(2022)737709_EN.pdf)

¹⁶² Recital 2 of Directive 2001/84/EC, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32001L0084>

¹⁶³ Article 1 of Directive 2001/84/EC, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32001L0084>

Besides the hypothetical reasoning we are building, this opens up a further point that centers around the actual classification of intermediaries that intervene in a usual NFT's sale, precisely on whether they can be considered as art market professionals following the specifications provided by Article 1(2) of the Directive or not; the role of marketplaces in this field has been already highlighted several times but an analysis of the potential legislative issues to which they may be related will be provided in the next sections.

Nonetheless, we see how the hypothesis of non-fungible tokens falling within the scope of this Directive would not be so utopic, at least if all the conditions are met; royalties' management would be following the specific interval brackets for the royalties' payments that are set by Article 4(1) of the Directive,¹⁶⁴ overall not exceeding 12500 EUR; decision is left to the various Member States on whether to adopt a lower minimum sale price under specific conditions, according to paragraph 3 of the same Article.¹⁶⁵

To be fair, also under this aspect a few obstacles may present, a first problem is linked to the reliability of percentages applied once the whole royalty payment becomes part of an automated procedure through the use of a smart contract; this may favor the establishment of a direct relationship among parties, with no intermediary involved, thus implementing a decentralized trade with no authority supervising whether the terms of the contract, and particularly the rates, actually respect the brackets set out by the Directive's provisions.

A further issue that is still related to the brackets foreseen for royalties' payments, may be the appropriateness of such rates when these are applied to an ecosystem where some NFTs are being sold for enormous prices with tokens being traded often more than one time, as testified by data on secondary sales we provided for the art market in chapter 1. For instance, some may argue on whether a 0.25 % royalty percentage for the portion of sale price exceeding 500 thousand EUR, particularly considering the reasons just described, would be reasonable or not; this, knowing the redundant confusion on the regulatory side, may overall create an unstable setting where high amounts of money are traded autonomously and with absent or low supervision.

¹⁶⁴ Article 4(1) of Directive 2001/84/EC: «*The royalty provided for in Article 1 shall be set at the following rates: (a) 4 % for the portion of the sale price up to EUR 50000; (b) 3 % for the portion of the sale price from EUR 50000,01 to EUR 200000; (c) 1 % for the portion of the sale price from EUR 200000,01 to EUR 350000; (d) 0,5 % for the portion of the sale price from EUR 350000,01 to EUR 500000; (e) 0,25 % for the portion of the sale price exceeding EUR 500000. However, the total amount of the royalty may not exceed EUR 12500*». Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32001L0084>

¹⁶⁵ Article 4(3) of Directive 2001/84/EC: «*If the minimum sale price set should be lower than EUR 3000, the Member State shall also determine the rate applicable to the portion of the sale price up to EUR 3000; this rate may not be lower than 4 %*». Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32001L0084>

Therefore, we can directly infer how this legislative scenario gets more and more intricate, even though, the eventual inclusion of NFTs as subject matter of this Directive would contribute to an efficient control of the whole process thanks to the stability, safety and traceability granted by NFTs and the automatized procedure provided by smart contracts.

3.6 VAT and NFTs, a difficult combination

A further point that is not always considered when dealing with non-fungible tokens and their legal implications is the potential consequences that they may have for tax purposes; NFTs are being sold rapidly and almost autonomously, with no or few authorities checking on these processes that as we saw may entail elevate spending that can reach millions of euros in some cases. A legal framework that concretely incorporates them is therefore needed, with ad-hoc provisions that can englobe them in order to grant an efficient enhancement of the digital finance sector that showed to increasingly rely on NFTs.

What we will now discuss is whether the confusion on these tokens' qualification that was already presented in this work, will unluckily have a significant role also in this field, eventually generating legal tax issues that have not been addressed until now.

As explained by Bal (2022),¹⁶⁶ and as could have been forecasted in light of the conduct of EU authorities in matter of these tokens' legislation that was analyzed up to now, EU tax law does not provide any specific rule neither on NFTs nor on their sales.

In this sense, a relevant piece of legislation at Union level is the Council Directive 2006/112/EC,¹⁶⁷ aimed at providing a common system of value added tax (VAT), which makes a differentiation among goods and services; here, Article 2 specifies that text's provisions apply to transactions that involve: «the supply of goods for consideration within the territory of a Member State by a taxable person acting as such», «the intra-Community acquisition of goods for consideration within the territory of a Member State [...] », «the supply of services for consideration within the territory of a Member State by a taxable person acting as such» or «the importation of goods».¹⁶⁸

¹⁶⁶ Bal: "Demystifying NFTs and VAT", Bloomberg Tax, 2022. Available at:

<https://news.bloombergtax.com/daily-tax-report-international/demystifying-nfts-and-vat>

¹⁶⁷ Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax, full text available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0112>

¹⁶⁸ Article 2 of Council Directive 2006/112/EC, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0112>

As evidenced by the same Directive in Article 14, paragraph 1 specifies that «supply of goods» shall refer to the «transfer of the right to dispose of a tangible property»;¹⁶⁹ therefore, despite the following paragraph states that «in addition to the transaction referred to in paragraph 1, each of the following shall be regarded as a supply of goods: (a) the transfer, by order made by or in the name of a public authority or in pursuance of the law, of the ownership of property against payment of compensation [...] »,¹⁷⁰ knowing that non-fungible tokens are not tangible assets, the eventual qualification of sales of NFTs for VAT purposes can hardly fall in the first category, the same holding for the second and fourth category given the difficulties of considering these tokens as goods, as also reported by Bal (2022).^{171,172}

As concerns the «supply of services» instead, this finds much more similarities with how non-fungible tokens have been delineated until now; Article 25 of the Directive in question indeed states: «A supply of services may consist, inter alia, in one of the following transactions: (a) the assignment of intangible property, whether or not the subject of a document establishing title [...] ». ¹⁷³

From this perspective therefore, sale of an NFT may be treated as a supply of services when happening within the territory of a MS; in this sense the identification of the place of supply becomes crucial to understand the applicability of VAT law and the various terms.

For this purpose, Article 43 defines general rules on the place of supply of services and identifies it as «the place where the supplier has established his business or has a fixed establishment from which the service is supplied, or, in the absence of such a place of business or fixed establishment, the place where he has his permanent address or usually resides»;¹⁷⁴ when dealing with non-fungible tokens it must be acknowledged that the majority of sales takes place through platforms that work as exchanges, some of which have been mentioned in this thesis (OpenSea for example).

¹⁶⁹ Article 14 of Council Directive 2006/112/EC, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0112>

¹⁷⁰ Article 14 of Council Directive 2006/112/EC, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0112>

¹⁷¹ Bal: “Demystifying NFTs and VAT”, Bloomberg Tax, 2022. Available at: <https://news.bloombergtax.com/daily-tax-report-international/demystifying-nfts-and-vat>

¹⁷² Note that however, evidence of the contrary will be provided in the next pages.

¹⁷³ Article 25 of Council Directive 2006/112/EC, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0112>

¹⁷⁴ Article 43 of Council Directive 2006/112/EC, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0112>

The problem is that most exchanges of this kind can be classified as intermediaries since they just link the seller and the buyer, therefore we should focus more on how to classify this type of sales, knowing the difficulties potentially encountered in NFTs' categorization, in order to describe the applicable rule that enables the identification of the place of supply.

The subsequent Article 44, which covers specifically the supply of services by an intermediary, identifies the place of supply of «services by an intermediary acting in the name and on behalf of another person» as « [...] the place where the underlying transaction is supplied in accordance with this Directive».¹⁷⁵ However, given the digital character that transactions taking place on these platforms share, place of supply defined as such becomes hardly detectable.

Due to this, it would be useful to deepen our analysis on what is the legal framework for electronically supplied services in order to see whether NFTs' sales may fall in any of the cases foreseen or not.

An interesting paper¹⁷⁶ by the European Commission explains that electronically supplied services are those that are delivered either via Internet or through an electronic network, with a supply that is mainly automated, with low human intervention and impossible to ensure with no informational technology. The paper clearly does not mention NFT's exchange platforms among the examples of the services' providers listed, however by thinking about the way in which most of these entities work, we can confidently state that such aspects are also common to them; the trade of these tokens, thanks to their blockchain-based character and the smart contracts on which their functioning relies, is largely automated, no significant human intervention is required and their sale is indeed impossible to ensure in the absence of informational technology.

As correctly pointed out by Bal (2022),¹⁷⁷ a further possibility, which however does not find much evidence of its applicability, would be that of considering the sale of an NFT as a transfer of IP rights; in this thesis, particularly in the section concerning copyright in relation to these tokens, we already highlighted the most common scenario that in the majority of the cases sees the acquisition of copyright being completely separated from

¹⁷⁵ Article 44 of Council Directive 2006/112/EC, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0112>

¹⁷⁶ Full paper available at: https://ec.europa.eu/taxation_customs/business/vat/telecommunications-broadcasting-electronic-services/sites/default/files/taxud-2016-00734-01-00-en.pdf

¹⁷⁷ Bal: "Demystifying NFTs and VAT", Bloomberg Tax, 2022. Available at: <https://news.bloombergtax.com/daily-tax-report-international/demystifying-nfts-and-vat>

the acquisition of the token, with its sale that much more likely involves simpler benefits, like rights of displaying the asset's representation for personal use, consequently causing the inclusion of this process in this category to seem quite forced.

Therefore, the correct approach appears to be that described before, that is to say, to treat sales of non-fungible tokens as digital services, this further justified by the way in which these tokens are usually received by the acquiror; the latter indeed most often obtains a jpg file (or an MP3 audio file when dealing with NFTs used for music as underlying asset), thus these sales seem to perfectly fit in the list of electronically supplied services provided by Annex II of Council Directive 2006/112/EC which, inter alia, includes: «supply of images, text and information and making available of databases» and «supply of music, films and games, including games of chance and gambling games, and of political, cultural, artistic, sporting, scientific and entertainment broadcasts and events».¹⁷⁸

Therefore, by sticking to this classification, the identification of the place of supply will consequently be based on the general rule under EU VAT law for this kind of services, which is that these are to be taxed in the country of the customer. It is remarkable that such an approach was also confirmed under Spanish Tax Law¹⁷⁹ as Bal (2022)¹⁸⁰ explains, thus supporting even more the idea.

However, for the sake of clarity, it must be mentioned that Spain case may be contraposed to that of Italy as presented by Annunziata and Conso (2022);¹⁸¹ here, authors present how NFTs may be qualified as goods under Italian legislation, therefore implying a completely different treatment with respect to the one just presented which instead involved the qualification of sale of non-fungible tokens as digital services.

Evidence in support of their thesis is based on Article 810 of the Italian Civil Code that provides a definition of “good”, the latter indeed basically includes any item over which a right can be exercised.

Non-fungible tokens, as explained also in the previous sections of this work, can be seen as digital representations of ownership, the latter being a fundamental right in EU, as

¹⁷⁸ Annex II of Council Directive 2006/112/EC, full text available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02006L0112-20220701#tocId585>

¹⁷⁹ Please, see <https://www.iberley.es/resoluciones/resolucion-vinculante-dgt-v0486-22-10-03-2022-1538333> for more.

¹⁸⁰ Bal: “Demystifying NFTs and VAT”, Bloomberg Tax, 2022. Available at: <https://news.bloombergtax.com/daily-tax-report-international/demystifying-nfts-and-vat>

¹⁸¹ Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, 2022.

certified in Article 17 of the Charter of Fundamental Rights; this therefore suggests that non-fungible tokens under this perspective may be classified as “goods” under Italian legislation, precisely because they are subject to the exercise of given rights.

Obviously, for the matter of this thesis, EU legislation shall be regarded as the one having the prominent role; nonetheless, given the uncertainty characterizing the legal framework on this topic, member states’ pieces of legislation and their approaches can be taken into consideration.

The eventual qualification of non-fungible tokens as “goods” will therefore hinder the classification of their sale as a digital service under EU legislation that was presented above, consequently implying a different treatment for tax purposes of the related transactions which may rather be seen as supply of goods thus impacting also on the identification of the territoriality used to determine the tax burden (even though a deeper analysis would be required);¹⁸² as of now we will follow the more “European” procedure and treat the considerations of Annunziata and Conso (2022)¹⁸³ as a useful example of the intricacy of the scenario and of the needed attention that the EU Lawmaker shall adopt when regulating these points.

Moreover, the idea of following the former approach is similarly also shared by Estonia, as reported by Lambert and Kasprzak (2022),¹⁸⁴ but also by some countries outside EU, with India and New Zealand that have recently announced that they will apply this procedure according to Deschâtres (2021).¹⁸⁵

Therefore, once having identified the place of supply by following the rule of thumb of considering sales of NFTs as digital service, the transaction’s taxation will be subject to the relevant provisions of the country of the customer, therefore a MS-specific analysis would be required in order to assess the relevant rules. Intuitively, the latter will not be provided in this thesis while the aim of the section was that of understanding whether EU tax law was applicable to sales of non-fungible tokens or not, especially considering the values that certain of these related transactions may reach; the answer is that, under

¹⁸² More on this can be found in ch.3 of Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, 2022.

¹⁸³ Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, 2022.

¹⁸⁴ Lambert and Kasprzak: “Will your NFT investments soon be subject to VAT?”, EY, 2022. Available at: https://www.ey.com/en_lu/tax/will-your-nft-investments-soon-be-subject-to-vat

¹⁸⁵ Deschâtres: “NFTs and VAT: the taxation of cryptoassets”, LinkedIn, 2021. Available at: <https://www.linkedin.com/pulse/nfts-vat-taxation-cryptoassets-iman-deschâtres>

Union's Law, they can potentially be classified as digital services with consequent application of the tax legislation on this point.

In this respect however, further considerations should be provided, particularly in light of the highly differentiated sector we are dealing with. Non-fungible tokens-related transactions must always be considered as involving tokens and assets which can take different forms, imply different rights and serve for different purposes; thus, the classification of the single NFT may significantly impact on the qualification of its sale with consequent need for us to contemplate the idea that the latter may also be subject to VAT exemptions in the different Member States.

On this regard, as also explained by Bal (2022),¹⁸⁶ EU tax law in its Directive 2006/112/EC foresees a series of exemptions of this kind; Article 135 (d), (e) and (f) inter alia, provide for exemptions that can be relevant for our purpose, in particular «transactions, including negotiation, concerning deposit and current accounts, payments, transfers, debts, cheques and other negotiable instruments, but excluding debt collection», «transactions, including negotiation, concerning currency, bank notes and coins used as legal tender [...] » or even «transactions, including negotiation but not management or safekeeping, in shares, interests in companies or associations, debentures and other securities, but excluding documents establishing title to goods, and the rights or securities referred to in Article 15(2)»¹⁸⁷ are exempted from VAT. The actual classification of non-fungible tokens-related transactions under both the first and second typology listed seems quite forced given the non-fungibility of these tokens that does not allow them to be considered as means of payment; what could instead be seen as including NFTs' sale is the third category, this however remaining a rare case applying only to transactions involving specific types of non-fungible tokens that can be treated as securities due to their features.¹⁸⁸ Therefore, as Spanish¹⁸⁹ and Belgian Tax Law¹⁹⁰ confirmed, the rule of thumb is to exclude NFTs from exemptions as explained by Bal (2022),¹⁹¹ platforms

¹⁸⁶ Bal: "Demystifying NFTs and VAT", Bloomberg Tax, 2022. Available at:

<https://news.bloombergtax.com/daily-tax-report-international/demystifying-nfts-and-vat>

¹⁸⁷ Article 135 and Article 15(2) of Council Directive 2006/112/EC available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0112>

¹⁸⁸ More on this will be discussed in the following paragraphs.

¹⁸⁹ Please, see <https://www.iberley.es/resoluciones/resolucion-vinculante-dgt-v0486-22-10-03-2022-1538333> for more.

¹⁹⁰ Please, see https://eservices.minfin.fgov.be/myminfin-web/pages/public/fisconet/document/1346e129-0cb0-4eb5-bf31-927083890fb7#_Toc106975212 for more.

¹⁹¹ Bal: "VAT Treatment of Services Provided by Crypto Exchange Platforms", Bloomberg Tax, 2022. Available at: <https://news.bloombergtax.com/daily-tax-report-international/vat-treatment-of-services-provided-by-crypto-exchange-platforms>

acting as intermediaries between seller and buyer in an NFT's transaction, following a case-by-case assessment, would have to charge a tax on the customer according to the VAT provisions that are foreseen in his/her country, this provided that the qualification of NFTs' sales as digital services is accepted.

Clearly, a more transparent approach on NFTs from EU tax law, with clear provisions implying their exclusion (or inclusion) from these measures, eventually comprising the exemption from VAT, would be probably the best option to allow for an efficient and correct application of the relative legislation in an already sufficiently confused scenario, this underlying that we, as users, must wait for clarifications from Union's competent authorities on this subject matter in order to understand how to move adequately.

3.7 NFTs' anonymity, AML as a solution

Now that an initial legislative framework covering NFTs in their most conceptual aspect as well as issues that may arise in relation to the rights attached to these tokens has been delineated, it is time for our discussion to move a step further. We already specified at the beginning of this chapter how the lack of precise rules capable of framing this topic requires us to base our analysis on potential application of existing pieces of legislation to non-fungible tokens; this will not be easy, since key aspects characterizing NFTs like their variety, mixed with the intricateness of a legal framework that, even if at Union level, may often rely on domestic legislation of the different MSs thus leading to differences in definitions and norms, overall end up making things even more complex. In this thesis, non-fungible tokens largely shown to share many uncommon benefits that allow to innovate certain sectors and to improve others through their adoption; however, downsides also exist, some were already pointed out (copyright infringement risk, exc.) but others have still to be discussed, anonymity granted by non-fungible tokens is definitely one of the most relevant since it can easily end up favoring illegal practices like terrorism financing or money laundering. These are activities generally extremely common to sectors like fine art where subjective valuations of items is highly present, here an individual's personal taste can totally determine the evaluation of a given asset therefore hindering supervisory activity that may base its approach on suspicious quotations of assets on which a reference price exists; art therefore constitutes a perfect

storage for high values that can be moved or traded in a much more compact and hidden way through NFTs.¹⁹²

As a matter of fact, reports highlighting the relevance of this phenomena in non-digital sectors are plenty, however lately non-fungible tokens have started being involved too and the redundant missing regulatory framework that characterizes them does not make things any simpler; the problem lies mainly on the structure behind these tokens, specifically on the platforms managing them who most often act as intermediaries in transactions.

The latter have been experiencing a dramatic growth in volumes and number during the last couple of years, this due to the increasing popularity of these tokens which, despite being traded heavily through direct trades among parties that do not involve any intermediary, often require a digital platform to rely on or an entity acting as intermediary between buyer and seller; this last aspect may also be linked to the excessively low reliability that is often associated to the digital world as well as the relatively new character of these tokens which, by causing general unawareness from the larger public, may force users to feel safer if a third party assists them in the transaction.

In this scenario, in order to analyze the issue from a legislative point of view, we should focus on Directive (EU) 2018/843 of the European Parliament and of the Council,¹⁹³ commonly known as (AMLD 5); this is a piece of legislation designed by EU bodies with the aim of preventing the misuse of the Union financial system for illegal practices.

An analysis of the full text as well as of its history is left out of the scope of this thesis and therefore will not be subject matter of this section; however, a brief overview of what this piece of legislation foresees will be provided, particularly in light of the impact that it may have on NFTs and related entities, assuming these fall in the scope of application of the text.

This Directive, currently in its fifth version with a sixth in the making, mainly establishes provisions governing entities and individuals that may be involved in money laundering and/or terrorism financing which Member States had to transpose into national legislation by January 10, 2020.¹⁹⁴

¹⁹² Please, see <https://www.idnow.io/blog/nft-non-fungible-tokens-new-art-money-laundering/> for more.

¹⁹³ Directive (EU) 2018/843 of the European Parliament and of the Council of 30 May 2018 amending Directive (EU) 2015/849 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing and amending Directives 2009/138/EC and 2013/36/EU. Full text available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32018L0843>

¹⁹⁴ Please, see https://finance.ec.europa.eu/financial-crime/eu-context-anti-money-laundering-and-countermeasures-financing-terrorism_en for more.

These provisions are mainly centered around three points which are: customer due diligence, record-keeping and reporting of suspicious transactions, these being preventive measures to which obliged entities are subject. The latter is a broad category involving credit and financial institutions, a series of natural or legal persons who perform actions such as managing client money exc., as well as auditors and others, full list of which is provided in Article 2 of Directive 2015/849;¹⁹⁵ note that this is a first crucial aspect since, as anticipated, a major complication to the safety of EU financial system (even if still not officially recognized) is related to the entities that work with NFTs (platforms, marketplaces exc.). The latter can be represented as pillar of the whole question since these entities generally tend to indirectly favor illegal practices like those mentioned by granting a sufficient level of anonymity to users that find in NFTs, also given their high volatility, a perfect instrument to be used with criminal intent.

As said, AMLD 5 aims at preventing the use of the financial system in EU for money laundering and terrorism financing activity and it does so with provisions that require obliged entities to perform a series of operations that significantly contribute to the supervisory and control activity performed by EU competent authorities.

Therefore, from a generalized perspective, non-fungible tokens-related platforms' inclusion in the scope of AMLD 5 would constitute a concrete move from the European

¹⁹⁵ Article 2(1) of Directive (EU) 2015/849 after amendment provided by Article 1 of Directive (EU) 2018/843: «*This Directive shall apply to the following obliged entities: (1) credit institutions, (2) financial institutions, (3) the following natural or legal persons acting in the exercise of their professional activities: (a) auditors, external accountants and tax advisors, and any other person that undertakes to provide, directly or by means of other persons to which that other person is related, material aid, assistance or advice on tax matters as principal business or professional activity; (b) notaries and other independent legal professionals, where they participate, whether by acting on behalf of and for their client in any financial or real estate transaction, or by assisting in the planning or carrying out of transactions for their client concerning the: (i) buying and selling of real property or business entities, (ii) managing of client money, securities or other assets, (iii) opening or management of bank, savings or securities accounts, (iv) organization of contributions necessary for the creation, operation or management of companies, (v) creation, operation or management of trusts, companies, foundations, or similar structures; (c) trust or company service providers not already covered under point (a) or (b); (d) estate agents including when acting as intermediaries in the letting of immovable property, but only in relation to transactions for which the monthly rent amounts to EUR 10 000 or more; (e) other persons trading in goods to the extent that payments are made or received in cash in an amount of EUR 10000 or more, whether the transaction is carried out in a single operation or in several operations which appear to be linked; (f) providers of gambling services; (g) providers engaged in exchange services between virtual currencies and fiat currencies; (h) custodian wallet providers; (i) persons trading or acting as intermediaries in the trade of works of art, including when this is carried out by art galleries and auction houses, where the value of the transaction or a series of linked transactions amounts to EUR 10 000 or more; (j) persons storing, trading or acting as intermediaries in the trade of works of art when this is carried out by free ports, where the value of the transaction or a series of linked transactions amounts to EUR 10 000 or more.*» Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02015L0849-20210630> or <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32018L0843>

Union Lawmaker towards the same direction of an approach followed until now and based on the intent of regulating the various innovations in the digital field. Additionally, this would seem almost intuitive given the relevance that these tokens have, particularly for the role these are reported to have in money laundering and other criminal acts like wash trading (the latter being not precisely within the scope of this Directive).

Data from a Chainalysis report¹⁹⁶ is indicative of the size of the issue, the study, also exploiting the traceability of transactions granted by blockchain technology, shows that third and fourth quarter of 2021 have highlighted «value sent to NFT marketplace from illicit addresses» (Chainalysis: “The 2022 Crypto Crime Report”, page 35, 2022)¹⁹⁷ ranging between 1 and 1.5 million USD per quarter.

This, despite being relatively small if compared to values related to cryptocurrency-based money laundering, still proves the significance of the role of these tokens in these practices which cannot be disregarded both due to their inner criminal purpose and to the negative impact they may have on the future of NFTs’ adoption in most sectors, with such a point that could be the source of an extreme slowdown to their evolution; accordingly, we will now try to understand whether entities implied in NFTs’ trading and management can be considered as obliged entities under AMLD 5.

Before proceeding, it must be specified that the classification of such entities is still unsettled due to the variety of services they offer which cover assets exchanged and managed that also lack of a proper framing; this, also favored by a legislative framework that never identifies them explicitly to be within the scope of a given directive or regulation, overall causes their categorization to often require to be accompanied by considerations on the related tokens.

A first differentiation can therefore be based on the NFT-related sector to which these platforms are linked; examples like Axie Infinity, Decentraland or NBA Top Shot are all sector-specific marketplaces for non-fungible tokens, some of which were already mentioned in this thesis. However, currently most entities tend to deal with NFTs that belong to the widest variety of fields, an example is OpenSea, one of the most popular marketplaces, which allows this type of tokens (attached to assets from art, sport, gaming, exc.) to be bought or sold among users, regardless of the sector to which they refer.

¹⁹⁶ Chainalysis: “The 2022 Crypto Crime Report”, 2022. Preview available at: <https://blog.chainalysis.com/reports/2022-crypto-crime-report-introduction/>

¹⁹⁷ Chainalysis: “The 2022 Crypto Crime Report”, 2022. Preview available at: <https://blog.chainalysis.com/reports/2022-crypto-crime-report-introduction/>

Nonetheless, for the matter of this thesis, a more useful differentiation can be obtained by distinguishing among the services offered by them; clearly, the services we will consider are those strictly related to money laundering therefore platforms which center majorly around the minting phase will be left out.

As can be inferred, the principal type of service is that related to the trade of these tokens, meaning platforms acting as intermediaries between buyers and sellers; this category can include all marketplaces serving the function of connecting the two parties, this connection can be either established by a platform which selects the token to be sold and makes it available for purchase (so called “curatorial platforms”) or alternatively by one avoiding any selection and allowing anyone to sell their tokens (“non-curatorial platforms”) (Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, page 56, 2022),¹⁹⁸ with the latter typology being clearly the one to which most risks are potentially attached given the lower level of controls.

Moreover, these platforms, which act in the interest of receiving a pre-specified percentage of the sale price, also provide an additional service which is that of accepting cryptocurrencies as means of payment; as a matter of fact, this is the main case for non-fungible tokens and represents an aspect to be considered also from the legislative perspective.

The second category of platforms that may be involved in NFTs’ management is that including those working as crypto wallets’, which in general enable users to access the items stored on the blockchain; in the case of NFTs’ crypto wallets, these permit the owner of the token to access to it through the private key or any other key of access needed. These wallets are the cornerstone of most operations to be performed with non-fungible tokens and therefore should be accurately treated, particularly under the legislative point of view.

This said, when analyzing the previous versions of the AML Directive, no clear discussion on NFTs was brought up, this even more so true for virtual currencies, therefore the eventual inclusion of the platforms we are describing under the scope of application of such provisions should be looked for in the most recent fifth Anti-money laundering Directive; this, besides other amendments which are not so relevant for the aim of this thesis, added to the list of obliged entities, inter alia, two categories which can

¹⁹⁸ Please, see Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, page 56, 2022.

be found in Article 1 (1) of this Directive (amending Article 2 of AMLD 4),^{199,200} these are: providers engaged in exchange services between virtual currencies and fiat currencies, and custodian wallet providers.

Considering these provisions, both categories could be, from a first impression, identified respectively as a potential classification for non-fungible tokens' exchange platforms and for those working as crypto wallet which were described before.

As concerns the former, the same Directive also provides an harmonized definition of “virtual currency”, valid all over the Union which may be useful to get a complete overview before stating conclusions; in particular, Article 3 (18) of Directive (EU) 2015/849, following the AMLD 5 amendment, defines a virtual currency as: « [...] a digital representation of value that is not issued or guaranteed by a central bank or a public authority, is not necessarily attached to a legally established currency and does not possess a legal status of currency or money, but is accepted by natural or legal persons as a means of exchange and which can be transferred, stored and traded electronically».²⁰¹ This definition is not specific at all but is rather quite wide, therefore may potentially include also non-fungible tokens given their representative character that allows them to be possibly accepted in a transaction (as it may be the case for Italian legislation which however slightly modified the definition provided by enlarging the scope of application),²⁰² thus suggesting a first introduction of exchange platforms involved in NFTs' trades under this category.

However, further and more accurate analysis would be required in order to understand precisely whether non-fungible tokens can be defined as virtual currency under this definition or not; thus, as of now, conclusions are far from being definitive, with NFTs

¹⁹⁹ Article 1 (1) of Directive 2018/843, point (c): «*the following points are added: (g) providers engaged in exchange services between virtual currencies and fiat currencies; (h) custodian wallet providers; (i) persons trading or acting as intermediaries in the trade of works of art, including when this is carried out by art galleries and auction houses, where the value of the transaction or a series of linked transactions amounts to EUR 10 000 or more; (j) persons storing, trading or acting as intermediaries in the trade of works of art when this is carried out by free ports, where the value of the transaction or a series of linked transactions amounts to EUR 10 000 or more*». Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32018L0843>

²⁰⁰ Please note that these are added as points (g), (h) to Article 2 (1) of AMLD 4 (Directive (EU) 2015/849). Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02015L0849-20210630>

²⁰¹ Article 3 (18) of Directive (EU) 2015/849, following Directive (EU) 2018/843 amendment, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02015L0849-20210630>

²⁰² Please, see Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, 2022, for more.

still moving in the limbo between “digital assets”, “hybrid” or “utility tokens” and “virtual currency” as specified by Kafteranis et al. (2022).²⁰³

Nonetheless, «providers engaged in exchange services between virtual currencies and fiat currencies»²⁰⁴ categorization also involves the terms “fiat currencies” and when it comes to this point, inclusion of platforms working in the NFTs’ sector becomes slightly more forced.

The main issue is that NFTs are mostly traded in crypto currencies and not in usual fiat money, therefore even if NFTs were to be treated as “virtual currencies”, the mean of payment used in order to allow for the exchanger to fall in the list of obliged entities (under this category) according to AMLD 5 would need to be fiat money, which is far unlikely; clearly, the legislative approach should also cover such an hypothesis but this remains a rare case, with trades between NFTs and crypto currencies forming the most common scenario and consequently the one on which most legislative attention should be put.

As concerns the second category of obliged entities added by the fifth Anti-money laundering Directive, that of “custodian wallet providers”, these are defined by the text as: « [...] an entity that provides services to safeguard private cryptographic keys on behalf of its customers, to hold, store and transfer virtual currencies»;²⁰⁵ the latter is a completely different typology of entity with respect to that just analyzed. Usually, NFTs’ access is subject to a crypto wallet that stores passwords or private keys necessary to manage or perform any action with the NFT; these wallets were initially intended to allow exchanges of cryptocurrencies but lately have been updated to support also NFTs’ access. Again, the definition provided above highlights the potential to include also digital wallets linked to non-fungible tokens under the scope of the Directive’s provisions, this still provided that these can be classified as “virtual currencies”, which as we said, is not so straight forward, at least under the EU definition.²⁰⁶

²⁰³ Kafteranis, D., Turksen, U.: “Art of Money Laundering with Non-Fungible Tokens: A myth or reality?” European Law Enforcement Research Bulletin, 22, SCE Nr.6: tbd., 2022. Available at: <https://bulletin.cepol.europa.eu/index.php/bulletin/article/view/531>

²⁰⁴ Article 1 of Directive 2018/843, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32018L0843>

²⁰⁵ Article 3 (19) of Directive (EU) 2015/849, following Directive (EU) 2018/843 amendment, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02015L0849-20210630>

²⁰⁶ Please, note that Annunziata and Conso: “NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art”, Montabone, 2022, provide an interesting analysis of the definition of “virtual currency” under Italian legislation which seems to actually include NFTs.

Special cases seem to be given by point (i) and (j) of the above-mentioned Article 2 (1) of Directive 2015/849 (amended by Article 1 (1) of AMLD 5); indeed, these two foresee a possible inclusion of NFTs and related platforms in the Directive' provisions, as long as they are «persons» acting as intermediaries in a sale involving the «trade of works of art» performed either by «art galleries» or «auction houses» or by «free ports» when «the value of the transaction or a series of linked transactions amounts to EUR 10 000 or more».²⁰⁷

We see therefore that these two are cases specifically applicable only to NFTs related to the art-sector, which, despite it has been seen to constitute a significant portion of the total uses of these tokens, would imply just a partial application of this Directive's provisions, this assuming that three conditions are satisfied: platforms fall in one of the above-mentioned cases (so can be classified as “art galleries”, “auction houses” or “free ports”), NFTs being traded are works of art and the value of the transaction is higher than 10 thousand EUR; thus we see that these are measures whose scope is quite restrictive.

As concerns the first condition, some NFT platforms may be treated as auction houses or art galleries, while it may also be the case that auction houses like Christie's, previously specialized in sales of real-world assets, start auctioning also NFTs. Nonetheless, with respect to the second condition, AMLD 5 does not provide any definition of work of art therefore, even if conceptually some NFTs may also be forcedly classified as such, it becomes again unclear whether non-fungible tokens and related-platforms may fall under the scope of this Directive.

To sum up, in light of the features with which platforms described are characterized as well as the services they provide, in general NFTs-related platforms (exchanges or crypto wallet providers) are neither clearly specified as obliged entities nor can be assimilated to a point specified in the list in absolute terms, at least not when dealing with non-fungible tokens; therefore, their certain inclusion within the scope of AMLD 5 seems to be currently not possible with consequent lower controls on users' transactions which are strictly related to very mediocre requirements for platforms in this sense.

²⁰⁷ Article 2 (1) points (i) and (j) of Directive 2015/849 after amendment provided by Article 1 of Directive 2018/843: «(i) persons trading or acting as intermediaries in the trade of works of art, including when this is carried out by art galleries and auction houses, where the value of the transaction or a series of linked transactions amounts to EUR 10 000 or more; (j) persons storing, trading or acting as intermediaries in the trade of works of art when this is carried out by free ports, where the value of the transaction or a series of linked transactions amounts to EUR 10 000 or more». Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02015L0849-20210630>

From a general point of view, useful measures that are foreseen by AMLD 5, and established as its three pillars, such as customer due diligence (obligation to identify the client asking ID and his transaction's purpose), record-keeping (keep the record of the transactions of the client) and reporting of suspicious transactions to competent authorities may not apply to NFT platforms, unless specific conditions are met; nonetheless, current scenario suggests high attention from competent authorities should be required, examples of what may happen due to large anonymity granted by platforms allowing for the creation and trade of NFTs, which could be hindered also by AMLD 5 provisions, are plenty.

Scams and frauds performed by cybercriminals are indirectly encouraged by these entities' behavior as well as by the lack of obligations on them, overall leading to NFTs currently constituting a further source of illegal activities linked mostly to money laundering and terrorism financing; the relevance of additional control and requirements have already been pointed out, what we will now do is to delineate the issue from a practical angle.

In this sense, many indicative examples of the lack of transparency that some of the platforms used to sell these tokens share, can be provided; these frequently require minimum personal data to allow a user to create a wallet or even mint a token, thus the eventual sanctioning of the perpetrator, subject to his/her identification, tends to be lagged in time and possibly even absent.

As explained by Kshetri (2022), an example is Twinci (an NFT social marketplace), which, often used in combination with wallets like imToken or Metamask (with the former declared accounting for more than 12 million users according to Shu (2021)),²⁰⁸ is presented as giving users the possibility to connect their crypto wallets like the two mentioned and, since these are characterized by an almost completely anonymous registration that does not even require an email, end up potentially favoring illegal behaviors.²⁰⁹

As concerns specifically money laundering, the described anonymity feature that NFTs platforms share makes them highly attractive to criminals; according to a Chainalysis

²⁰⁸ Shu: "Cryptocurrency wallet and blockchain tech startup imToken raises \$30 million Series B", TechCrunch, 2021. Available at: <https://tcrn.ch/3dpaZ1w>

²⁰⁹ N. Kshetri: "Scams, Frauds, and Crimes in the Nonfungible Token Market" in *Computer*, vol. 55, no. 04, pp. 60-64, 2022. doi: 10.1109/MC.2022.3144763. Available at: <https://www.computer.org/csdl/magazine/co/2022/04/09755212/1Cubv0qQJxe>

report,²¹⁰ volumes subject to money laundering suffered a strict increase during 2021 when compared to values of 2020, hitting the 8.6 million USD. We infer how, under this perspective, an enhanced system of vigilance and supervision, with platforms working with smart contracts and NFTs increasing their identification practices to be capable of checking wallet addresses, seems to be strictly required; this is exactly what von Wachter et al. (2022) suggest: «smart contract-based NFT platforms may consider the implementation of obligatory or voluntary identification initiatives» (von Wachter et al.: “NFT Wash Trading Quantifying suspicious behaviour in NFT markets”, pages 7-8, 2022).²¹¹

Illegal practices to which NFTs may be associated however are not only money laundering, an activity that is worth mentioning, again linked also to platforms adopted for the trade of NFTs is wash trading; the latter intended as «sets of trades between collusive addresses, without taking market risk, that lead to no change in the individual position of the participating addresses» (von Wachter et al.: “NFT Wash Trading Quantifying suspicious behaviour in NFT markets”, page 8, 2022),²¹² is mainly aimed at increasing the value of a given token by trading it between addresses belonging to the same entity, consequently creating a misleading picture of its value.

In general, suspicious transactions, besides being favored also by the high volatility in non-fungible tokens' prices that was already discussed in the section dedicated to NFTs' use as investment instrument, find a significant amount of examples in this ecosystem. As several recent studies like Tariq et al. (2022)²¹³ and von Wachter et al. (2022)²¹⁴ show, the number of transactions and related wallet addresses in this market suggests that regulators should keep an eye on what is happening in NFT marketplaces. Indeed, as the latter evidence, the percentage of suspicious transactions triggering market abuse, over a sample involving the largest 52 collections by volume on a period going from January 2018 to November 2021, was almost 4 %; these were additionally translated in monetary

²¹⁰ Chainalysis: “DeFi Takes on Bigger Role in Money Laundering But Small Group of Centralized Services Still Dominate”, 2022. Available at: <https://blog.chainalysis.com/reports/2022-crypto-crime-report-preview-cryptocurrency-money-laundering/>

²¹¹ von Wachter, Jensen, Regner and Ross: “NFT Wash Trading Quantifying suspicious behaviour in NFT markets”, arXiv e-prints, 2022. Available at: <https://arxiv.org/pdf/2202.03866.pdf>

²¹² von Wachter, Jensen, Regner and Ross: “NFT Wash Trading Quantifying suspicious behaviour in NFT markets”, arXiv e-prints, 2022. Available at: <https://arxiv.org/pdf/2202.03866.pdf>

²¹³ S.A. Tariq and I. Sifat.: “Suspicious trading in nonfungible tokens (nfts): Evidence from wash trading”, 2022. Available at SSRN: <https://ssrn.com/abstract=4097642>

²¹⁴ von Wachter, Jensen, Regner and Ross: “NFT Wash Trading Quantifying suspicious behaviour in NFT markets”, arXiv e-prints, 2022. Available at: <https://arxiv.org/pdf/2202.03866.pdf>

terms and accounted to have inflated the «authentic trading volume» by 149.5 million USD.²¹⁵

Further concrete evidence of wash trading with NFTs is also given by a Chainalysis report,²¹⁶ which declares a reported 110 wash traders who profited almost 8.9 million USD with this practice; an additional and most notable example is the case of the CryptoPunk 9998 NFT which was sold on October 28, 2021 at around 532 million USD-worth ETH at the time with the ether being transferred through a flash loan,^{217,218} this procedure was followed by the token being listed at 25000 ETH (worth around 1 billion USD at the time) hence almost doubling its “value” which is even more impressive when considering that the same NFT had a value of around 350 thousand USD prior to this wash trading attempt.

One of the main factors favoring these practices, besides the general anonymity that many platforms grant to their users, is the frequent adoption of public key cryptography that individuals use to connect to markets by generating a given number of addresses (Johannes et al. (2021));²¹⁹ this, together with the relatively new character of the NFTs’ market, with users’ knowledge on actual value and potential of some of these tokens that is still limited due also to the lack of historical data, can facilitate practices like wash trading with perpetrators who may find the perfect scenario to boost prices and trick investors.

We see how overall, this foggy scenario in which individuals can perform actions that can hinder both users and the market, ends up favoring the continuation of these behaviors also since both the sanctioning and the detection of criminals is obstructed by the lack of obligations to which platforms involved may be subject, eventually leading to lower controls on trades involving NFTs, despite the evident relevance of the phenomena confirmed by the data provided.

However, the increase in the supervisory provisions could be as useful as problematic; a first issue is that an enhanced level of controls over users and their accounts to be efficient should be firstly introduced under the regulatory point of view, that is to say, AMLD 5

²¹⁵ von Wachter, Jensen, Regner and Ross: “NFT Wash Trading Quantifying suspicious behaviour in NFT markets”, arXiv e-prints, 2022. Available at: <https://arxiv.org/pdf/2202.03866.pdf>

²¹⁶ Chainalysis: “Crime and NFTs: Chainalysis Detects Significant Wash Trading and Some NFT Money Laundering In this Emerging Asset Class”, 2022. Available at: <https://blog.chainalysis.com/reports/2022-crypto-crime-report-preview-nft-wash-trading-money-laundering/>

²¹⁷ Please, see <https://www.techtarget.com/whatis/feature/NFT-wash-trading-explained> for more.

²¹⁸ Please, see <https://academy.binance.com/it/articles/what-are-flash-loans-in-defi> for more.

²¹⁹ Johannes R Jensen, Victor von Wachter, and Omri Ross: “An Introduction to Decentralized Finance”, Complex Systems Informatics and Modeling Quarterly, 2021.

provisions should be applied also to these platforms. Indeed, these could hardly derive a benefit from implementing such measures if they are not obliged to do so but the global dimension that these entities have reached, as well as issues in covering NFTs and identifying the platforms as obliged entities that have been pointed out earlier, cause several obstacles to a legislative approach of this type.

A further point that may complicate the resolution of this problem is that stricter controls can translate into lower privacy of users and therefore end up deteriorating the NFTs' ecosystem under another perspective (we saw previously how low privacy may translate into losses of wallet credentials) and therefore cause a serious damage to a given marketplace or platform selling and managing these tokens.

What should be clear is therefore the need for a balanced set of measures that both prevent the exploitation of NFTs for illegal practices like money laundering and terrorism financing (as well as wash trading), simultaneously protecting users with an adequate level of privacy that prevents thefts of crucial access data.

AMLD 5 provisions clearly represent the most feasible, even if complex, solution to be adopted against money laundering activities being performed via NFTs; additionally, from a more pragmatic point of view, as concerns wash trading the same provisions would also be useful since stricter obligations on platforms would signify also lower possibilities for criminals to undertake most illegal actions.

However, as suggested by von Wachter et al. (2022), ad-hoc measures like limitations to trading velocity or higher fees implemented on any transaction which would eventually lead to lower incentives for criminals to follow such behaviors, may constitute a further possible answer to the problem.²²⁰ As of now, these still remain proposals that don't find concrete application in the real world; however, it keeps getting clearer and clearer that a move from competent authorities is required since the perpetration of illegal practices may blunt the credibility of the NFT market with users that could easily fall into the trap of criminals, paying extremely high prices for tokens whose value was significantly lower.

Concluding, the problem, rather than lying in the most intrinsic nature of NFTs as other issues already presented, is most to be found on the way in which these assets are minted and traded, which means on the platforms that allow for creating, trading and in general managing these tokens.

²²⁰ von Wachter, Jensen, Regner and Ross: "NFT Wash Trading Quantifying suspicious behaviour in NFT markets", arXiv e-prints, 2022. Available at: <https://arxiv.org/pdf/2202.03866.pdf>

Similar difficulties were already pointed out in matter of copyright and related rights' infringement, for instance, particularly with the tendency of criminal users to use the name or work of an existing creator to mint non-fungible tokens and sell them, overall obtaining a profit which was mainly justified by the abuse rather than by the ability of the seller himself. This issue's sources were largely found to be the relatively recent history of these tokens, that in a way justified a low awareness by victims of these abuses, and by the high level of anonymity granted by NFTs' platforms.

Therefore, this should serve as evidence that when dealing with non-fungible tokens, obstacles towards their efficient regulation are not necessarily related only to tokens themselves whilst issues may also be represented by the entities around them. Anti-money laundering directive could be a solution, but in this view as we specified, the framing of NFTs should be strictly linked to the "virtual currency" definition in order to allow for the Directive to cover also platforms related to the NFTs' ecosystem and provide a significant answer to the difficulties analyzed; thus, again we infer how the problem is in reality fractionized in different issues that overall require time and action to be solved. The speed of growth at which the digitalization goes, with NFTs' one not seeming to run slower, highlights the impellent need for immediate action by competent authorities including legislative measures that can obstacle these practices and regulate registration and access to the platforms at stake; we will see what the sixth anti-money laundering Directive will bring (its implementation was required by June 2021), even though elements that are worth mentioning with respect to the subject matter of this thesis do not seem to be present.

3.8 MiCA Regulation

While there is no univocal answer on whether Anti-Money Laundering Directive's scope of application includes non-fungible tokens or not, concerns keep raising also on what will be the effects of the Markets in Crypto-Assets Regulation (MiCAR or MiCA Regulation), which is still now on its preliminary phase therefore being it considered a Proposal whose scope of application, given its premises, will potentially be covering this topic at EU level.

This text constitutes one of the main answers from the Union to the legislative gap, particularly evident in matters of crypto-assets, that was highlighted by the FinTech Action Plan dated March 2018, following ESMA and EBA analysis. The latter indeed

evidenced that, besides Anti-Money Laundering Directive which was also seen to be not significantly covering crypto-assets, EU legislation was missing a piece of law foreseeing provisions that could enable users' protection as well as market integrity, particularly in light of the presence of high risks in this sector, when dealing with this type of assets; as a consequence, competent authorities launched the "digital financial package" on September 24, 2020, which includes several measures aimed at improving the overall Union's financial sector by increasing its competitiveness and stability while also ensuring adequate consumer protection, with an eye on supporting the digital transition.²²¹

This package finds in the proposal for a MiCA Regulation one of its most relevant expressions, at least for the aim of this thesis; this was indeed built with the aim of creating a unique legislative framework covering crypto-assets that have been left out by current EU legislation, that is to say, among the others, all those that are not financial instruments as asset-referenced tokens (for example stablecoins) or residual tokens,²²² by hindering any regulatory arbitrage possibility that have been emerging due to differences in domestic legislation covering such assets in the various Member States.

Accordingly, most scholars legitimately thought that this would also involve non-fungible tokens; nonetheless, as usual, conclusions are not so trivial, and as will be seen their features and particularly their relatively new character do not ease their own regulation via a completely new piece of legislation like MiCA.

Before deepening the discussion on this Proposal in relation to non-fungible tokens, it is necessary to analyze its text, at least from a general point of view; this since, in the case in which NFTs and related services providers will be covered by the Regulation, it will be useful to know what are the provisions to which they will be subjected.

Overall, the text has as its main purpose that of improving the competitiveness of the digital financial sector in EU, as well as granting higher safety to the market by limiting risks whose presence is getting more and more significant when dealing with the large majority of crypto-assets given their low legislative coverage in the Union.

As concerns specifically these assets, the aim is to impact with direct provisions on crypto-assets' issuers and crypto-assets' services providers (CASPs), together with an

²²¹ Please, see https://finance.ec.europa.eu/publications/digital-finance-package_en for more.

²²² Annunziata and Conso: "NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art", Montabone, 2022.

enhancement of related consumers' protection,²²³ all this to be done through a set of laws that will be uniformly adopted through all the European Union, given the regulatory nature of the Proposal, therefore substituting any existing domestic legislation.²²⁴

This procedure was highly criticized, as described by Annunziata and Conso (2022) since it relies on the idea that all crypto-assets in question have to be treated as if they were characterized by potential financial implications; the point is that these assets make up a category which is highly differentiated, a small part of which falls already under financial instrument's classification as specified in recital (3) of the Proposal,²²⁵ therefore not only a uniform approach may be inappropriate but it may also lead to CASPs and other related entities to be subject to unnecessary obligations that will end up being detrimental to their own development which conversely was described as one of the objectives of the still provisory piece of legislation.²²⁶

This said, even if we are currently near the end of the long regulatory debates around MiCA with further amendments that can therefore be involved, the lack of a uniform legislative framework in the sector was evident and had to be addressed, only time will tell us whether the approach was correct or if an ad-hoc set of laws would be more appropriate.

Before analyzing the current Proposal from a specific NFT-related point of view, it must be discussed how the conclusions on the latest text were reached; indeed, the Proposal has seen several updates from the initial version published on September 24, 2020, each amending one or more specific points.

By reviewing the text of the first Proposal, in particular Article 1 that delineates the subject matter, provisions in question are displayed as rules covering: «(a) transparency and disclosure requirements for the issuance and admission to trading of crypto-assets; (b) the authorisation and supervision of crypto-asset service providers and issuers of asset-referenced tokens and issuers of electronic money tokens; (c) the operation, organisation and governance of issuers of asset-referenced tokens, issuers of electronic money tokens and crypto-asset service providers; (d) consumer protection rules for the

²²³ Please, see <https://cib.bnpparibas/explained-mica-markets-in-crypto-assets-regulation/> for more.

²²⁴ Annunziata and Conso: "NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art", Montabone, 2022.

²²⁵ Recital (3) of first Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets states: «*Some crypto-assets qualify as financial instruments as defined in Article 4(1), point (15), of Directive 2014/65/EU of the European Parliament and of the Council*». Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²²⁶ Annunziata and Conso: "NFT the other side of art Non-fungible tokens: taking rules further, beyond the edges of art", Montabone, 2022.

issuance, trading, exchange and custody of crypto-assets; (e) measures to prevent market abuse to ensure the integrity of crypto-asset markets»,²²⁷ hence no specific mention on non-fungible tokens but rather a further indirect statement that reminds to a definition of crypto-assets involved. The latter is provided subsequently in Article 3 of the same text as: « [...] a digital representation of value or rights which may be transferred and stored electronically, using distributed ledger technology or similar technology».²²⁸ This serves as first evidence that NFTs can easily fit in this description, what we described until now can be classified as a digital representation (of rights particularly), that is (always) transferred and stored through electronic means, using a DLT (blockchain); therefore from a first impression, non-fungible tokens classification as crypto-assets is feasible thus implying them to be additionally covered by the Proposal.

Nonetheless, further clarifications on the point can be obtained by deepening the analysis of the text where provisions applying to non-fungible tokens and to related bodies are indeed found; Article 4 of the text²²⁹ for example covers offers to the public of crypto-assets that are not asset-referenced tokens or e-money tokens by setting requirements and obligations to be applied to issuers. Here, inter alia, requirements of being a legal entity and of drafting, notifying and publishing a white paper are delineated for issuers of crypto-assets in question; however, in the following section, points related to the white paper (that is from (b) to (d) of Article 4 (1))²³⁰ are specified not to apply where «the crypto-assets are unique and not fungible with other crypto-asset»,²³¹ therefore implying that issuers of such assets would be required “only” to be a legal entity and comply with further requirements (Article 13 of the Proposal).

²²⁷ Article 1 of first MiCA Regulation Proposal, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²²⁸ Article 3 of first MiCA Regulation Proposal, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²²⁹ Article 4 of first MiCA Regulation Proposal, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²³⁰ In particular, Article 4 (1) of first MiCA Regulation Proposal: «*No issuer of crypto-assets, other than asset-referenced tokens or e-money tokens, shall, in the Union, offer such crypto-assets to the public, or seek an admission of such crypto-assets to trading on a trading platform for crypto-assets, unless that issuer: (a) is a legal entity; (b) has drafted a crypto-asset white paper in respect of those crypto-assets in accordance with Article 5; (c) has notified that crypto-asset white paper in accordance with Article 7; (d) has published the crypto-asset white paper in accordance with Article 8; (e) complies with the requirements laid down in Article 13*». Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²³¹ Article 4 (2) of first MiCA Regulation Proposal, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

Before proceeding, it is necessary to point out what a white paper is; this can be seen as a document which contains all relevant information on the asset which it refers to and which, according to the provisions just saw, must be provided by the issuer to the public. Therefore, following the rules set out, non-fungible tokens' issuers, provided that these fall in the crypto-assets' classification, will not be subject to any obligation in this respect, neither of drafting, publishing nor notifying such document; the latter, as foreseen by Article 5 of the Proposal, shall contain relevant data such as «a detailed description of the rights and obligations attached to the crypto-assets and the procedures and conditions for exercising those rights» and «a detailed description of the risks relating to the issuer of the crypto-assets, the crypto-assets, the offer to the public of the crypto-asset and the implementation of the project».²³²

Under this thesis' view, this is a key aspect, especially when considering the issues that may be derived from non-fungible tokens such as risks related to confusion that may arise on what rights the purchase of the single token implies; this was seen to be often due to their relatively short history that can legitimately cause low familiarity with terms and conditions usually attached to the smart contract.

The implementation of a white paper requirement for issuers of NFTs (intended either as those offering them to the public and as those seeking an admission for the tokens to trading platforms), would be a real turning point in this sense, capable of providing an additional aid to users who, as we saw, happen to be confused in this intricated and new scenario, not having a clear view of what are the downsides and implications of buying a non-fungible token both in light of the risks mentioned and also of the high volatility of prices.

Such a document would instead grant a safer instrument, even more direct than the terms and conditions specified in the smart-contract, this since, inter alia, some of the requirements to which the white paper is subject focus on granting easily understandable information to users; for instance Article 5 (5) of the Proposal states that the document «shall contain a clear and unambiguous statement that: (a) the crypto-assets may lose their value in part or in full; (b) the crypto-assets may not always be transferable; (c) the crypto-assets may not be liquid; (d) where the offer to the public concerns utility tokens, that such utility tokens may not be exchangeable against the good or service promised in the

²³² Article 5 (1) of first MiCA Regulation Proposal, respectively in points (d) and (f), states the above-mentioned rules on white-paper requirements. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

crypto-asset white paper, especially in case of failure or discontinuation of the project»,²³³ and additionally Article 5 (7) of the same text: «The crypto-asset white paper shall contain a summary which shall in brief and non-technical language provide key information about the offer to the public of the crypto-assets or about the intended admission of crypto-assets to trading on a trading platform for crypto-assets, and in particular about the essential elements of the crypto-assets concerned [...] ».²³⁴

A further point to understand the relevance of the white paper can be found by analyzing Article 5 (1) point (c), which implies the requirement to specify in the document the crypto-asset's characteristics as well as those of the project and of the offer to the public, and in addition « [...] the number of crypto-assets that will be issued or for which admission to trading is sought [...] »;²³⁵ this indeed serves us as an assist to evidence a key aspect of non-fungible tokens which we still did not discuss and which however can be the origin of many legal disputes that could instead be mitigated by the introduction of a requirement of this kind.

Non-fungible tokens are unique, and this feature largely contributes to their popularity as already specified; however, a few processes can threaten the existence of such peculiarity, at least from a first impression: one is fractionization and the other is the minting of different editions of a given token.

The latter is a phenomenon that represents the apex of the exploitation process that digital creators are adopting by relying on non-fungible tokens to maximize the profits generated with their works; thanks to the various features described, by minting different editions of NFTs, creators are simply manipulating the rarity of a given token thus multiplying their gains.

In this context, NFTs created will still be unique tokens even though they will represent all the same content (a song for example), these being registered on the blockchain with a specific code, different from any other NFT of the same set. Hence, unicity is not altered by this procedure, each owner will get a unique token, identified by a unique code that enables differentiation among the remaining editions; clearly, this enables the creator to

²³³ Article 5 (5) of first MiCA Regulation Proposal, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²³⁴ Article 5 (7) of first MiCA Regulation Proposal, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²³⁵ Article 5 (1) point (c) of first MiCA Regulation Proposal, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

increase his/her profit but also to democratize the ownership of the given content, similarly to fractionization.

However, the drawback of the process just described is that it often creates disparity in the various tokens' prices with some editions (usually the first ones) that will be worth more and others less, which under some circumstances, especially considering the high presence of neophytes in the sector, may create legal disputes; therefore, the implementation of a white paper, reporting relevant data related to the number of tokens that will be minted, can represent a significant aid.

A useful example that may clarify the relevance of an eventual inclusion of non-fungible tokens in the provisions specified, can be the case of Amir Soleymani²³⁶ who, around mid 2021 filed a UK High Court claim against NFT marketplace Nifty Gateway. In a nutshell, after having taken part to a ranked auction²³⁷ in which the top 100 bidders would have obtained a numbered edition of the Beeple's "Abundance" NFT, each corresponding to how users classified in the auction, Soleymani was the 3rd top bidder and Nifty Gateway (which was the marketplace on which the auction took place) asked him to pay the value of his bid (about 650000 EUR) for a second edition of the NFT in question. However, given the significantly lower value that a second edition of an NFT generally has with respect to a first edition of the same token, Soleymani refused to pay his bid contesting the terms of the auction and its validity, claiming no information on the edition of the NFT was provided also objecting that his bid was referred to the first edition, while a second one's value would not even be close to that amount. Moreover, this overall gave rise to thousands of euros' worth legal proceedings since in response to the refusal of payment by Soleymani, Nifty Gateway froze his account on the marketplace impeding him to sell or trade his digital assets already owned and worth millions of EUR.

As we can see, this specific dispute centers around the difference in value that a first edition of an NFT has with respect to lower indexed ones, which is just one of the "small" features of these tokens which could seem meaningless but in reality represent source of huge changes in value among the different tokens. Therefore, considering the potential role that a white paper attached to this specific NFT may have had, but willing also to extrapolate a more general consideration, we see how such a document, that reports all

²³⁶ Please see <https://www.theartnewspaper.com/2021/10/01/art-collector-sues-nft-platform-over-beeple-auction> or <https://www.pinsentmasons.com/out-law/analysis/court-case-potential-legal-contractual-issues-nfts> for more.

²³⁷ Please, note that ranked auctions are one of the most common methods to sell NFTs.

the token's features and specifics (including the number of editions), could potentially solve many problems.

However, besides again specifying that under this first text the white paper requirement does not apply to issuers of non-fungible tokens, for the sake of clarity it should be noted that "Abundance" NFT example just described refers to an entity which is not an issuer of the token but rather a platform acting as intermediary between the seller (and actual issuer) that is the creator of the token (the artist Beeple) and the buyer (which are more than one since it is a ranked auction), this resembling much more a crypto-asset service provider (CASP) than an issuer. The formers are defined in Article 3 of the Proposal,²³⁸ together with the services involved; here it can be inferred that entities like the one in question may fit in the descriptions provided by at least one of the points in the Article. Therefore, hypothesizing a provision concerning a white paper requirement also for non-fungible tokens and given this is specified in the MiCA Regulation Proposal as applying only to issuers, it is unclear whether, in case of platforms like Nifty Gateway, which instead can be classified as CASPs, the requirement involving this document should be applied too.

As a matter of fact, a white paper considered as attached to any sale of the NFT to which it refers, meaning also to secondary sales taking place on digital platforms, could potentially prevent similar cases;²³⁹ nonetheless it should be reminded again that neither NFTs-related issuers nor CASPs are subject to such provisions under this first MiCA Regulation Proposal, this consequently implying that the same scenario may delineate also when dealing with direct purchases of an NFT from the issuer.

A last and further protection foreseen by this first Proposal, together with provisions on marketing communications and public offer, which is instead granted to crypto-assets' buyers (other than asset-referenced tokens and e-money tokens) with no exclusion for non-fungible tokens', is the requirement for issuers of these assets to offer the right of

²³⁸ In particular, Article 3 (1) of the Proposal, respectively in points (8) and (9), states: « 'crypto-asset service provider' means any person whose occupation or business is the provision of one or more crypto-asset services to third parties on a professional basis» and « 'crypto-asset service' means any of the services and activities listed below relating to any crypto-asset: (a)the custody and administration of crypto-assets on behalf of third parties; (b)the operation of a trading platform for crypto-assets; (c)the exchange of crypto-assets for fiat currency that is legal tender; (d)the exchange of crypto-assets for other crypto-assets; (e)the execution of orders for crypto-assets on behalf of third parties; (f)placing of crypto-assets; (g)the reception and transmission of orders for crypto-assets on behalf of third parties; (h)providing advice on crypto-assets». Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²³⁹ Note that, by analyzing the text of the last MiCA Regulation Proposal we can infer that exchanges of assets with no issuers will be required to complement the token for sale with a white paper.

withdrawal to eventual buyers according to Article 12; in particular paragraph 1 and 2 are worth-mentioning, these respectively stating: «Issuers of crypto-assets, other than asset-referenced tokens and e-money tokens, shall offer a right of withdrawal to any consumer who buys such crypto-assets directly from the issuer or from a crypto-asset service provider placing crypto-assets on behalf of that issuer. Consumers shall have a period of 14 calendar days to withdraw their agreement to purchase those crypto-assets without incurring any cost and without giving reasons. The period of withdrawal shall begin from the day of the consumers' agreement to purchase those crypto-assets.» and «All payments received from a consumer, including, if applicable, any charges, shall be reimbursed without undue delay and in any event not later than 14 days from the day on which the issuer of crypto-assets or a crypto-asset service provider placing crypto-assets on behalf of that issuer is informed of the consumer's decision to withdraw from the agreement».²⁴⁰ Conversely to what happens for the white paper, Article 12 does not mention any exclusion for non-fungible tokens (or any crypto-assets typology's definition that could resemble them), and as can be seen instead also adds within the scope of this provision purchases from CASPs when these meet certain conditions, overall this implying an additional source of security for potential buyers of NFTs which would enhance the performance of the whole market. Nonetheless, a crucial point that must be noted is that the Article here considers right of withdrawal to be applicable to any consumer, thus potentially excluding firms.

Ultimately, to summarize what issuers of NFTs may be subject to according to the text, the provisions applied to them according to this first Proposal are mostly specified in Title II (on crypto-assets, other than asset-referenced tokens or e-money tokens) and mainly involve requirements of being a legal entity as well as rules on marketing communication (Articles 6 and 11), public offer (Article 9 and 10) and withdrawal rights (Article 12);²⁴¹ however, they seem to be excluded from a white paper requirement, despite this potentially constituting a significant improvement for NFTs' regulation even more so considering the already mentioned lack of ad-hoc legislative measures.

In our view, this specific provision would have allowed for a general improvement on the way these tokens are perceived by the public, capable of limiting legal issues generated

²⁴⁰ Article 12 (1) and 12 (2) of first MiCA Regulation Proposal, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²⁴¹ Article 6, 9, 10, 11 and 12 of first MiCA Regulation Proposal available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

by foggy situations just described, eventually enabling a safer and stronger development of NFTs' application in the most disparate sectors.

As concerns specifically CASPs instead, we anticipated that a definition for these entities, as well as for the related services provided, is given by Article 3 of this first Proposal of MiCA Regulation.

The definition embraces all those entities that perform the activity of providing crypto-assets services (listed in the same article) on a professional basis; this can therefore potentially include NFTs' exchange platforms, which were seen to be probably the most important type of entity dealing with these tokens, but the definition could also imply application of the relevant provisions to platforms serving the function of crypto wallet, the latter being already explained to fit quite well within the borders defined by AML as custodian wallet providers (provided that the given specific conditions are met).

When it comes to discussing provisions related to CASPs, the part of this first MiCA Regulation Proposal that should be considered is Title V, where unequivocal rules are set out with the aim of allowing an overall improvement of the digital financial sector in EU, working side to side with the intent of ensuring safety to consumers. This can be inferred clearly already from Article 53,²⁴² where, in paragraph 1 and 2 we find specified the requirements for any CASP which shall be authorized and have a registered office in a Member State as well as the obligation for competent authorities to grant that the authorization in question, pursuant to Article 55 of the same text, specifies the services the given provider is entitled to offer.²⁴³

By going further, paragraph 3 of the same Article²⁴⁴ serves as evidence of the purposes just declared since it states that the authorization granted by the competent authority to

²⁴² In particular, Article 53 (1) and (2) of first MiCA Regulation Proposal respectively state: «*Crypto-asset services shall only be provided by legal persons that have a registered office in a Member State of the Union and that have been authorised as crypto-asset service providers in accordance with Article 55. Crypto-asset service providers shall, at all times, meet the conditions for their authorisation. No person who is not a crypto-asset service provider shall use a name, or a corporate name, or issue marketing communications or use any other process suggesting that he or she is authorised as a crypto-asset service provider or that is likely to create confusion in that respect.*» and «*Competent authorities that grant an authorisation under Article 55 shall ensure that such authorisation specifies the crypto-asset services that crypto-asset service providers are authorised to provide*». Full text available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²⁴³ Article 55 of first MiCA Regulation Proposal available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²⁴⁴ Article 53 (3) of first MiCA Regulation Proposal: «*An authorisation as a crypto-asset service provider shall be valid for the entire Union and shall allow crypto-asset service providers to provide throughout the Union the services for which they have been authorised, either through the right of establishment, including through a branch, or through the freedom to provide services [...]* ». Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

the crypto-asset service provider will be valid through all EU consequently enabling it to perform the same activities it is entitled to in the country where it has its registered office, also in all other Member States.

Furthermore, according to Article 57 of the text of this first Proposal,²⁴⁵ ESMA shall create an updated register which lists and keeps track of all crypto-assets service providers authorized by competent authorities; these shall be taken out from the register once the authorization is withdrawn, the latter event taking place under the conditions specified in Article 56 of the same text.²⁴⁶

Following these considerations, NFTs' platforms that work as exchanges can fit in the definition of crypto-asset service provider according to the abovementioned Article 3, this obviously provided that non-fungible tokens fall in that of crypto-asset under the same Proposal; therefore, each NFTs' exchange platform as well as any other related platform should individually assess firstly whether it actually falls in the CASP definition, then it should verify whether the assets it manages can be classified as crypto-assets and also if the activities or services it performs fall in the list provided by the Proposal. Once these conditions are satisfied then it is likely that these entities will be subject to Title V of the first text of the MiCA Regulation Proposal, consequently implying requirements like the obligation to obtain an authorization by the competent authorities to perform the crypto-asset services in question as well as the duty of coping with prudential and organizational requirements set out in Article 60, 61,²⁴⁷ to apply.

²⁴⁵ Article 57 (1) of first MiCA Regulation Proposal: «ESMA shall establish a register of all crypto-asset service providers. That register shall be publicly available on its website and shall be updated on a regular basis». Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²⁴⁶ Article 56 (1) and (2) of first MiCA Regulation Proposal respectively state: «Competent authorities shall withdraw the authorisations in any of the following situations the crypto-asset service provider: (a)has not used its authorisation within 18 months of the date of granting of the authorisation; (b)has expressly renounced to its authorisation; (c)has not provided crypto-asset services for nine successive months; (d)has obtained its authorisation by irregular means, including making false statements in its application for authorisation; (e)no longer meets the conditions under which the authorisation was granted and has not taken the remedial actions requested by the competent authority within a set-time frame; (f)has seriously infringed this Regulation.» and «Competent authorities shall also have the power to withdraw authorisations in any of the following situations: (a)the crypto-asset service provider or the members of its management body have infringed national law implementing Directive (EU) 2015/849 62 in respect of money laundering or terrorist financing; (b)the crypto-asset service provider has lost its authorisation as a payment institution in accordance with Article 13 of Directive (EU) 2015/2366 or its authorisation as an electronic money institution granted in accordance with Title II of Directive 2009/110/EC and that crypto-asset service provider has failed to remedy the situation within 40 calendar days». Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²⁴⁷ Article 60 and 61 of first MiCA Regulation Proposal available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

By going deeper, Article 63 is also worth mentioning since its provisions could seem including also crypto wallets providers which were seen to be key players in NFT-related activities. Its paragraph 1, states: «Crypto-asset service providers that hold crypto-assets belonging to clients or the means of access to such crypto-assets shall make adequate arrangements to safeguard the ownership rights of clients, especially in the event of the crypto-asset service provider's insolvency, and to prevent the use of a client's crypto-assets on own account except with the client's express consent»²⁴⁸, thus this specifies prudential measures that these entities shall take in order to prevent misuse of the crypto assets they are linked to; as seen in the previous chapter, loss or theft of private keys and credentials that allow owners to access their non-fungible tokens is an issue that is increasingly frequent due to the exponential growth in value that some of these tokens are experiencing, therefore such a provision may have a positive impact over their security.

Further obligations that could apply to non-fungible tokens' related platforms are provided in Chapter 3 of Title V of this first Proposal overall aimed at granting protection to investors; however, if these platforms are to be covered by this text, benefits will also be granted, for instance as already mentioned, when it comes to non-fungible tokens' exchange platforms, these will have the possibility to provide the services they are entitled to also outside the country in which their office is located, thus positively affecting the whole working process' efficiency.

In conclusion, it can be stated that this first text of MiCA Regulation Proposal would certainly be helpful if applied to non-fungible tokens' issuers and related-service providers; it must be noted that most provisions' application is subject to precise conditions thus the list of entities eventually concerned could be significantly shortened. The un-applicability of the requirement of a white paper, as established by Article 4 (2) of the text, is certainly a missed opportunity particularly considering the lack of safety and presence of high volatility that characterize this ecosystem. Nonetheless, the requirements set out for issuers and CASPs under this first version of the text could surely be seen as the cornerstone of a needed set of rules to be established to regulate these tokens and their uncontrolled evolution.

²⁴⁸ Article 63 (1) of first MiCA Regulation Proposal available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

3.8.1 Last MiCA Regulation Proposal

However, as specified at the beginning of this section and as seen to be often true when analyzing non-fungible tokens, conclusions can never be obtained so trivially; the text just analyzed is indeed the first that European authorities proposed and is dated September 24, 2020 and as such, it has been (and still may be) subject to several amendments and modifications by competent authorities following discussions and assessments on the actual efficiency of the measures foreseen.

As reported by Goebel et al. (2022),²⁴⁹ the European Council on November 19, 2021 suggested the start of the negotiations between Presidency and the European Parliament.²⁵⁰

One of the key players in these discussions has been the applicability of the norms provided by the MiCA Regulation Proposal to non-fungible tokens; as said, the first text implied a partial coverage of issuers of non-fungible tokens, with no required issuance of a white paper, and several norms involving NFTs' related platforms which met the criteria allowing them to fall in the scope of application of CASPs-linked rules.

Overall, this seemed to us a good point which, despite the un-applicability of the norms at the moment (given an expected entry into force of MiCA Regulation by 2024) which does not allow for concrete evidence of their actual usefulness, could be able to address at least some of the criticalities of the sector which was seen to be highly affected by inexperience of users leading to confusion and by high volatility in prices that eventually imply significant risks.

This notwithstanding, the key turning point was represented by the Committee on Economic and Cultural Affairs (ECON) who in March 2022 clarified its position on the negotiations proposing an amendment of the Proposal suggesting a complete exclusion of non-fungible tokens from the scope of the upcoming MiCA Regulation. Therefore, by referring to the report of March 17, 2022 by the Committee, recital 8a specifies: «This Regulation should only apply to crypto-assets that are able to be transferred among holders without the issuer's permission. It should not apply to crypto-assets that are unique and not fungible with other crypto-assets, that are not fractionable and are accepted only by the issuer, including merchant's loyalty schemes, that represent IP rights

²⁴⁹ Dechert LLP (Goebel, List, Spangler, Stamm and Wright): "Countdown to MiCA: The EU's cryptoassets regulation", JDSupra, 2022. Available at: <https://www.jdsupra.com/legalnews/countdown-to-mica-the-eu-s-cryptoassets-7919247/>

²⁵⁰ Mandate available at: <https://www.consilium.europa.eu/media/53104/st14066-en21.pdf>

or guarantees, that certify authenticity of a unique physical asset, or that represent any other right not linked to the ones that financial instruments bear, and are not admitted to trading on a crypto-asset exchange.[...]».²⁵¹ Anyway, the same recital also evidences that NFTs capable of being assimilated to security tokens shall be treated as crypto assets covered by the Regulation since they grant owners' rights similar to those of financial instruments, consequently implying them to be subject also to AML and other relevant pieces of legislation at EU level.

Discussions have progressed up to June 2022 when, on the 30 of the month, the Council presidency and the European Parliament announced to have reached a provisional agreement on the markets in crypto-assets Regulation Proposal²⁵² which followed what was the ECON idea, specifying the exclusion of non-fungible tokens from the scope of the piece of legislation unless these fall in categories that are already existing; it must be said that in the same press release, the European Council pointed out that in the following 18 months the Commission would be required to prepare a legislative proposal, if necessary, covering NFTs.²⁵³

Despite the agreement was reached on June 2022, most relevant text at the moment is the last amended MiCA Regulation Proposal which followed the arrangement on all points reached between European Parliament and the Council dated October 5, 2022;²⁵⁴ by deepening the analysis both of the ECON report and of the Proposal itself after this most recent amendment, we see how currently non-fungible tokens do not fall within the scope of the upcoming Regulation even though some specifications shall be provided since this is not always completely true.

In particular, recitals 6a, 6b and 6c of the latest text²⁵⁵ are relevant for the purpose of our discussion since the former defines ESMA as the authority entitled to provide guidelines capable of identifying not only whether a given crypto asset can qualify as a financial

²⁵¹ Full report available at: https://www.europarl.europa.eu/doceo/document/A-9-2022-0052_EN.html#title1

²⁵² Please, see <https://www.consilium.europa.eu/en/press/press-releases/2022/06/30/digital-finance-agreement-reached-on-european-crypto-assets-regulation-mica/> for more.

²⁵³ Please, see <https://www.consilium.europa.eu/en/press/press-releases/2022/06/30/digital-finance-agreement-reached-on-european-crypto-assets-regulation-mica/> for more.

²⁵⁴ Last MiCA Regulation Proposal, available at: <https://data.consilium.europa.eu/doc/document/ST-13198-2022-INIT/en/pdf>

²⁵⁵ Recitals 6a, 6b and 6c of last MiCA Regulation Proposal, available at: <https://data.consilium.europa.eu/doc/document/ST-13198-2022-INIT/en/pdf>

instrument (and therefore be outside of the scope of MiCA Regulation²⁵⁶ while be covered by related pieces of legislation like MiFID II) but also criteria to assess if an NFT can be classified this way.

The second and the latter instead recall significantly recitals 8a and 8b of the ECON report; recital 6b states: «This Regulation should not apply to crypto-assets that are unique and not fungible with other crypto-assets, including digital art and collectibles, whose value is attributable to each crypto-asset's unique characteristics and the utility it gives to the token holder. Similarly, it also does not apply to crypto-assets representing services or physical assets that are unique and not fungible, such as product guarantees or real estate. While these crypto-assets might be traded in market places and be accumulated speculatively, they are not readily interchangeable and the relative value of one crypto-asset in relation to another, each being unique, cannot be ascertained by means of comparison to an existing market or equivalent asset. Such features limit the extent to which these crypto-assets can have a financial use, thus limiting risks to users and the system, and justifying the exemption.».²⁵⁷

As we can see, this part is not only a clear statement of eviction of NFTs from the subject matter of the Proposal but it also provides a rationale for such a decision; the point around which the conclusion centers is that these tokens lack of interchangeability, hence both the Parliament and the Council recognize that non-fungible tokens may be valuable and thus be traded but this value is not easily ascertainable, they are transferrable but lack of standardization and negotiability, overall concluding that these characteristics make them less appropriate for a financial use consequently implying lower risks for users with no need to be covered by this Proposal.

Nonetheless, before proceeding with the analysis of the remaining recital, it should be noted on this purpose how in this thesis NFTs were presented as being highly adopted with investment purposes, also in light of the high volatility of the market and of the low correlation with usual instruments, thus the point made by EU on the lower riskiness of these tokens in this recital could be subject of discussion.

However, in respect of that decision it becomes crucial to see how ESMA will build its guidelines on this point since these will be the cornerstone of the future identification of

²⁵⁶ Recital 6 of last MiCA Regulation Proposal, states: « [...] the Regulation explicitly excludes crypto-assets that qualify as financial instruments as defined under Directive 2014/65/EU [...] ». Available at: <https://data.consilium.europa.eu/doc/document/ST-13198-2022-INIT/en/pdf>

²⁵⁷ Recital 6b of last MiCA Regulation Proposal, available at: <https://data.consilium.europa.eu/doc/document/ST-13198-2022-INIT/en/pdf>

those non-fungible tokens which are not considered as such but rather as financial instrument as defined by Directive 2014/65/EU of EP and Council,²⁵⁸ always recalling that it may be the case that such a financial character could not be adequately neither detected nor tackled in all NFTs if these guidelines are not built properly.

As concerns recital 6c, here a real turning point is provided since fractionization is treated as a discriminating aspect capable of differentiating between non-fungible tokens not covered by the provisions of MiCA Regulation Proposal and those which instead may fall under its scope of application. We already presented what fractional non-fungible tokens (F-NFTs) and their possible applications are so the discussion will now be centered around the reasons why these are treated differently from “usual” NFTs and which are the consequences of a legal framework covering them and not the others.

First of all, it must be assessed the rationale behind such a decision, the text specifies: «The fractional parts of a unique and non-fungible crypto-asset should not be considered unique and not fungible. The issuance of crypto-assets as non-fungible tokens in a large series or collection should be considered as an indicator of their fungibility. The sole attribution of a unique identifier to a crypto-asset is not sufficient to classify it as a unique or not fungible. The assets or rights represented should also be unique and not fungible for the crypto-asset to be considered unique and not fungible. The exclusion of crypto-assets that are unique and not fungible from this Regulation is without prejudice to qualification of such crypto-assets as financial instruments».²⁵⁹

Therefore, the main importance here is given to the inner nature of fractional non-fungible tokens which, by being parts of the same unique token, are to be considered as fungible; thus, the provision attributes fungibility to F-NFTs consequently allowing them to share a feature that causes them to be treated differently from usual NFTs at least from the regulatory point of view. Accordingly, fractional non-fungible tokens are to be considered as crypto assets falling inside the scope of application of the upcoming MiCA Regulation conversely to what happens to non-fungible tokens as such.

Nonetheless, the same recital also offers an additional clarification which is crucial: for a crypto-asset (in this case an NFT) to be considered as unique and non-fungible, and therefore outside of the scope of this Proposal as provided by the previous recital, the

²⁵⁸ Directive 2014/65/EU (MIFID II), available at: <https://eur-lex.europa.eu/legal-content/IT/ALL/?uri=CELEX%3A32014L0065>

²⁵⁹ Recital 6c of last MiCA Regulation Proposal, available at: <https://data.consilium.europa.eu/doc/document/ST-13198-2022-INIT/en/pdf>

unicity of its identifier is not sufficient but it must be accompanied by unicity of the underlying asset, being it a set of rights or an asset itself, which is represented by it.

This is an essential specification since EU authorities through this rule are defining complete separation between the token and the asset or right represented, which has been one of the main subjects of discussion during these years of negotiations.

Overall, some useful conclusions on this can be obtained: the exclusion of non-fungible tokens from the provisions of the latest Markets in Crypto-assets Regulation Proposal, despite the evident issues that have been highlighted in this thesis and the increasing popularity that these tokens are experiencing also among the most unexperienced users, underlies, together with several obligations, the inapplicability of a white paper requirement; this implies that risks that are attached to these tokens (high volatility, purchase of tokens which do not imply ownership of the asset represented exc.) are not mitigated by any significant piece of law at EU level and most likely the situation will not be altered by the time MiCA Regulation enters into force.

It must be noted that, according to the Proposal but also analyzing the most recent version of Anti-Money Laundering Directive seen in the previous paragraphs, non-fungible tokens fall in a sort of grey area which, from a general perspective is not covered by such rules; in this sense a case-by-case assessment that may bring these tokens to be included in the definition of one of the existing assets or instruments' categories that are already regulated at the Union level would be required.

It is the case of some non-fungible tokens that, due to their inner features, are to be considered as financial instruments; these will be subject to a case-by-case assessment according to guidelines defined by European competent authority (ESMA) or it may be also the case of fractional NFTs which have been classified as neither unique nor non-fungible (provided all conditions are met), as specified by the last MiCA Regulation Proposal in its recital 6c.

Therefore, the text analyzed does not provide for an effective and complete solution to the problem of a missing regulatory framework for NFTs, it certainly represents a step further, but this cannot be considered sufficient.

In its same recital 6c, the Proposal agreed by Parliament and Council also specifies: « [...] This Regulation should also apply to crypto-assets that appear unique and not fungible, but whose de facto features or features linked to de facto uses would make them

either fungible or not unique [...] »;²⁶⁰ thus evidencing once again that the exclusion of a given NFT is not pre-determined and, as such, should not be taken for granted; this implying that the specific eviction will be necessarily be based on an accurate (and long) analysis that may bring those tokens whose use makes them non-fungible and not unique to be actually included in the scope of the Regulation.

The latter makes a further clear point: the applicability or inapplicability of the rules set out by MiCA Regulation to the crypto assets in question, in addition to all the aspects already mentioned, will be bound to their use rather than their formal qualification.

In this respect, in the following lines, the same text also provides some general considerations on the approach that EU authorities should follow when dealing with crypto-assets' classification, particularly when considering those that may qualify as non-fungible and unique; here the provision is reported as follows: «In this regard, when assessing and classifying crypto-assets, competent authorities should adopt a substance over form approach, under which the features of the asset in question should determine the qualification, not its designation by the issuer».²⁶¹

This belief eventually confirms once again the concept that an individual analysis is required when dealing with this type of crypto assets; the common approach, particularly for NFTs, shall be that of focusing on the purposes for which the single token is used rather than on its classification provided by the issuer, thus in this way, responsibilities mainly lie on competent authorities.

Such a conclusion however should not be misleading; in our view, issuers and entities providing services related to non-fungible tokens shall have their relevance in the legislative process but the complete exclusion of those non-fungible tokens that are unique and non-fungible implies a lacking legislation in this sense.

As a matter of fact, the requirements that would have potentially apply to NFTs' exchange platforms falling in the crypto-assets service provider's definition set out in Article 3 of the first Proposal are cancelled by the agreement between European Parliament and Council of October 5, 2022, this including inter alia: prudential and authorization requirements, obligations to act honestly, fairly and professionally in the client's best interest and many others.

²⁶⁰ Recital 6c of last MiCA Regulation Proposal, available at: <https://data.consilium.europa.eu/doc/document/ST-13198-2022-INIT/en/pdf>

²⁶¹ Recital 6c of last MiCA Regulation Proposal, available at: <https://data.consilium.europa.eu/doc/document/ST-13198-2022-INIT/en/pdf>

The same happening for crypto assets' issuers that, even though these were already excluded from application of some crucial provisions of the Regulation Proposal before the publication of last amended version, can now perform a set of unregulated activities where neither this piece of legislation nor AML will apply, this eventually causing a negative impact to an already unstable scenario with frauds and copyright infringements that can, together with the other problems described in this thesis, seriously threaten the whole scenario. These entities, as well as crypto-wallet providers, remain mostly uncovered; the most relevant applicable provisions would be those given by Fifth Anti-money Laundering Directive, this provided that non-fungible tokens in question can be considered as "virtual currencies" according to the definition provided by the same Directive, which was seen not to be always the case.

Concluding, always considering that the entry into force of MiCA Regulation will be subject to a formal approval by the Council and the Parliament (expected by the first months of 2023), the Digital Finance Package purpose of enhancing new financial technologies' evolution to improve innovation while simultaneously granting an adequate level of protection to consumers is therefore not completely satisfying the expectations of many scholars and experts, with non-fungible tokens' exclusion from its provisions that will need to be addressed as soon as possible by competent authorities.

As anticipated earlier, European Council in one of its press releases,²⁶² specified that some legislative measures specifically involving non-fungible tokens will be taken in the upcoming months following an European Commission analysis; however, not only it remains to be seen how these measures will be built, with effectiveness that becomes crucial in such an intricaded sector, but it will be deemed necessary to assess also how much time will it take for these potential rules to enter into force, both considering the long legislative procedures and the rapidity with which the NFT world is evolving.

3.9 NFTs as financial instruments, does MIFID II apply?

What could be rationally questioned at this point, in light of the scenario described above, is how the NFTs' ecosystem would be framed following these tokens' potential inclusion under the "umbrella" of "financial instruments"; this assuming ESMA's guidelines, that are set to be provided in the upcoming months as specified by the most recent text of the

²⁶² Please, see <https://www.consilium.europa.eu/en/press/press-releases/2022/06/30/digital-finance-agreement-reached-on-european-crypto-assets-regulation-mica/> for more.

MiCA Regulation Proposal,²⁶³ will be able to clarify at least from a purely formal point of view the situation.

The plausible exclusion of NFTs from this Regulation, leaves space for inference and interpretation on what will be the legislative future of these tokens, therefore it becomes crucial to analyze, even if only from a hypothetical perspective, the scenario in which non-fungible tokens were to be classified as “financial instruments”.

In this case, one of the prominent pieces of legislation would be the Markets in Financial Instruments Directive (MiFID) in its most recent version, meaning MiFID II (Directive 2014/65/EU) whose entry into force is dated 2018.

This Directive aims at regulating financial instruments through provisions that optimize the functioning of financial markets as well as enhancing investor’s protection, transparency, and resilience.²⁶⁴

When analyzing its text, we must recall this is a Directive, hence it is a piece of legislation designed to set the goals Member States must reach while leaving them room for adopting their own laws to do so, and as we will see this may create problems in a future inclusion of certain NFTs in its scope of application, in particular with respect to the different definitions provided by each country.

The Directive’s provisions are related to entities listed in Article 1 (1) of the text: « [...] This Directive shall apply to investment firms, market operators, and third-country firms providing investment services or performing investment activities through the establishment of a branch in the Union.»²⁶⁵

The former typology is defined in Article 4 (1) point 1 as « [...] any legal person whose regular occupation or business is the provision of one or more investment services to third parties and/or the performance of one or more investment activities on a professional basis [...] », “investment services and activities” are then outlined in the following point as: « [...] any of the services and activities listed in Section A of Annex I relating to any of the instruments listed in Section C of Annex I».²⁶⁶

Therefore, it appears to be clear that the approach we must follow in order to assess the eventual consequences of an inclusion of non-fungible tokens in the big category of

²⁶³ Last MiCA Regulation Proposal, available at: <https://data.consilium.europa.eu/doc/document/ST-13198-2022-INIT/en/pdf>

²⁶⁴ Please, see <https://www.esma.europa.eu/policy-rules/mifid-ii-and-mifir> for more.

²⁶⁵ Article 1 (1) of MiFID II, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014L0065-20220228#tocId3>

²⁶⁶ Articles 4 (1) of MiFID II, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014L0065-20220228#tocId3>

financial instruments must be based on two analysis, one that aims at determining whether the entities that operate with NFTs are classifiable as those mentioned in Article 1 (1), specifically as “investment firms” according to Article 4 (1) of above, and the other focused on whether the instruments listed in the relative section may include these tokens as related to the activity or service provided by those entities.

As concerns the first point, we saw how organisms that may be involved in the issuance and trading of a given non-fungible token tend to be hardly qualifiable, at least from a formal point of view, this being valid particularly for exchange platforms. The latter, considering the definition of “investment firm” and the services listed in Section A of Annex I of the Directive, can potentially be seen as investments firms that either provide «Reception and transmission of orders in relation to one or more financial instruments» or «Execution of orders on behalf of clients»,²⁶⁷ however the usual case-by-case assessment should be adopted until further clarifications are provided on the legislative side.

For the purpose of this thesis, we will have to deepen the discussion also around those instruments that are subject matter of the definition provided above, these are the so called “financial instruments” and in the relative section C of Annex I we find them as including, inter alia, «Transferable securities», «Money-market instruments» and «Units in collective investment undertakings».²⁶⁸

²⁶⁷ Annex I of MiFID II, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014L0065-20220228#tocId3>

²⁶⁸ Annex I, Section C of MiFID II: «(1)Transferable securities;(2)Money-market instruments;(3)Units in collective investment undertakings;(4)Options, futures, swaps, forward rate agreements and any other derivative contracts relating to securities, currencies, interest rates or yields, emission allowances or other derivatives instruments, financial indices or financial measures which may be settled physically or in cash;(5)Options, futures, swaps, forwards and any other derivative contracts relating to commodities that must be settled in cash or may be settled in cash at the option of one of the parties other than by reason of default or other termination event;(6)Options, futures, swaps, and any other derivative contract relating to commodities that can be physically settled provided that they are traded on a regulated market, a MTF, or an OTF, except for wholesale energy products traded on an OTF that must be physically settled;(7)Options, futures, swaps, forwards and any other derivative contracts relating to commodities, that can be physically settled not otherwise mentioned in point 6 of this Section and not being for commercial purposes, which have the characteristics of other derivative financial instruments;(8)Derivative instruments for the transfer of credit risk;(9)Financial contracts for differences;(10)Options, futures, swaps, forward rate agreements and any other derivative contracts relating to climatic variables, freight rates or inflation rates or other official economic statistics that must be settled in cash or may be settled in cash at the option of one of the parties other than by reason of default or other termination event, as well as any other derivative contracts relating to assets, rights, obligations, indices and measures not otherwise mentioned in this Section, which have the characteristics of other derivative financial instruments, having regard to whether, inter alia, they are traded on a regulated market, OTF, or an MTF; (11)Emission allowances consisting of any units recognised for compliance with the requirements of Directive 2003/87/EC (Emissions Trading Scheme)». Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014L0065-20220228#tocId115>

Among these three, but also considering the remaining categories of financial instruments listed, the most appropriate class within which non-fungible tokens could fall would probably be that of “transferrable securities”; this would however require NFTs to be a class of security, hence sharing not only specific features like negotiability on the capital markets but also «fungibility, or interchangeability or replicability» (Di Bernardino et al.: “NFT-Legal Token Classification”, page 6, 2021).²⁶⁹ As a consequence, the non-fungibility of these tokens could be a serious obstacle for their inclusion under this category; in this respect, we should note however that the same reasoning does not apply to F-NFTs which are instead considered as fungible, consequently implying a more appropriate classification as securities since they are not unique.

Examples of transferrable security are outlined in Article 4 (1) point (44) of the Directive, where, clearly, no mention or specific reference to NFTs is neither provided nor made; the examples provided include «shares in companies [...] », «bonds [...]» and «any other securities giving the right to acquire or sell any such transferable securities or giving rise to a cash settlement determined by reference to transferable securities, currencies, interest rates or yields, commodities or other indices or measures».²⁷⁰

Nonetheless, it is crucial to remind that MiFID, being it a Directive, allows for Member States to implement their own definitions, within certain limits; this therefore implies that, on a country-based level, some non-fungible tokens could fall in the “financial instruments” category with consequent applicability of additional legislative provisions, while the same crypto asset could not be covered in another MS with a similar case that may be transposed to the related entities and their rules.

The inclusion of NFTs in the category of “financial instruments”, which seems quite complex if not for really specific tokens that however do not resemble, in their key features, the “usual” NFT, would cause under MiFID II that those entities that operate within the NFTs’ ecosystem, provided that they are classifiable as “investment firms” (or any other remaining type of entity listed in Article 1 (1)) according to the definition given in Article 4 (1) point 1 of the Directive,²⁷¹ will, inter alia, have to get an authorization to

²⁶⁹ Di Bernardino, Penedo, Ellul, Ferreira, Goldbeck, Herian, Siadat and Siedler: “NFT-Legal Token Classification”, EU Blockchain Observatory and Forum, 2021. Available at: <https://www.eublockchainforum.eu/sites/default/files/research-paper/NFT%20-%20Legal%20Token%20Classification.pdf>

²⁷⁰ Article 4 (1) of MiFID II, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014L0065-20220228>

²⁷¹ Article 4 (1) of MiFID II, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014L0065-20220228#tocId7>

operate by a national competent authority; such an authorization will be required to specify the investments services or activities the given entity is entitled to perform and it will be valid throughout the Union. Additionally, these entities will also be subject to requirements concerning the categorization of clients that overall aim at ensuring them an adequate level of protection, depending on their level of expertise and needs as specified by Article 24 of the text.²⁷²

Thus we see how an eventual application of MiFID II to NFTs would signify a substantial turning point in matter of transparency and safety that will be granted to participants, at least for those tokens that can be considered “financial instruments”; the same points could be enhanced even more by the inclusion of non-fungible tokens in the scope of application of other pieces of legislation, crucial at EU level, that will be discussed in a moment.

As of now, besides this hypothetical reasoning, what is sure is that ESMA has been designated as the competent authority for the implementation of a set of guidelines that, in addition to their usefulness in detecting crypto assets that can be classified as financial instruments, will also provide rules to detect those non-fungible tokens following the same classification. This point is written down in black and white in recital 6a of the latest MiCA Regulation Proposal,²⁷³ therefore it can be seen as a clear suggestion of the possibility in the future of having (at least some) NFTs to be covered by pieces of legislation relevant in the field of financial instruments, as MiFID II, as always only after a case-by-case assessment.

Hence, even if currently these tokens seem far from being considered as within the scope of this Directive, nothing suggests that the scenario will not change in the upcoming months, even more so considering the character of this piece of legislation which may lead to less restrictive definitions among Member States, consequently indicating that the idea of categorization just built under our hypotheses might be relevant.

In the specific as we saw, the main implications derived from a MiFID application would be the authorization and consumer protection measures that would apply to NFTs-related entities, provided that all the conditions mentioned above are met (that the NFT is a

²⁷² Article 24 of MiFID II, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014L0065-20220228#tocId7>

²⁷³ Recital 6a of last MiCA Regulation Proposal, available at: <https://data.consilium.europa.eu/doc/document/ST-13198-2022-INIT/en/pdf>

financial instrument, the entity is classifiable as an “investment firm”, the service or activity provided falls in the list provided by the Directive, exc.).

Similarly, further rules, other than those provided by Directive 2014/65/EU, would involve those legal entities (as issuers or service providers in general) operating with non-fungible tokens once these are classified as financial instruments; pieces of EU legislation to be considered here include the Prospectus Regulation, Transparency Directive, as well as the Market Abuse Regulation which will be analyzed in the next paragraphs.

3.9.1 Prospectus Regulation

The Prospectus Regulation should be the cornerstone of our discussion now considering the risks and problematics that have been seen to characterize non-fungible tokens, the latter being described as highly volatile tokens that share downsides which are largely unknown to the majority of participants, thus implying an intrinsic risk of scams, misuse (or losses when used for investment purposes) which should be taken into serious consideration especially supporting the idea of a missing regulatory framework.

Regulation (EU) 2017/1129 (Prospectus Regulation) basically implies the setting out of harmonized rules aimed at regulating the requirement for a prospectus (to be seen as an informative document) to be applied to securities when these are « [...] offered to the public or admitted to trading on a regulated market situated or operating within a Member State » as defined by Article 1.²⁷⁴

This document must contain, inter alia, useful information that enable the investor to assess the financial situation of the issuer and the rights attached to the security as defined in Article 6 (1),²⁷⁵ this therefore constituting a potential substitute to the white paper whose requirement was excluded to be applied to NFTs by the most recent MiCA Proposal (if not for those crypto assets that are fungible and not unique).

²⁷⁴ Article 1 of Prospectus Regulation, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R1129&qid=1671460380827#d1e1665-12-1>

²⁷⁵ Article 6 (1) of Prospectus Regulation: «*Without prejudice to Article 14(2) and Article 18(1), a prospectus shall contain the necessary information which is material to an investor for making an informed assessment of: (a) the assets and liabilities, profits and losses, financial position, and prospects of the issuer and of any guarantor; (b) the rights attaching to the securities; and (c) the reasons for the issuance and its impact on the issuer. That information may vary depending on any of the following: (a) the nature of the issuer; (b) the type of securities; (c) the circumstances of the issuer; (d) where relevant, whether or not the non-equity securities have a denomination per unit of at least EUR 100 000 or are to be traded only on a regulated market, or a specific segment thereof, to which only qualified investors can have access for the purposes of trading in the securities*». Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R1129&qid=1671460380827#d1e1665-12-1>

In this sense, the conclusions we obtained from the analysis of the upcoming Regulation on Markets in Crypto-Assets, specifically those concerning the white paper, are almost identical to those we can retrieve for the prospectus, at least with respect to the usefulness of this document once established as a requirement harmonized at EU level; this meaning that the latter's introduction would allow market participants to make more informed decisions on whether to purchase an NFT or not, thus constituting a large obstacle to uninformed acquisitions that often lead customers to experience regret since unaware of what that token involved in terms of rights or risk at the time of buying.

Required prospectus' specifics are listed in Chapter II of the text;²⁷⁶ the document, in addition to key information on the issuer, must also contain information on the security in question and on the offer to the public, as well as various warnings. In our view it is debatable whether a link between data on the issuer and on the security would exist when dealing with non-fungible tokens, except for information relating to his/her records that could warn users in case of past frauds or criminal history and therefore justify the inclusion of this kind of information in the prospectus.

Anyway, such information is certainly hardly classified as detrimental to participants, at least from a consumer point of view, its consequent inclusion could surely allow for an improvement in terms of safety of the whole market. However, it must be noted that a prospectus requirement could solve just partially the problem; such a measure would allegedly apply to issuers of NFTs and not to exchangers or platforms dealing with aspects of the tokenization process that go beyond the "simple" creation of the crypto asset, these having been seen to suffer from presence of significant drawbacks as well. This conclusion is derived from the analysis of what this piece of legislation mainly aims to regulate which is the offer to the public of the given security, that, in the case of a non-fungible token, is a duty that would mostly rely on the issuer rather than on digital platforms acting as exchanges.

This said, a further doubt that could instead arise more legitimately is why are we talking about securities and related provisions if the aim of this section was centered around the possible classification of NFTs as financial instruments. The point is that the link between securities and financial instrument, even from a formal point of view, is strong; securities, as focus of attention of the Prospectus Regulation and thus of the prospectus requirement, are referred to in Article 2 (a) of this text as « [...] transferable securities as defined in

²⁷⁶ Chapter II of Prospectus Regulation, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32017R1129&from=en>

point (44) of Article 4(1) of Directive 2014/65/EU with the exception of money market instruments as defined in point (17) of Article 4(1) of Directive 2014/65/EU, having a maturity of less than 12 months».²⁷⁷ In other words, the subject matter of this text is constituted by the same type of “financial instrument” which was listed in section C annex I of MiFID II and defined in the aforementioned Article; hence if NFTs were to be considered as financial instrument, in particular as “transferrable securities” (according to Article 4(1) of MiFID II), their offer to the public (or admission to trading) would be subject to a prospectus requirement as laid down in Article 1 of Regulation (EU) 2017/1129.

Nonetheless, doubts on the actual feasibility of non-fungible tokens’ classification as this type of securities were already evidenced in the previous section when we dealt with Markets in Financial Instruments Directive, as said, main obstacles are the lack of negotiability and interchangeability; consequently what can be done is to rely on a case-by-case assessment to see whether such a categorization is possible or not, depending on whether these features are shared by the token in question, even though clearly non-fungibility is a characteristic that can hardly be removed from NFTs.

Therefore, we see how we keep moving in a grey area that yes, finds some evidence of a potential regulatory framework that would allow NFTs to follow existing rules, but simultaneously these solutions underlie several doubts and critical issues that do not permit a definitive answer.

In this hypothetical scenario, what we can do is to try to analyze the situation and provide possible forecasts of the legislative development that will impact non-fungible tokens, which, as much as constantly evolving, require an immediate answer from competent authorities; this always recalling that our main hope is that the situation will be clarified, even if partially, once ESMA’s guidelines will be published.

3.9.2 Transparency Directive

A further piece of legislation that would again tackle the lack of transparency in NFTs’ world if these tokens would classify as financial instrument is the Transparency Directive (TD), this is aimed at harmonizing rules concerning informational disclosure requirements to be applied to issuers of securities.

²⁷⁷ Article 2 of Prospectus Regulation, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R1129&qid=1671460380827#d1e1665-12-1>

Therefore here, one more time, the subject matter of the provisions are securities defined in Article 2 (1) of the text as those « [...] transferable securities as defined in Article 4(1), point 18, of Directive 2004/39/EC of the European Parliament and of the Council of 21 April 2004 on markets in financial instruments with the exception of money-market instruments, as defined in Article 4(1), point 19, of that Directive having a maturity of less than 12 months, for which national legislation may be applicable».²⁷⁸

However, the Directive in question (Directive 2004/39/EC) is also known as the first MiFID which was then repealed by MiFID II (and prorogated by Directive (EU) 2016/1034),²⁷⁹ therefore, we shall refer to the definition of “transferable securities” already provided by MiFID II in its Article 4 (1) point (44) also when dealing with the Transparency Directive’s subject matter; this consequently implies again the presence of potential obstacles to the NFTs’ inclusion in this definition that we referred to in the other two sections where the same categorization was proposed.

Moreover, assuming an NFT falls in the latter classification, consequences from a legal perspective would be that issuers of such instruments would be allegedly required to disclose relevant information in a programmed and periodic way, this taking place for example through publication of annual financial reports which will have to be kept available to the public for at least 10 years according to Article 4 (1) of the Directive,²⁸⁰ as well as through disclosure of information about major holdings (notification of acquisition or disposal) for instance.

Overall, this would cause issuers of non-fungible tokens, who were seen to be either ad-hoc entities, specialized in the process, but also private individuals (often digital artists) who play the main character in the minting phase, to be subject to direct obligations that aim at enhancing transparency to advantage investors and participants in general. Consequently, the revolution from a legislative perspective would be still significant in a sense, but not that impacting especially when considering that usual securities tend to have a much stronger relationship with their issuer with respect to the link that establishes between NFTs and creators.

²⁷⁸ Article 2 of Transparency Directive, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02004L0109-20210318>

²⁷⁹ This Directive amended Directive 2014/65/EU (MiFID II); full text available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32016L1034&from=it>

²⁸⁰ Article 4 of Transparency Directive, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02004L0109-20210318#E0001>

The final considerations, moreover, must always take into account the potential normative discrepancies that may coexist among Member States' domestic legislation in light of the fact that we are dealing with a Directive and not with a Regulation; therefore, precisely as seen for MiFID II, definitions may differ among countries within the Union with consequent differences in application.

Therefore, we again can infer how easily we can get from a completely effective legislative framework covering NFTs to a scenario in which rules tend to overlap among each other, eventually leading to phenomena like that of overregulation or MS's legislation discrepancies; such a thin border, in legislative terms, must therefore be clear and always be borne in mind by the EU Lawmaker.

3.9.3 Market Abuse Regulation (MAR)

The last relevant piece of legislation that should be considered in our analysis of the consequences of an eventual inclusion of NFTs within the category of "financial instruments" is the Market Abuse Regulation (Regulation (EU) no 596/2014), often referred to as "MAR".

This piece of legislation had to be transposed into domestic legislation by July 3, 2016, and is aimed at tackling, inter alia, market manipulation and insider dealing while preventing market abuse in order to grant integrity of financial markets and protect investors in EU, as specified by Article 1 of the text.²⁸¹

This is a text whose provisions apply to financial instruments that meet the characteristics of one of the types listed in Article 2, including: « [...] (a) financial instruments admitted to trading on a regulated market or for which a request for admission to trading on a regulated market has been made», «(b) financial instruments traded on an MTF, admitted to trading on an MTF or for which a request for admission to trading on an MTF has been made» , «(c) financial instruments traded on an OTF» and «(d) financial instruments not covered by point (a), (b) or (c), the price or value of which depends on or has an effect on the price or value of a financial instrument referred to in those points, including, but not limited to, credit default swaps and contracts for difference».²⁸²

²⁸¹ Article 1 of Market Abuse Regulation, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014R0596-20210101>

²⁸² Article 2 (1) of Market Abuse Regulation, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014R0596-20210101>

Besides the various specifications and features, it must be noted that, unless looking for exceptions²⁸³ which may include also non-financial instruments under some circumstances which if analyzed are still not affecting non-fungible tokens' possible legal framework, the scope of application of this Regulation is limited to financial instruments; these are defined by this piece of legislation in its Article 3 (1) point 1 as: « [...] a financial instrument as defined in point (15) of Article 4(1) of Directive 2014/65/EU».²⁸⁴

Such definition therefore refers again to MiFID II provisions whose list of included financial instruments was already specified at the beginning of this section; as a consequence, the same reasoning applies in this sense, with “transferrable securities” constituting the most relevant category which NFTs could resemble even if the procedure is presenting several obstacles that were pointed out also in the other relevant pieces of legislation mentioned (MiFID II and Transparency Directive), while others in the list remain applicable categories, even if subject to further difficulties.

Accordingly, if, following a case-by-case assessment, an NFT presents features that allows it to be considered as a financial instrument (as defined by the aforementioned Article), rules and sanctions set by Market Abuse Regulation would apply to persons or companies committing a market abuse when trading that non-fungible token, as well as to « [...] any transaction, order or behavior concerning any financial instrument as referred to in paragraph 1 and 2, irrespective of whether or not such transaction, order or behavior takes place on a trading venue» as specified in Article 2 (3) of the same text.²⁸⁵ Again, as specified for the Transparency Directive, these may not seem rules that are capable of completely transform the legislative scenario related to non-fungible tokens; however, these measures' impact can be crucial in fighting their adoption in illegal practices like money laundering or wash trading that were seen to have a strong role in last years' records. Clearly, such a result shall be backed up by an adequate framing of the specific token within one of the typologies of financial instruments provided in the relevant piece of law; nonetheless, this still does not appear to be immediate with the

²⁸³ In the specific, we refer to Article 2 (1) of MAR which states: « [...] *This Regulation also applies to behaviour or transactions, including bids, relating to the auctioning on an auction platform authorised as a regulated market of emission allowances or other auctioned products based thereon, including when auctioned products are not financial instruments, pursuant to Regulation (EU) No 1031/2010. Without prejudice to any specific provisions referring to bids submitted in the context of an auction, any requirements and prohibitions in this Regulation referring to orders to trade shall apply to such bids*».

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014R0596-20210101>

²⁸⁴ Article 3 (1) of Market Abuse Regulation, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014R0596-20210101>

²⁸⁵ Article 2 of Market Abuse Regulation, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014R0596>

current normative scenario which rather tends to suggest that a case-by-case assessment could be more appropriate even though the speed of evolution of this sector seems not to leave much room for such a procedure.

3.9.4 Final considerations on MiFID II, Prospectus Regulation, Transparency Directive and MAR

To conclude, non-fungible tokens' inclusion inside the category of "financial instrument" would have significant implications from the legislative point of view; clearly, this is not something that can be taken in absolute terms with just some of these tokens that share the features allowing them to follow this classification. Such tokens could fall in the scope of application of the second version of the Markets in Financial Instruments Directive (MiFID II) thus implying the introduction of several requirements and obligations to be applied to issuers and entities related to NFTs, capable of being qualified as « [...] investment firms, market operators, and third-country firms [...] »²⁸⁶ providing services or activities that are specified in this piece of legislation (see services and activities listed in Section A Annex I of the text).²⁸⁷

Measures would include the requirement of obtaining, by the relative entity, an authorization, valid throughout the Union, that specifies the services or activities this is allowed to provide; additionally, obligations centering around the protection of the client and acting in his/her best interest would lay upon this organism which will be subject to implement, inter alia, a categorization of clients according to their riskiness and objectives.

A qualification of non-fungible tokens as "financial instrument" (with a lower list involved with respect to that provided by MiFID II) was seen to imply potentially also the application of Market Abuse Regulation with provisions aimed at hindering market abuses; therefore, in light of a sector, which was described in this work as still showing some downsides from the safety and transparency point of view, this eventual inclusion would reinforce even more the idea of the usefulness of such an approach, also considering the illegal uses and frauds these crypto assets are being involved in.

It must be recalled however, that among the categories of financial instruments which are included in the list provided by MiFID II in its Annex I, the one which gets closer to

²⁸⁶ Article 1 (1) of MiFID II, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014L0065-20220228#tocId7>

²⁸⁷ Annex I of MiFID II, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014L0065-20220228#tocId8>

NFTs is that of “transferrable securities”; a potential inclusion of these tokens in the latter, besides the benefits already highlighted, however, presents several obstacles that culminate in their lack of fungibility. Therefore, measures that depend on this classification such as the imposition of a requirement for an informative document as the prospectus before any issuance or admission to trading, as well as of a disclosure of crucial data to investors through annual financial reports testifying the situation of the issuer, respectively foreseen by Prospectus Regulation and Transparency Directive, remain unstable and limited to a specific set of tokens meeting these restrictive criteria. Nonetheless, not only these provisions would be applicable mainly to issuers of these tokens, thus leaving out other crucial entities that have shown to deserve a similar degree of attention from competent authorities too, but difficulties in adopting such categorization are many.

The discussion suffers a drastic change when we start dealing with fractional non-fungible tokens (F-NFTs); these, as already explained, are more likely to be considered as fungible since they lack unicity, therefore they can potentially be considered as financial instruments or transferrable securities in some cases, with consequent application of all three pieces of legislation in question.

In general, leaving aside F-NFTs which are way less common than usual NFTs, even if looking at the problem from a wider perspective (thus focusing only on the larger category of “financial instruments”), the lack of a specific mention of non-fungible tokens in the relative provisions of the various pieces of legislation analyzed complicates even further such a classification which should therefore be based on a case-by-case assessment procedure that does not cope with the rapidity of evolution of the sector.

A light may be shed by the upcoming ESMA’s guidelines which will be aimed to provide some hints and rules on the aspects that may classify non-fungible tokens as “financial instruments”, but again as of now we must wait until further clarifications will be provided by competent authorities.

Moreover, in our opinion it must be noted that the guidelines we might be dealing with in a few months, would hardly be able to permit a non-fungible tokens’ classification as “transferrable securities”, this due to the reasons already specified which obstacle the possibility of these tokens to be considered as such since their lack of fungibility, unless an ad-hoc provision is created.

In our view, ESMA would much more likely set rules that enable the inclusion of NFTs in a new category of financial instruments (probably to be added to Section C of Annex I

of MiFID II) or simply define which characteristics a non-fungible token should have to be considered a “financial instrument”.

Nonetheless, these hypotheses would exclude, at least for the moment, NFTs and their issuers or service providers from obligations or requirements implying, *inter alia*, the issuance of a prospectus or of annual financial reports that would instead be applied only if the “transferrable securities” category was involved. This, despite the relevance such measures may have in the current scenario, is due to the reasons already specified that imply a much narrower scope of either Prospectus Regulation and Transparency Directive which apply only to those entities that deal with “transferrable securities” and not with any general financial instrument. Therefore, overall, this would imply the non-applicability of measures which were shown to share a high potential in the sector, specifically in light of the problems these tokens may suffer which were pointed out in this thesis. Non-fungible tokens and related entities could still be subject to MiFID II once these are classified as “financial instruments”, but the subject matter will not fall within the scope of application of the other pieces of legislation unless these tokens/entities are not specifically mentioned or regulated; in this context, it remains to be seen what ESMA will do, hoping for a clearer scenario to delineate as soon as possible.

Conclusion

At the end of this thesis, it becomes crucial to evidence what are the conclusions of this deep analysis of these recently born, yet so popular tokens; NFTs have been described as sharing a series of benefits which are efficiently addressing requests from users and companies that belong to the most desperate sectors and which may require a digital certificate granting ownership of a given asset (or right) to be represented in a virtual, and thus readily transferrable way, whose safety and transparency are granted by their blockchain-based character.

This was seen not to be limited only to digital assets, the underlying may be also in the physical form (even if through a more intricate process) or be a digital representation of the latter, even though we must recall this was presented as also involving some uncertainties and misunderstandings that may be related to copyright and general management of the asset's related rights. In this regard, analysis of EU IP law framework allowed us to conclude that, unless specified, an NFT's purchase grants simply the transfer of the ownership of the underlying while no copyright or further rights are moved to the buyer, with terms and conditions specified in the smart contract that constitute the real instructions on what does the sale imply or not.

This issue, together with VAT implications, was one of the firstly analyzed in an ecosystem that was seen to present many further problems, particularly on the legislative side; besides risks related to their high volatility (which on the other hand empowers these tokens with an investment instrument character), risks of frauds or scams that are frequently attached to them (mostly due to the lack of adequate knowledge or experience by users in this field) as well as their minting's environmental implications, a huge problem is represented by the lack of a legislative framework covering NFTs.

As a matter of fact, their "strengths and weaknesses" study allowed us from one side to delineate the main reasons why these should be taken into strong consideration by users and companies, and on the other hand, as much as we deepened our discussion, it became more and more rational to expect to see them being covered by an adequate set of legislative provisions capable of ensuring an efficient answer to issues or misuses that may easily take place in this scenario, as evidenced.

Nonetheless, our work highlights that a legislative framework at EU level is almost completely missing, thus forcing us to base our discussion on an approach which follows the traditional method consisting in analyzing already existing pieces of legislation and

classifications, to provide a description of what would be the consequences of an eventual inclusion of a given NFT in the given categories with consequent application of the related rules.

This process, always considering a case-by-case assessment that is required due to the variety of features and specifics that NFTs may have, ended up evidencing that an application of existing pieces of legislation at EU level may be, if possible, even more fragmented than the types of non-fungible tokens existing.

Among the pieces of legislation discussed, Anti-money laundering Directive (AMLD 5), Markets in Financial Instruments Directive (MiFID II), Prospectus Regulation, Transparency Directive, MAR and the upcoming Markets in Crypto-assets Regulation (MiCA) (with the latter most likely being applied only to F-NFTs or limited series) can mostly be considered as applicable only if the given token shares specific features and serves for certain uses, this implying that each NFT may be treated differently according to its characteristics.

Despite recognizing the reasons behind such an approach, the fact that users and companies are forced to continuously deal with a high uncertainty given the different possible categorization of these tokens, cannot go unnoticed; additionally, provisions analyzed are all applicable under really specific and restrictive conditions that cannot get along well with the clear willing of EU of providing an applicable legislative framework which is fully harmonized, particularly considering the relevance of a sector which was shown to be involving millions of euros' worth transactions.

These tokens, besides their most generical character of “crypto asset” which is largely attributed to them, under specific circumstances can also be seen as entitlement documents or title deeds (as suggested by the Italian Legislation and as discussed in this thesis), as a type of “virtual currency” or as “financial instruments”, each of them implying different consequences from a legislative point of view with specific provisions applying.

As a matter of fact, we saw how an entitlement document classification, which can be helpful from a primary look, would apply following an analysis that considers the most conceptual framing of NFTs; these can be seen as “boxes” containing a link that refers to the various underlying whose ownership and authenticity are certified by the NFTs themselves.

Such qualification however implies necessary reliance on domestic legislation since, in matters of property law, EU does foresee an approach that empowers MS's national law

with a prevailing role. In this sense, this may cause regulatory arbitrage possibilities when dealing with rules covering NFTs considered as such, which, combined with the liquid character of the concept of ownership (as explained by Trujillo (2022)),²⁸⁸ overall is likely to end up causing severe obstacles to the aforementioned willing of EU to uniform rules on this matter.

Additionally, considerations following an NFTs' classification as "virtual-currency" were again not so trivial; this category's definition, as provided by AMLD 5,²⁸⁹ is quite generic and therefore leaves open the possibility to include also non-fungible tokens.²⁹⁰

However, as frequently happened when dealing with this topic, things are not that simple; the eventual inclusion of NFTs within the scope of application of this Directive would not be sufficient to grant application of the related provisions. The main rules foreseen by the text are indeed mainly directly referred to a list of obliged entities, therefore the various requirements provided and the eventual implications for these tokens would depend on whether NFTs-related entities fall or not in the scope of application of the Directive, hence if they can be considered as obliged entities or not. "Custodian wallet providers" and "providers engaged in exchange services between virtual currencies and fiat currencies" are the categories which mostly resemble these tokens-related entities; however, also here several obstacles are present, among the others it is worth mentioning that fiat currency is rarely used to pay for NFTs, thus impeding an effective qualification of the given organism according to the categories just provided.

Markets in crypto-assets Regulation was seen as the piece of legislation set to change the rules of the game and finally grant significant provisions covering NFTs, or at least this was the common belief. Despite the definition of "crypto asset" provided by the text, which, being quite wide once again can potentially include also NFTs, as well as this Regulation's intent of covering all those crypto assets that had been left out by the current EU legislation which would suggest an application also to these recently born tokens, the

²⁸⁸ Trujillo: "The surge of non-fungible tokens and its implications for digital ownership from an Internet governance perspective", *Rivista Italiana di Informatica e Diritto*, 2022. Available at: https://www.google.com/url?sa=i&rc=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=0CAMQw7AJahcKEwiQsN_F_9D8AhUAAAAAHQAAAAAQAw&url=https%3A%2F%2Fwww.rivistaitalianadiinformaticaediritto.it%2Findex.php%2FRIID%2Farticle%2Fdownload%2F101%2F81&psig=AOvVaw3spoX6tkEA8FIkDediWrbs&ust=1674127089972439

²⁸⁹ Article 3 (18) of Directive (EU) 2018/843 (AMLD 5), available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32018L0843>

²⁹⁰ Please recall, as specified in the relative section, that the main points around which this is built, by simplifying, are that the subject matter to be defined as a "virtual currency" must be a digital representation of value which can be used as means of exchange and which is not issued by any public authority or central bank.

most recent MiCA Regulation Proposal²⁹¹ clearly evidences how rules here do not apply to non-fungible tokens unless, under specific conditions, these can be seen as F-NFTs or NFTs issued in a large series or collection.

Indeed, following yearlong discussions, the last version of this piece of legislation completely excluded non-fungible tokens from the scope of the text (unless falling in the mentioned cases); thus requirements for both issuers and CASPs, with the formers being required, *inter alia*, to issue an informative document (white paper) to be attached to the asset in question which could have been a partial solution to the issues of safety of these tokens, shall not be applied to NFTs.

The ratio behind such a decision, mainly based on their lack of significant financial risks attached due to a missing interchangeability and standardization, despite questionable, leads to an approach which is surely clear and does not leave space for any misunderstanding; fungibility and unicity are treated as discriminating features that, provided that the underlying assets or rights, considering also the *de facto* uses or features, are also unique and non-fungible, cause NFTs to be taken out from the scope of application of this upcoming Regulation.

Given much hope had been placed on this last text, coherently with what has been the approach through all the discussion, in the ending section of this thesis we questioned what a classification, if possible, of non-fungible tokens as “financial instruments” would mean from a legislative perspective, and this led us again to not completely satisfactory results.

For the aim of this thesis, MiFID II was perceived as an interesting solution in terms of provisions since it establishes a series of rules to be applied to given types of entities dealing with financial instruments which, *inter alia*, would have been required, following the transposition of the Directive into national legislation, to obtain an authorization, valid throughout the Union, to perform the services or activities in question.

The same text provides a list of financial instruments which, as could be inferable given the absent role EU Lawmaker has been having up to now, does not contain any specific mention for NFTs.

As said, the type of financial instrument which, more than the others, could include these tokens is that of “transferrable securities” but NFTs’ characteristics, with their lack of fungibility as culminating factor, create a serious obstacle unless considering specific

²⁹¹ Last MiCA Regulation Proposal, available at: <https://data.consilium.europa.eu/doc/document/ST-13198-2022-INIT/en/pdf>

cases of tokens which strictly resemble securities or similar instruments and share a predominant financial character.

As for AMLD 5, potential application of MiFID II is subject both to NFTs' inclusion in the relevant category (that of "financial instrument" in this case) and to the inclusion of the related entities in the scope of the provisions listed, thus making the case even more complex.

An exclusion from financial instrument's classification, particularly from that of "transferrable securities" can also impede most NFTs to be subject to Prospectus Regulation and Transparency Directive, with Market Abuse Regulation's provisions that apply to a shorter list of financial instruments, these all representing possible answers to risks and transparency pitfalls that may be implied by the use or sale of these tokens.

As also appointed for the other pieces of legislation, all the provisions considered represent potentially significant measures capable of positively impacting the scenario around these tokens; the results obtained in this work, however, are to be taken as indicative of the possibilities that do exist from a legislative perspective while also acknowledging the presence of obstacles to their applicability, at least in a fully harmonized way.

The impossibility for a uniform approach is therefore not only present, but evidences another time how intricately this sector's legal framework build up can be; difficulties in achieving a common qualification of NFTs, due to the highly differentiated specifics and to the reasons largely highlighted in this thesis, are often also accompanied by issues that concern related entities' qualification, with platforms acting as intermediaries in these tokens-linked transactions representing probably the main character in the field.

In our view, these tokens' high potential cannot end up wasted, misused or threatened by a missing legislative framework that leaves room for any detrimental behavior. This, even if not directly tackling the adoption of non-fungible tokens which is always increasing, must be considered with a much more forward-looking approach; in a context where NFTs are largely used as digital certificates of ownership, their blockchain-based character which is the key player in terms of granting safety and transparency to the whole process, may not be enough if the credibility of these tokens is hindered by frequent frauds, scams or occurring legal disputes. Such conducts should be taken into serious consideration by EU competent authorities who should see the lack of a legislative framework as a clear warning of future issues, also recognizing that such a scenario does

not provide an adequate support to companies and privates that are willing to invest in the Union's digital sector, thus additionally impeding useful progresses on this side.

The role of NFTs' characteristics as high obstacle to a harmonized approach has been largely mentioned, on the other hand we must also keep always in mind that the potential of a uniform applicability of norms to these tokens should be one of the primary objectives of EU both for the redundant potential that these tokens share but also, much more concretely, for the enormous amount of money that circulate around them.

An efficiently working scenario, with non-fungible tokens that get to be adopted in almost any sector, and their key presence in innovative ecosystems like Metaverse, set to be one of the core areas of business in the upcoming years, has a clear potential to be a game changer of the future economy; an adequate legislative framework is however clearly propaedeutic to this, and consequently cannot be disregarded.

While EU competent authorities and Union's Lawmaker still did not provide a sufficient answer, some Member States started dealing with this subject matter in the last couple of years with domestic provisions, thus creating concrete possibility of regulatory arbitrage among countries, something that is always targeted as one of the core risks EU aims to avoid.

Applicability of existing pieces of legislation at Union's level may be a solution, at least for specific types of NFTs, but in this thesis downsides of such an approach were also highlighted, the latter being necessarily subject to a case-by-case assessment procedure that is rationally not optimal, in particular when considering the rapidity of evolution of this digital world.

It is true that this is a situation which competent authorities defined as temporary, with the upcoming months being most likely the setting of (hopefully) definite answers from the legislative side that are set to be provided by the Commission, as specified by the recent European Council press release;²⁹² however, such a scenario, besides all the possible and justifiable reasons that include their relatively new character, as well as their fluid nature which impedes them to be completely confined within a single category of asset or instrument, is clearly not ideal and the huge potential and monetary implications of these tokens shall be taken into serious consideration, starting from a legislative answer which may be already late.

²⁹² Please, see <https://www.consilium.europa.eu/en/press/press-releases/2022/06/30/digital-finance-agreement-reached-on-european-crypto-assets-regulation-mica/> for more.

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