Non-Fungible Tokens: An Italian Private Law Perspective

Giorgia Vulpiani*

Abstract

Recently, non-fungible tokens have been attracting enormous interest. The legal regulations surrounding non-fungible tokens in Italy and the European Union suffer from insufficient and disjointed framework. As a result, several legal issues emerge from these new digital assets, such as their legal status, their mortis causa transmissibility, and the liability associated with their use. In the context of the creative sector, another relevant issue regards copyright and trademark protection, as examined in the July 2022 Court of Rome judgment.

I. Introduction

Recently, the potential of blockchain technology has attracted enormous interest. Blockchain is a distributed database that is shared among a computer network's nodes. Blockchain guarantees the fidelity and security of a data record without needing a trusted third party. Much of the attraction of this technology stems from blockchain's seemingly unbreakable security, immutability, and unparalleled transparency.

The most well-known application of blockchain is within the financial sector where it is used with cryptocurrencies like Bitcoin. Furthermore, blockchain enables storage and protection of smart contracts, which are programs that run when predetermined conditions are met, following the logic 'if this, then that'.

Blockchain and smart contracts are involved also when we talk about non-fungible tokens, which are becoming increasingly relevant.

In March 2021, Christie's sold Beeple's non-fungible token (NFT), *Everydays: The First 5000 days*, for the staggering sum of $69.3 million, causing sensation in the art market.[1]

* Assistant Professor of Private Law, University of Macerata, Department of Law. This paper is the result of the research conducted within the TRUST project – digital TuRn in Europe: 'Strengthening relational reliance through Technology'. This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101007820. This article reflects only the author's view and the REA is not responsible for any use that may be made of the information it contains.

[1] See, A. Alpini, 'NFT and NFTed artworks between property and copyrightability', to be published in *Persona e Mercato* (2023), read by courtesy of the author.

This sale was followed by a frenzy of NFT trading,[2] which has involved not only the art world, but also fashion, cinema, sport and music and has inevitably awakened the interest of jurists.[3]

Non-fungible tokens, therefore, play an increasingly important role in the art and fashion industries (crypto art and crypto fashion) and are also connected with the metaverse. One of NFT's biggest appeals is their unique and niche market status.

A token[4] is a series of encrypted data registered on a blockchain or another distributed ledger that can be fungible or non-fungible.

Fungible tokens are interchangeable units that hold equal value. An important fungible token is Bitcoin, which, like physical money, can be traded or exchanged for another bitcoin.[5] The protocol associated with fungible tokens is ERC20 –

[2] A. Lennart, 'The non-fungible token (NFT) market and its relationship with Bitcoin and Ethereum' *Blockchain Researching Lab Working Paper Series* no 20, 6 June 2021.

[3] On nfts, art, fashion and blockchain, see G. Magri, 'La blockchain può rendere più sicuro il mercato dell'arte?' 2 *Aedon* (2019); G. Frezza, 'Blockchain, autenticazioni e arte contemporanea' *Il Diritto di Famiglia e delle Persone*, 489 (2020); R. Moro Visconti, 'La valutazione dell'arte digitale' *Diritto industriale,* 472 (2021); G. Nava, 'I non fungible token' in R. Giordano et al eds, *Il diritto nell'era digitale* (Milano: Giuffrè, 2022), 237-282; G. Trovatore, 'L'opera d'arte e il suo valore nell'epoca della blockchain' *Arte e Diritto*, 81-94 (2022), 81; E. Damiani, 'Cripto-arte e non fungible tokens: i problemi del civilista' *Rassegna di diritto della moda e delle arti*, 352-364 (2022); G. Vulpiani, 'NFTs e cryptofashion: profili giuridici' *Rassegna di diritto della moda e delle arti,* 47-67 (2022); C. Iorio, 'Artwork circulation and blockchain: a legal overview' *Diritto mercato e tecnologia*, 1-22 (2022); P. Liberanome, 'Criptoarte e nuove sfide alla tutela dei diritti autorali' *Contratti*, 93-100 (2022); N. Muciaccia, 'Prime riflessioni sul rapporto tra NFT e proprietà intellettuale' Il *diritto informazione e informatica*, 893-944 (2022); A. Alpini, n 1 above; Id, 'Dalla 'platform economy' alla ' clout economy'. La discussa natura giuridica degli NFTs' Rassegna *di diritto della moda e delle arti*, 365-374 (2022); A. Caloni, 'Blockchain e mercato dell'arte: spunti di diritto privato' *Arte e diritto*, 183-207 (2022) See also, Frye and Brian L., 'NFTs & the Death of Art', 19 April 2021, available at https://tinyurl.com/mry5erfj (last visited 20 September 2023); L.J. Trautman, 'Virtual Art and Non fungible tokens' *Hofstra Law Review*, 362-426 (2022); A. Guaccero and G. Sandrelli, 'Non-fungible tokens (NFTs)' *Banca, borsa, titoli di credito*, I, 834, 824-867 (2022); R. Moro Visconti, 'La valutazione dei marchi nella moda: dal Fashion Tech al Digital Clothing' *Diritto industriale,* 255-268 (2022). B. Bodo et al, 'The Rise of NFTs: These Aren't the Droids You're Looking For' *European Intellectual Property Review*, 44, 5, 265-282 (2022).

[4] On tokens in general, P. Hacker and C. Thomale, 'Crypto-Securities Regulation: ICOs, Token Sales and Cryptocurrencies under EU Financial Law' *European Company and Financial Law Review*, 645-696 (2018); F. Annunziata, 'Speak if you can: what are you? An alternative approach to the initial coin offerings' *Bocconi Legal Studies Research Papers Series*, 11 February 2019, 1-50; E. Rulli, 'Incorporazione senza res e dematerializzazione senza accentratore: appunti sui token' *Orizzonti del diritto commerciale*, 121-150 (2019); M. Giuliano, 'Le risorse digitali nel paradigma dell'art. 810 cod. civ. ai tempi della blockchain. Parte prima' *Nuova giurisprudenza civile commentata*, I, 1214-1226 (2021) and Id, 'Le risorse digitali nel paradigma dell'art. 810 cod. civ. ai tempi della blockchain. Parte seconda' *Nuova giurisprudenza civile commentata,* I, 1456-1466 (2021).

[5] On this topic, see N. Vardi, ' "Criptovalute" e dintorni: alcune considerazioni sulla natura giuridica dei bitcoin' *Il diritto dell'informazione e dell'informatica*, III, 448-449 (2015); F. Carrière, 'Le "criptovalute" sotto la luce delle nostrane categorie giuridiche di "strumenti finanziari", "valori mobiliari" e "prodotti finanziari": tra tradizione e innovazione' *Rivista di diritto bancario*, I, 135-136, (2019); M. Mancini, 'Valute virtuali e Bitcoin' *Analisi giuridica dell'economia*, 117-138 (2015); A. Caloni, ' "Bitcoin": profili civilistici e tutela dell'investitore' *Rivista di diritto civile*, 169 -182 (2019);

CLASS OF IDENTICAL TOKENS.

On the other hand, an NFT is a unique cryptographic token registered on a blockchain, certifying the ownership, authenticity and scarcity of the linked asset.[6] Each NFT has a digital signature that makes it impossible for it to exchange it for another NFT, making NFTs non-fungible in nature. The protocol for non-fungible tokens is ERC-721 on Ethereum– CLASS OF UNIQUE TOKENS.

The key concept of NFTs is represented by their uniqueness, as it is the scarcity of these goods that determines their value and therefore creates a niche market.

Cryptocurrencies are used to purchase NFTs, and NFT transaction records are kept on a public blockchain ledger which allows open access to NFT ownership verification. Blockchains, as we will examine later in this essay, are appealing because they use a series of complex mathematical equations to process a transaction, making it an extremely secure form of asset management.

NFTs are created through minting, which is the process of creating a code that contains unique identification and ownership details for a digital asset on a blockchain network.

Once NFTs are minted, the NFT creators can sell their work through the NFT market, which links to the user's blockchain account to keep track of transactions and ownership. NFTs function as codes that locate and authenticate a digital image. The NFT code is 'on chain', located within blockchain, while the image, such as a digital artwork, is 'off chain' and located in a wallet.

In order to mint and transfer an NFT, smart contracts are of fundamental importance. Once the conditions of a smart contract are met, the smart contract code will mint an NFT, transfer an NFT, or pay royalties to the NFT's creator.[7]

Every digital asset, including images, videos, music, and tweets, can be minted

M. Cian, 'La criptovaluta – alle radici dell'idea giuridica di denaro attraverso la tecnologia: spunti preliminari' *Banca, borsa e titoli di credito*, I, 331-332 (2019); E. Girino, 'Criptovalute: un problema di legalità funzionale' Rivista di diritto bancario, I, 733-769, (2019); A. Rahmatian, 'Electronic Money and Cryptocurrencies (Bitcoin): Suggestions for Definitions' *Journal of International Banking Law and Regulation*, 115-121 (2019); G. Rinaldi, 'Approcci normativi e qualificazione giuridica delle criptomonete' *Contratto e impresa*, 257-296 (2019); E. Calzolaio, 'La qualificazione del bitcoin: appunti di comparazione giuridica' *Danno e responsabilità*, 188-197 (2021); M. Giuliano, 'Le risorse digitali [...]. Parte prima' n 4 above, and Id, 'Le risorse digitali [...]. Parte seconda' n 4 above, 1456; U. Malvagna and F. Sartori, 'Cryptocurrencies as 'Fungible Digital Assets' Within the Italian Legal System: Regulatory and Private Law Issues' *The Italian Law Journal*, 481-502 (2022); M. Guastadisegni, 'Criptovaluta e prodotto finanziario' *Danno e responsabilità,* 492-509 (2022). In the Italian jurisprudence, see Corte di Cassazione-Sezione penale 26 October 2022 no 44378, *ilpenalista.it*, 16 February 2023, annotated by R. Razzante, 'Le crypto attività come prodotti finanziari'.

[6] Qin Wang et al, 'Non-Fungible Token (NFT): Overview, Evaluation, Opportunities and Challenges' *Cornell University*, 25 October 2021, 1-20, arXiv:2105.07447.

[7] K.E. Busch, 'Non-Fungible Tokens (NFTs)' *Congressional Research Service*, 1-21, 20 July 2022; A. Stazi, 'Smart contracts, NFT trading and weaker party protection', 11, 1-18 (1 February 2023), forthcoming in F. Di Porto and O. Pollicino eds, *NFTs and Metaverses versus Law* (Springer, 2023), available at https://tinyurl.com/3ua6427x (last visited 20 September 2023); Qin Wang et al, n 6 above, 4.

as an NFT. Although a jpeg file. can be duplicated, non-fungible tokens are not duplicative because the NFT's code is unique and inimitable.

Each non-fungible token is associated with a smart contract containing information on the authorship of the work, payment of royalties to the creator, the methods of disposal and use of the work.

An NFT's creator can easily prove the existence and ownership of a digital asset in the form of video, image, event ticket, or other applicable medium.

Many legal issues arise regarding NFTs, such as their legal status or potential copyright violations. Counterfeit NFTs linked to the unauthorized use of artworks and trademarks, and fraudulent accounts selling them, may result in allegations of trademark or copyright infringement. NFT marketplaces do not provide a system to authenticate users and verify that they have secured the proper rights before selling the digital asset. NFTs can guarantee ownership, but not authenticity because if the information originally entered is false or in error from the start, the NFTs will confirm and perpetuate that falsehood in all their future sales. Thus, we need to investigate the legal implications of smart contracts.

II. NFTs: Lack of Legislation

There is no legislation specific to non-fungible tokens; therefore, NFTs give rise to several legal questions, including the nature of this good and their *mortis causa* transmissibility. There is also the problem of the protecting intellectual property, especially in the artistic and creative sectors. Consider, for example, the creation and sale of an NFT reproducing the painting of a well-known artist who did not consent to reproducing his work or, selling a fashion item in the metaverse that reproduces the products or logos of well-known designers. In these cases, we must ask whether the types of protection suitable in the 'physical' world are applicable to the metaverse. A further issue concerns civil liability linked to the creation and circulation of non-fungible tokens.[8]

As mentioned above, non-fungible tokens are inseparably linked to blockchain and smart contracts.[9] Even with regard to these technologies, national and

[8] L. Buonanno, 'La responsabilità civile nell'era delle nuove tecnologie: l'influenza della blockchain' *Responsabilità civile e previdenza*, 1618-1627 (2020).

[9] Regarding the Italian doctrine on the topic, see P. Cuccuru, 'Blockchain ed automazione contrattuale. Riflessione sugli smart contract' *Nuova giurisprudenza civile commentata*, 107-119 (2017); D. Di Sabato, 'Gli smart contracts: robot che gestiscono il rischio contrattuale' *Contratto e impresa*, 378-402 (2017); D. Restuccia, 'Il notaio nel terzo millennio, tra sharing economy e blockchain' *Notariato*, 53-56 (2017); G. Finocchiaro, 'Il contratto nell'era dell'intelligenza artificiale' *Rivista trimestrale di diritto e procedura civile*, 441-460 (2018); L. Parola et al, 'Blockchain e smart contract: questioni giuridiche aperte' *Contratti*, 681-688 (2018); A. Razzini, 'Blockchain e protezione dei dati personali alla luce del nuovo regolamento europeo GDPR' *Ciberspazio e diritto*, 197-210 (2018); E. Giorgini, 'Algorithms and Law' *The Italian Law Journal*, 131-149 (2019); R. Moro Visconti, 'La valutazione delle blockchain: Internet of value, network digitali e smart transaction' *Diritto ind*ustriale, 301-311 (2019); R. Pardolesi and A. Davola, '«Smart contract»: lusinghe ed equivoci

European legislation is very meagre and can highlight several instances of friction between the technologies themselves and some fundamental rights of the person, such as protection of personal data and privacy.[10]

dell'innovazione purchessia' *Foro italiano*, V, 195-207 (2019); F. Di Ciommo, 'Smart contract e non diritto' *Nuovo diritto civile*, 257-295 (2019); F. Delfini, 'Blockchain, smart contracts e innovazione tecnologica: l'informatica e il diritto dei contratti' *Rivista del diritto privato*, 167-178 (2019); R. Battaglini and M.T. Giordano eds, *Blockchain e smart contract* (Milano: Giuffrè, 2019). M. Giaccaglia, 'Considerazioni su blockchain e smart contract (oltre le criptovalute)' *Contratto e impresa*, 941-970 (2019); Id, 'Il contratto del futuro? Brevi riflessioni sullo smart contract e sulla perdurante vitalità delle categorie giuridiche attuali e delle norme vigenti del codice civile italiano' *Tecnologie e diritto*, 113-169 (2021); Id, 'Questioni (ir)risolte in tema di smart contract. Per un ritorno al passato' *Tecnologie e diritto*, 333-366 (2022); A. Stazi, *Automazione contrattuale e contratti intelligenti. Gli smart contracts nel diritto comparato* (Torino: Giappichelli, 2019), 99, 1-208; F. Scutiero, 'Smart contract e sistema di diritto, un connubio tutto da definire' *Foro napoletano*, 113-134 (2019); E. Battelli, 'Le nuove frontiere dell'automatizzazione contrattuale tra codici algoritmici e big data: gli smart contracts in ambito assicurativo, bancario e finanziario' *Giustizia civile,* 681-711 (2020); C. Pernice, 'Smart contract e automazione contrattuale, potenzialità dei rischi della negoziazione algoritmica nell'era digitale' *Diritto del mercato assicurativo e finanziario*, 117-137 (2019); Ead, 'Distributed ledger technology blockchain e smart contracts: prime regolazioni' *Tecnologie e diritto*, 490-505 (2020); R. De Caria, 'Blockchain and Smart Contracts: Legal Issues and Regulatory Responses between Private and Economic Law' *The Italian Law Journal*, 363-379 (2020); F. Faini, 'Blockchain e diritto: la catena del valore tra documenti informatici, smart contracts e data protection' *Responsabilità civile e previdenza*, 297-316 (2020); I. Ferlito, '«Smart Contract». Automazione contrattuale ed etica dell'algoritmo' *Comparazione e diritto civile*, 661-703 (2020); V. Bellomia, 'Il contratto intelligente: questioni di diritto civile' *Judicium*, 1-28 (2020); C. Amato, 'La computerizzazione del contratto (Smart, data oriented, computable e self-driving contracts. Una panoramica)' *Europa e diritto privato*, 1259-1306 (2020); M. Maugeri, *Smart contracts e disciplina dei contratti* (Bologna: il Mulino, 2021), 1-184; Ead, 'Smart contracts' *Enciclopedia del diritto* (Milano: Giuffrè, 2021) 1132-1149; Ead, 'Smart contracts, Consumer protection, and Competing European Narrativesof Private Law' *German Law Journal*, 900-909 (2022); F. Gambino, 'Blockchain, smart contract e diritto sradicato' *Tecnologie e diritto*, 28-37 (2021); C. Iorio, 'Blockchain e diritto dei contratti: criticità e prospettive' *Actualidad Juridica Iberomericana*, 654-689 (2022); M. Proto, 'Questioni in tema di intelligenza artificiale e disciplina del contratto' in R. Giordano et al eds, *Il diritto nell'era digitale* (Milano: Giuffrè, 2022), 175-189; P. Matera and A. Benincampi, 'Blockchain' *Digesto, discipline privatistiche, sez. comm.*, (Torino: UTET, 2022), 23-51; I. Martone, *Smart contracts. Fenomenologia e funzioni*, (Napoli: Edizioni Scientifiche Italiane, 2022), 13; L. Di Nella, 'Smart contract, Blockchain e interpretazione dei contratti' *Rassegna di diritto civile*, 48-91 (2022); M. Chierici, 'Contratto di Blockchain as a Service: fondamenti teorici di una nuova prassi commerciali' *Contratti*, 197-219 (2022).

[10] On privacy in general, see: P. Perlingieri, *Manuale di diritto civile* (Napoli: Edizioni Scientifiche Italiane, 2018), 198; Id, 'Privacy digitale e protezione dei dati personali tra persona e mercato' *Foro napoletano*, 481-496 (2018) and Id, *Il diritto civile nella legalità costituzionale secondo il sistema italo-europeo delle fonti* (Napoli: Edizioni Scientifiche Italianei, 2020), III, 107. See also S. Rodotà, *Tecnologie e diritti*, (Bologna: il Mulino, 1995); Id: 'Riservatezza', *Enciclopedia italiana Treccani*, (Roma: Treccani, 2007) VII App, (now also on Roma: Treccani Libri, 2020); Id, 'Una costituzione per internet?' *Politica del diritto*, 342, 337-351 (2010). The issues on privacy and data protection arise in particular regarding social networks; on this topic, see, C. Perlingieri, *Profili civilistici dei social network* (Napoli: Edizioni Scientifiche Italiane, 2014), 66. Regarding the issues on privacy, social networks and minors, see C. Perlingieri, 'La tutela dei minori di età nei social networks' *Rassegna di diritto civile*, 1324-1340 (2016); E. Andreola, *Minori e incapaci in Internet* (Napoli: Edizioni Scientifiche Italiane, 2019) 107; A. Astone, 'L'accesso dei minori d'età ai servizi della c.d. Società dell'informazione: l'art. 8 del Reg. (UE) 2016/679 e i suoi riflessi sul Codice per la protezione dei dati personali' *Contratto e impresa*, 614-648 (2019); G. Vulpiani,

Moreover, questions arise regarding civil liability. Currently, the only intervention carried out by the Italian legislator on the subject is Legge 12 of February, 11 2019, Conversion Law of decreto legge no 135 of December 14, 2018, that inserted Art 8-*ter* on technologies based on distributed registers and smart contracts.[11] According to this law, distributed register technologies are computer technologies and protocols that

> 'use a shared, distributed, replicable, simultaneously accessible, architecturally decentralized register on a cryptographic basis, to allow the registration, validation, updating and storage of data both unencrypted and further protected by encryption, verifiable by each participant. These data are non-alterable and non-modifiable'.[12]

The technologies allow the execution of the contract: the code is read, validated, and stored on a plurality of distributed registers. It follows the logic of 'if this, then that'. The law does not, therefore, speak of blockchain, but, more generally, of distributed registers superimposing the two figures.[13] Whereas the smart contract is defined by Art 8-*ter* legge 12/2019 as a computer protocol that operates on technologies based on distributed registers and whose execution automatically binds two or more parts based on predefined effects from the same.

Further, there is a lack of EU regulation on blockchain and smart contracts, even in the face of various initiatives such as the establishment of the EU Blockchain Observatory and Forum, of the International Association for Trusts Blockchain Applications, and the Interoperable Standards for DLT and Blockchains.

Of particular relevance is the 2018 European Parliament Resolution on distributed register and blockchain technologies: creating trust through disintermediation.[14] The resolution analyses the implications of digital ledger technologies, and proposed regulation, developed by the European Commission on the markets for crypto assets (MiCAR),[15] to which is linked another relating to a

'L'utente minore online: tutela della privacy e attività negoziale' *Tecnologie e diritto*, 103-122 (2021).

[11] On this topic, see G. Remotti, 'Blockchain smart contract: primo inquadramento e prospettive d'indagine (commento all'art. 8 ter D.L. 14 dicembre 2018, n. 135)' *Osservatorio del diritto civile e commerciale*, 189-228 (2020); C. Pernice, n 11 above, 490; M. Maugeri, n 9 above, 1139-1140; S. Rigazio, 'Smart contracts e tecnologie basate su registri distribuiti nella L. 12/2019' *Diritto dell'informazione e dell'informatica*, 369-395 (2021). See also, C. Poncibò, *Il diritto comparato e la blockchain* (Napoli: Edizioni Scientifiche Italiane, 2020), 154-158.

[12] Author's translation. Art 8-*ter*, Legge 12/2019 states that 'Si definiscono "tecnologie basate su registri distribuiti" le tecnologie e i protocolli informatici che usano un registro condiviso, distribuito, replicabile, accessibile simultaneamente, architetturalmente decentralizzato su basi crittografiche, tali da consentire la registrazione, la convalida, l'aggiornamento e l'archiviazione di dati sia in chiaro che ulteriormente protetti da crittografia verificabili da ciascun partecipante, non alterabili e non modificabili'.

[13] On this topic, S. Rigazio, n 11 above, 369.

[14] European Parliament resolution 3 October 2018 on distributed ledger technologies and blockchains: building trust with disintermediation (2017/2772(RSP)).

[15] Proposal for a Regulation of the European Parliament and of the Council on Markets in

pilot scheme for market infrastructures based on distributed ledger technologies (DLT).[16]

The MiCAR, approved on May 31 2023,[17] qualifies crypto assets as one of the main applications of distributed ledger technology and defines them as 'digital representations of value or rights that could bring significant benefits to market participants, including retail holders of crypto-assets'.

This definition does not include the non-fungible tokens, as also highlighted by Report no 7/2021 of the European observatory on blockchain;[18] in fact it is expressly stated that the regulation

> 'shall not apply to crypto-assets that are unique and not fungible with other crypto-assets, including digital art and collectibles. The value of such unique and non-fungible crypto-assets is attributable to each crypto-asset's unique characteristics and the utility it gives to the holder of the token. Nor should this Regulation apply to crypto-assets representing services or physical assets that are unique and non-fungible, such as product guarantees or real estate'.

III. The Blockchain: Definitions and Legal Issues

Blockchain is a type of technology aimed at managing transactions through the creation of a distributed database among users of a network.[19] Blockchain is a shared and immutable distributed ledger (DLT), which facilitates the process of recording and managing transactions and tracking assets within a defined network.

The concept of database management distribution rejects the traditional logic of centralized data management through the control of a single central authority.

Crypto-assets, and amending Directive (EU) 2019/1937, COM(2020) 593 final 24th September 2020. Cf F. Annunziata, 'Verso una disciplina europea delle crypto-attività- Riflessioni a margine della recente proposta della commissione UE' *dirittobancario.it*, 15 October 2020.

[16] Proposal for a Regulation of the European Parliament and of the Council on a pilot regime for market infrastructures based on distributed ledger technology, COM(2020)594 final 24 September 2020.

[17] Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets, and amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937 [2023] OJ L150/40.

[18] EU Blockchain Observatory and Forum, NFT-Legal token classification, available at https://tinyurl.com/3pnn3r2s (last visited 20 September 2023).

[19] A.T. Aras and V. Kulkarni, 'Blockchain and its applications – a detailed survey' *International Journal of Computer Applications*, 180, 29-35 (2017); Q.F. Zhang et al, 'Blockchain: Architecture and research progress' *Chinese Journal of Computers*, 041(005), 969–988 (2018); M.N.M. Bhutta et al, 'A Survey on Blockchain Technology: Evolution, Architecture and Security' *IEEE Access*, 61048-61073 (2021); Shashank Mohan Jain, *A Brief Introduction to Web3: Decentralized Web Fundamentals for App Development* (New York: Apress, 2023), 13.

In the DLTs, all users operate at the same level, on a peer to peer network, and may act only with the consent of the majority of nodes.

The distributed ledger is structured in blocks linked to each other through an immutable encryption system and is thus able to reliably maintain the recorded information. Each transaction on the block network is validated by the network itself, removing the need for a central authority to monitor or for intermediaries to intervene. More specifically, the validation mechanism of the block and all transactions contained in it require the resolution of a complex cryptographic puzzle (mining). The recorded data are time stamped by means of asymmetric key cryptographic techniques – where every user has a private and a public key – in the chain of blocks and, once recorded, cannot be modified or tampered with without the consent of the majority of the involved nodes, which is highly complex. This allows substantial inalterability and traceability of the information entered. The characteristics of the blockchain are, therefore, decentralization, verifiability and immutability; characteristics that guarantee the authenticity, integrity and reliability of the recorded information.[20]

Blockchain technology ensures the validity of datasets by spreading data over many nodes which must agree to confirm data validity via the previously determined consensus mechanism. So, blockchain can ensure that data are not manipulated while stored and that the party making a transfer is entitled to transfer the asset on the ledger and is not able to transfer it twice to separate buyers.

However, beyond these inbuilt protection mechanisms, blockchain does not make inaccurate data accurate. Inaccurate data remains, in fact, inaccurate and the 'garbage in, garbage out' dilemma holds.

Moreover, while the standardization and automatization that form part of blockchain mitigate operational risk, in principle, an error once implemented in the code may easily spread over the whole system affecting a greater number of nodes and individuals than would occur in a concentrated ledger.

There is a distinction between two types of blockchain: permissionless blockchains and permissioned blockchains. The differences concern mainly the identification of the subjects participating in it, the method of selection of nodes, the size of the network, the mechanism of shared consensus and the transparency of the content of the blocks.

In fact, in a permissionless blockchain, anyone can enter the network and act

[20] On blockchain and notary activity, M. Manente, 'Blockchain: la pretesa di sostituire il notaio' *Notariato*, 211-219 (2016); D. Restuccia, 'Il notaio nel terzo millennio, tra sharing economy e blockchain' *Notariato*, 53-56 (2017); M. Nastri, 'Registri sussidiari, blockchain #notaio oltre la lezione di Carnelutti?' *Notariato*, 369-371 (2017); M. Krogh, 'Transazioni in valute virtuali e rischi di riciclaggio. Il ruolo del notaio' *Notariato*, 155-169 (2018); C. Licini, 'Il notaio nell'era digitale: riflessioni gius-economiche' *Notariato*, 142-150 (2018); U. Bechini, *Il notaio digitale. Dalla firma alla blockchain* (Milano: Giuffrè, 2019), 153. On the notarchain, see E. Damiani, 'Blockchain Application in General Private Law: the Notarchain Case', in A. Caligiuri ed, *Legal Technology Transformation. A Practical Assessment* (Napoli: Editoriale Scientifica, 2021), 229-236.

as a node, keeping their identity confidential, which makes it a highly complex procedure to alter this type of blockchain because it would require a very high computational skill, in addition to the consensus of more than fifty percent of nodes.

Permissioned blockchains, on the other hand, are characterized by greater centralization, because a central entity can determine who can access them by identification.

There is also a distinction between public and private blockchains. The difference between these two types of blockchain is that the former is not managed by anyone, while the latter refers to a single entity or group.

It is the financial sector that has witnessed the birth and diffusion of the technology under consideration, where the blockchain is used as the 'engine' of the bitcoin cryptocurrency conceived by Satoshi Nakamoto.[21]

Bitcoin is not a currency issued by a central bank, but a peer-to-peer electronic cash system, it is therefore a technology that allows you to send value between parts of a network without an intermediary.[22]

A particularly interesting application in the legal field can be found in France, where the Blockchain Order no 2017/1674 was issued, with which the use of the BTC for the 'représentation et la transmission de titres financiers' was authorized. Ordonnance no 2017/1674 follows Ord no 2016/520 of April 28, 2016 that allows the sale of certain types of financial products on the blockchain.

Due to the specific structure of the blockchain, legal criticalities emerge in relation to the connection between this technology and EU Regulation 2016/679 (GDPR)[23] and decreto legislativo no 196/2003, as amended by decreto legislativo no 101/2018, with reference to the identification of the data controller and the right to be forgotten.[24]

[21] See S. Nakamoto, Bitcoin: a Peer-to-Peer Electronic Cash System, in www.bitcoin.org.

[22] M. Giuliano, 'Le risorse digitali […]. Parte seconda' n 4 above, 1456. See also, N. Vardi, n 5 above, 448; F. Carrière, n 5 above, 135; M. Mancini, n 5 above, 117; A. Caloni, ' "Bitcoin": profili civilistici e tutela dell'investitore' Rivista di diritto civile, 169 -182 (2019); M. Cian, n 5 above, 331; E. Girino, n 5 above, 733; A. Rahmatian, n 5 above, 115; G. Rinaldi, n 5 above, 257; E. Calzolaio, n 5 above, 188; U. Malvagna and F. Sartori, n 5 above, 485; M. Guastadisegni, n 5 above, 492.

[23] On Reg. (UE) n. 679/2016, see P. Perlingieri, 'Privacy digitale' n 10 above, 481; A. De Franceschi, *La circolazione dei dati personali tra privacy e contratto* (Napoli: Edizioni Scientifiche Italiane, 2018), 3; I.A. Caggiano, 'Privacy e minori nell'era digitale. Il consenso al trattamento dei dati dei minori all'indomani del Regolamento UE 2016/679, tra diritto e tecno-regolazione' *Familia*, 3-23 (2018); E. Lucchini Guastalla, 'Il nuovo regolamento europeo sul trattamento dei dati personali: i princìpi ispiratori' *Contratto e impresa*, 2018, 106-125; A. Mantelero and D. Poletti eds, *Regolare la tecnologia: il Reg. UE 2016/679 e la protezione dei dati personali. Un dialogo tra Italia e Spagna* (Pisa: University Press, 2018), 9; V. Cuffaro, 'Il diritto europeo sul trattamento dei dati personali' *Contratto e impresa,* 1098-1119 (2018). See also F. Piraino, 'Il regolamento generale sulla protezione dei dati personali e i diritti dell'interessato' *Nuove leggi civili commentate*, 369-409 (2017) and A. Gentili, 'La volontà nel contesto digitale: interessi del mercato e diritti delle persone' *Rivista trimestrale di diritto e procedura civile* 701-716 (2022).

[24] On the right to be forgotten, see M. Mezzanotte, *Il diritto all'oblio*. Contributo allo studio *della privacy storica*, (Napoli: Edizioni Scientifiche Italiane, 2009), 81; S. Rodotà, *Il diritto di avere*

Many practitioners and academics have pointed out that blockchain is incompatible with privacy laws. For instance, in a permissionless public blockchain system, no single party takes responsibility for the availability or security of a particular blockchain network, and all users of the system may have access to the data on the network.

Another issue concerns negligent performance. For instance, in the financial sector, a certain security and processing standard for market participants are required - what if the blockchain fails to meet these standards? Further, what if the user sends virtual currency to the wrong address? Is there anyone to whom the user can turn for redress?

IV. Smart Contracts: Definition and Legal Issues

A smart contract can be stored on the blockchain. This is a computerised transaction protocol that executes the terms of a contract at the fulfilment of pre-set conditions.[25] Through the blockchain, the unchangeability and automatic

diritti, (Bari-Roma: Laterza, 2012) 404; F. Di Ciommo, 'Quel che il diritto non dice. Diritto e oblio' *Danno e responsabilità*, 1101-1113 (2014); S. Morelli, 'Oblio (diritto all')' *Enciclopedia del* diritto, (Milano: Giuffrè, 2002), agg. VI, 848; Id, 'Fondamento costituzionale e tecniche di tutela dei diritti della personalità di nuova emersione (a proposito del cd 'diritto all'oblio')' *Giustizia civile*, 515-524 (1997); L. Rattin, 'Il diritto all'oblio' *Archivio. civile*, 1069-1074 (2000); E. Gabrielli eds, *Il diritto all'oblio (Atti del convegno di studi del 17 maggio 1997)* (Napoli: Edizioni Scientifiche Italiane, 1999); P. Laghezza, 'Il diritto all'oblio esiste (e si vede)' *Foro italiano*, I, 1835-1838 (1998). On the right to be forgotten in the GDPR, see F. Di Ciommo, 'Il diritto all'oblio (oblito) nel regolamento Ue 2016/679 sul trattamento dei dati personali' *Foro italiano*, V, 306-315 (2017); Id, 'Il diritto all'oblio nel Regolamento (UE) 2016/679. Ovvero, di un 'tratto di penna del legislatore' che non manda al macero alcunché' *Corriere giuridico*, 16-31 (2018); Id, 'Privacy in Europe After Regulation (EU) No 2016/679: What Will Remain of the Right to Be Forgotten?' *The Italian Law Journal*, 623-646 (2017); S. Bonavita and R. Pardolesi, 'GDPR e diritto alla cancellazione (oblio)' *Danno e responsabilità*, 269-281 (2018).

[25] For a technical point of view, see Lin Shi-Yi, Lei Zhang et al, 'A survey of application research based on blockchain smart contract' *Wireless Networks*, 28, 635-690 (2022). On the legal issues, see A. Wright and P. De Filippi, 'Decentralized Blockchain Technology and the Rise of Lex Cryptographia', 1-58, (March 10, 2015), available at https://tinyurl.com/bdhymrbb (last visisted 20 September 2023); A. Savelyev, 'Contract law 2.0: 'Smart contracts as the beginning of the end of classic contract law' *Higher School of Economics Research Paper no WP BRP 71/LAW/2016*, 3-24 (2016); E. Mik, 'Smart contracts: Terminology, technical limitations and real world complexity' *Law, Innovation and Technology, Research Collection School Of Law*, 9, (2), 269-300, (2017); M. Raskin, 'The Law and Legality of Smart Contracts' 1 *Georgetown Law Technology Review* 305-341 (2017); R. O'Shields, 'Smart contracts: legal agreements for the blockchain' *North Carolina Banking Institute*, 177-194 (2017); L.W. Cong and Z. He, 'Blockchain disruption and Smart Contracts' *The Review of Financial Studies*, 1754-1797 (2019); P. Sanz Bayón, 'Key Legal Issues Surrounding Smart Contract Applications' KLRI *Journal of Law and Legislation*, 63-91 (2019); M. Durovic and A. Janssen, 'The Formation of Blockchain-based Smart Contracts in the Light of Contract Law' *European Review of Private Law* 6, 753–772 (2019); M. Durovic and F. Lech, 'The Enforceability of Smart Contracts' *The Italian Law Journal*, 493-511 (2019). In the Italian literature, see P. Cuccuru, 'Beyond bitcoins: an early overview on smart contracts' *International Journal of Law and Information Technology,* 179–195 (2017); Id, 'Blockchain' n 9 above, 107; D. Di Sabato, n 9

execution of the computer code of the smart contract is guaranteed.

The term smart contract was coined by Nick Szabo. According to Szabo, 'a smart contract is a computerized transaction protocol that executes the terms of a contract'. The general objectives of smart contract design are to satisfy common contractual conditions (such as payment terms, liens, confidentiality, and even enforcement), minimize exceptions both malicious and accidental, and minimize the need for trusted intermediaries. Related economic goals include lowering fraud loss, arbitration and enforcement costs, and other transaction costs.[26] According to Szabo, POS terminals and cards, EDI, and agoric allocation of public network bandwidth are examples of smart contracts. The strength of the smart contract lies in the fact that the cooperation of the parts is not necessary for its execution; for them to run automatically, it is sufficient that the predetermined conditions are met, following the logic of the 'if, then that'.

The impulse that determines the execution of the smart contract can then depend either on elements internal to the code or external elements, such as the fluctuations of an interest rate.

If you need to access information off-chain, you will need the intervention of an element placed outside the blockchain: the Oracle, which sends information to the chain of blocks in relation to circumstances deduced in the code of the smart contract that constitute the conditions of execution.[27]

above, 378; G. Finocchiaro, n 9 above, 441; L. Parola, P. Merati and G. Gavotti, n 9 above, 681; R. Pardolesi and A. Davola, n 9 above, 195; F. Di Ciommo, 'Smart contract e non diritto' n 9 above 257-295; F. Delfini, n 9 above, 167; R. de Caria, 'The Legal Meaning of Smart Contracts' 26(6) *European Review of Private Law*, 731, 745-750 (2018); Id, 'Definitions of Smart Contracts. Between Law and Code', in M. Cannarsa et al eds, The Cambridge *Handbook of Smart Contracts, Blockchain Technology and Digital Platforms* (Cambridge: Cambridge University Press, 2019); G. Lemme, 'Gli smart contracts e le tre leggi della robotica' *Analisi giuridica dell'economia*, 133, 129-152 (2019); M. Giaccaglia, n 9 above, 333; F. Scutiero, n 9 above, 113 ff; E. Battelli, n 9 above, 681; I. Ferlito, n 9 above, 661; V. Bellomia, n 9 above; C. Amato, n 9 above, 1259; M. Maugeri, n 9 above; A. Palladino, 'Dall'homo loquens all'homo smart: la contrattualistica del terzo millennio' *De Iustitia*, 90-103 (2020); G. Rinaldi, 'Smart contract: meccanizzazione del contratto nel paradigma della blockchain' in G. Alpa ed, *Diritto ed* intelligenza artificiale (Pisa: Pacini giuridica, 2020), 343; F. Gambino, n 9, above, 28; S. Orlando, 'Profili definitori degli "smart contracts" ' in R. Clarizia ed, *Internet. Contratto e persona, Quale futuro?* (Pisa: Pacini editore, 2021), 48; A. Stazi, *Smart Contracts and Comparative Law - A Western Perspective* (Berlin: Springer, 2021), 105; A. Cinque, 'Gli "smart contract" nell'ambito del "FinTech" e dell'"InsurTech" ' *Jus Civile*, 187-204, (2021); V. Zeno-Zencovich, ' "Smart contracts", "granular norms" and "non-discrimination" ', in C. Busch and A. De Franceschi eds, *Algorithmic Regulation and Personalized Law* (Munich: Beck, 2021), 264-278; M. Proto, n 9 above, 179; E.W. Di Mauro, 'Smart Contracts Operating on Blockchain: Advantages and Disadvantages' *The Italian Law Journal*, 109-130 (2022); C. Iorio, 'Blockchain e diritto dei contratti' n 9 above, 659; I. Martone, n 9 above, 13; L. Di Nella, n 9 above, 48.

[26] N. Szabo, 'Smart contracts: building blocks for digital markets' *EXTROPY: The Journal of Transhumanist Thought*, 1996, 16, 18.

[27] Lin Shi-Yi, Lei Zhang et al, n 25 above, 660: 'As a closed system environment with deterministic, blockchain is separated from the real world. The blockchain can only obtain the data in the chain but not out of the chain, which the main reason is that smart contract can only passively accept but cannot actively obtain the data out of the chain. In addition, it is mostly used for the transaction processing of digital assets when blockchain is applied to finance, and the required

Here the first problem already becomes apparent regarding the correctness of information from outside and the liability in the case of erroneous data transmission.

One of the central issues smart contracts raise concerns the traceability of the same to the classical concept of a contract.

The subject of the automated execution of the contract was already present in legal doctrine well before the advent of smart contracts and electronic contracts. As early as 1901, in *Gli automi del diritto privato* Cicu questioned the problems related to the conclusion of the contract with the help of automatons.[28] At the center of his reflection was the so-called 'automatic contract; in which the automaton is the mechanism by which a performance is made by an act to be performed by the person who wants the service itself and which usually consists in the introduction of a currency.

More specifically, the doctrine in question saw a legal transaction in the inserting of the coin, which constitutes the act that makes clear the subject's desire to acquire the good or the service advertised by the machine. In his analysis, Cicu identified the beginning of the automatic legal transaction as when the owner placed the automaton in a public place.

There have been three different theories: the first identified an invitation to offer, the second qualified it as a promise to the public and the third saw in it a proper contractual offer.

The latter was the thesis accepted by Cicu, who spoke more precisely of offering to the public. In this case, the offeree although undetermined at the time of setting up the machine, would be determined at the time of the insertion of the coin. Most of the reflections made by Cicu have been taken into consideration in the most recent doctrine for the examination of the regulation applicable to the conclusion of the telematic contract[29] to which the general legislation contained

data comes from within the chain. However, non-financial applications such as supply-chain and IoT need to obtain off-chain data (that is, the data of the real world) when carrying out, and smart contracts do not support external requests. Therefore, Blockchain Oracle came into being. Blockchain Oracle is the link of data exchange between blockchain and the real world, and essentially is the interface and the only way for smart contract to interact with the external world'.

[28] A. Cicu, 'Gli automi nel diritto privato' *Filangieri*, 561-597 (1901) now in *Scritti minori di Antonio Cicu*, (Milano Giuffrè, 1965), II, 287-323; see also A. Galizia, 'I contratti automatici e la loro interpretazione' (Città di Castello, Lapi, 1910), 3-21. On this topic, see N. Irti, 'Scambi senza accordo' *Rivista trimestrale di diritto e procedura civile*, 347-364 (1998) and G. Oppo, 'Disumanizzazione del contratto?' *Rivista di diritto civile*, 525-533 (1998), and also N. Irti, '«È vero ma...» (replica a Giorgio Oppo)' *Rivista di diritto civile*, 273-278 (1999); see also Id: 'Lo scambio di foulard (replica semiseria al Prof. Bianca)' *Rivista trimestrale di diritto e procedura civile*, 601-604, (2000) and C.M. Bianca, 'Acontrattualità dei contratti di massa?' *Vita notarile*, 1120-1128 (2001) and F. Gazzoni, 'Contatto reale e contatto fisico (ovverosia l'accordo contrattuale sui trampoli)' *Rivista del diritto commerciale e del diritto generale delle obbligazioni*, 655-668 (2002), and in *Studi in onore di C.M. Bianca* (Milano: Giuffré 2006), III, 313. See also, C.M. Bianca, *Diritto civile. 3.3 Il contratto* (Milano: Giuffrè, 2019), 43.

[29] E. Damiani, 'Note in tema di conclusione del contratto mediante sistemi automatici (spunti per una rilettura delle tesi di Antonio Cicu)' *Rassegna di diritto civile*, 749-761 (2020). On this

in the Italian Civil Code is considered applicable, albeit with some divergence in doctrine with reference to some norms.[30]

According to one legal theory, smart contracts cannot be considered legal contracts because they are more similar to channels of the management of agreements than agreements themselves.[31] In this sense, the smart contract does not relate to the phase of the formation of the agreement, but to that of fulfilment; so, consequently, it cannot integrate a case of atypical agreement *ex* Art 1322 Civil Code.[32]

Consider, for instance, the case of a smart contract connected to an air ticket which, in case of delay or cancellation of the flight, automatically gives the passenger the monetary compensation referred to in Regulation (EC) no 261/2004.[33] Another example could be a protocol linked to an insurance contract which, when the conditions indicated in the contract itself are met, proceeds automatically to the payment of a sum to the insured person.[34]

However, another thesis states that there is no reason to exclude the ordinary regulation established by contract law from applying to smart contracts, noting the need to confront the various issues that arise regarding the particularity of this technology, such as the imputation of the will, the right of withdrawal, the acquisition of the consumer's express consent and the remedies.[35] With regard to the latter, it should be noted that the rigidity of the smart contract makes it

topic, see also, V. Franceschelli, *Computer e diritto* (Rimini: Maggioli Editore, 1989), 165; E. Giannantonio, *Manuale di diritto dell'informatica* (Padova: CEDAM, 1994), 219; A.M. Gambino, *L'accordo telematico* (Giuffrè: Milano, 1997), 14; A. Gentili, 'L'inefficacia del contratto telematico' *Rivista di diritto civile*, 747-773 (2000); C. Camardi, 'Contratto e rapporto nelle reti telematiche. Un nuovo modello di scambio' *Contratto e impresa*, 557-570 (2001); G. Finocchiaro, 'Lex mercatoria e commercio elettronico. Il diritto applicabile ai contratti conclusi su internet' *Contratto e impresa*, 571-610 (2001); S. Giova, *La conclusione del contratto via Internet* (Napoli: Edizioni Scientifiche Italiane, 2000), 9; F. Delfini, *Contratto telematico e commercio elettronico* (Milano: Giuffrè, 2002); M. Pennasilico: 'La conclusione dei contratti online tra continuità ed innovazione' *Diritto dell'informazione e dell'informatica*, 805-834 (2004); L. Follieri, *Il contratto concluso in Internet* (Napoli: Edizioni Scientifiche Italiane, 2005), 85; A.C. Nazzaro, 'Riflessioni sulla conclusione del contratto telematico' *Informatica e diritto*, 7-32 (2010); G. Perlingieri, 'Il contratto telematico' in D. Valentino ed, *Manuale di diritto dell'informatica* (Napoli: Edizioni Scientifiche Italiane, 2010), 274; E. Battelli, 'Riflessioni sui procedimenti di formazione dei contratti telematici e sulla sottoscrizione on line delle clausole vessatorie' *Rassegna di diritto civile*, 1035-1081 (2014); G. Conte, *La formazione del contratto,* in P. Schlesinger and F.D. Busnelli eds, *Il codice civile. Commentario* (Milano: Giuffrè, 2018), 282.

[30] C. Scognamiglio, 'La conclusione e l'esecuzione del contratto telematico' in S. Sica ed, *Commercio elettronico e categorie civilistiche* (Milano: Giuffrè, 2002), 73. See also, F. Delfini, 'Il D.Lgs., 70/2003, di attuazione della direttiva 2000/31/CE sul commercio elettronico. Commento' *Contratti*, 607-619 (2003).

[31] P. Cuccuru, 'Blockchain ed automazione contrattuale' n 9 above, 111.

[32] L. Parola, P. Merati and G. Gavotti, n 9 above, 685.

[33] A.U. Janssen and F.P. Patti, 'Demistificare gli smart contracts' *Osservatorio del diritto civile e commerciale*, 31 (2020).

[34] E. Battelli, n 9 above, 681.

[35] M. Maugeri, n 9 above, 1142.

extremely difficult to envisage a temporary remedy,[36] for example, in the case of an illicit contract, unless a self-destruct function of the smart contract has been included from the beginning.

This issue also affects liability profiles. In this regard, some legal theories have, in fact, observed how the characteristics of blockchain and smart contracts make it impossible to control illegal activities carried out by users of the network, as the manager of a blockchain cannot intervene to remove an illicit contract from the nodes.[37]

It is also necessary to ask ourselves what the possible safeguards are in the case of errors in data entry, which according to the garbage-in, garbage-out mechanism are repeated in all the network nodes. These errors cannot be altered, and identifying the responsible party would be difficult. Some theorists have noted that regarding blockchain technology, reference should be made to a regulation based on the objective nature of the responsibility of the creator-operator of the platform, in order to have a more reasonable and efficient approach to risk-taking, as well as to boost user confidence in the target market.[38] According to this argument, the fact that the operator does not have control of the transactions carried out on the platform would exclude rules based on culpability. Consequently, the operator of the platform will then be responsible for the damages caused to users.

However, it should be noted that this can easily be envisaged in the case of private permissioned blockchain, where it is possible to identify the entity that exercises a control function. Whereas the public permissionless blockchain is an autonomous system, without an entity in charge of the control, and it would be difficult to identify the responsible subject. This topic is linked to another important issue, relating to the friction between the structure of BLT, especially of the permissionless public blockchain, with the protection of personal data and privacy. This type of technology does not, in fact, allow the identification of the data controller to whom the user would be able to turn for the removal of data.[39]

V. Non-Fungible Tokens: Juridical Nature

Now that the essential characteristics and major legal issues of blockchain and smart contracts have been examined, we must focus on the legal issues around

[36] On smart contracts' rigidity, J.M. Sklaroff, 'Smart Contracts and the Cost of Inflexibility' 166 *University of Pennsylvania Law Review*, 279, 263-603 (2017); M. Giancaspro, 'Is a 'Smart Contract' Really a Smart Idea?' *Computer Law & Security Review*, 1-23, (2017).

[37] L. Buonanno, 'La responsabilità civile nell'era delle nuove tecnologie: l'influenza della blockchain' *Responsabilità civile e previdenza*, 1418-1627 (2020).

[38] ibid

[39] On this topic, A.M. Gambino and C. Bomprezzi, 'Blockchain e protezione dei dati personali' *Il diritto dell'informazione e dell'informatica*, 619 -646 (2019); R. Belen-Saglam et al, 'A systematic literature review of the tension between the GDPR and public blockchain systems' *Blockchain: Research and Applications*, 1-64 (10 January 2023).

non-fungible tokens.

As already mentioned, an NFT is a series of encrypted data recorded on a blockchain associated with a certificate of authenticity.[40]

Different types of NFTs have been identified, such as asset tokens, which confer a specific right on a tangible or intangible asset; utility tokens, which guarantee an exclusive right of access to goods or services on a given blockchain platform; security tokens, which represent the ownership of a group of assets and give holders rights comparable to those of financial instruments.[41] There are, therefore, different types of tokens that perform various functions.

Non-fungible tokens guarantee the media file's authenticity, which would otherwise be endlessly playable. In the case of digital artwork, a unique value identification code, which is associated with a smart contract, is registered on the blockchain and contains information on the authorship of the work and the payment of royalties to the author.

Due to the characteristics of this technology already examined, the circulation of a non-fungible token on the blockchain takes place transparently and therefore leaves a trace of any change of ownership.

Non-fungible tokens have created a new market in the digital world, which has led to several reflections from a legal point of view.

There are many legal issues related to this type of asset, and they primarily concern identifying of their juridical nature.[42] US legal doctrine qualifies the NFT as digital personal property,[43] affirming the need to treat the non-fungible tokens as items of actual personal property, with the subsequent applicability of the regulation of the sale of personal property, in such a way as to clearly distinguish the legal situation relating to NFTs from that relating to licenses on intellectual property. In fact, according to this theory, property regulation is better suited to how non-fungible tokens are used, as the owner can enjoy and dispose of them without any external interference. This would conflict with the online intellectual property license model, where the owner of a work's intellectual property rights can decide how the copyright can be used or sold.

This approach is shared, for example, by the High Court of the United Kingdom in *Osbourne* v *Persons Unknown and Ozone Inc.* (Opensea), which ruled that non-fungible tokens 'are to be treated as property as a matter of English law'.[44]

[40] Q. Wang et al, n 6 above.

[41] *EuBlockchain Observatory and forum* Report, 2021, 2, *eublockchainforum.eu*; F. Annunziata, 'Speak if you can: what are you?' n 4 above.

[42] P. Carrière, n 5 above; G. Nava, n 3 above, 267; E. Damiani, 'Cripto-arte' n 3 above, 356; A. Alpini, 'NFT and NFTed artworks' n 1 above; Ead, 'Dalla 'platform economy' alla 'clout economy' n 3 above. G. Vulpiani, 'NFTs e cryptofashion' n 3 above, 54; C. Iorio, 'Artwork circulation' n 3 above, 13; A. Guaccero and G. Sandrelli, n 3 above, 841.

[43] S. Reis, 'Toward a Digital transfer doctrine? The first sale doctrine in the digital era' 109 Northwestern University Law Review, 173-207 (2015); M.J. Fairfield, 'The law of non-fungible tokens and unique digital property' 97 *Indiana Law Journal*, 1261 (2022).

[44] *Osbourne* v *Persons Unknown & Anor* [2022] EWHC 1021 (Comm), available at

Osbourne arises from the theft of two NFTs from the applicant's crypto wallet, which therefore required the judge to 'freeze' the crypto-assets stolen and to order the platform operated by Ozone Network, ie Opensea – a well-known NFT trading platform – to provide information to identify the accounts that controlled the wallets to which the stolen NFTs had been transferred.[45]

Consistent with other cases concerning cryptocurrency fraud, the Court found that the non-fungible tokens were localized near the owner's domicile, and therefore in England, because NFTs can be considered 'as property' It is also interesting to note that the Court ruled that compensation for damage would not have been an appropriate remedy, given the particular nature of the non-fungible tokens, 'which have a particular, personal and unique value to the claimant which extends beyond their mere Fiat currency value'. It is, therefore, appropriate to grant the injunction, to avoid the risk that crypto-assets are transferred

> 'through multiple different accounts at great speed, and in a way which will make it practically either very difficult or possibly even impossible, for the claimant to trace and retrieve her assets'.

However, some Italian legal theory has drawn attention to the fact that the classification of non-fungible tokens as assets *ex* Art 810 Civil Code[46] would, in any case, leave the question of the definition of the situation of ownership unaffected, as the discipline of dual alienation and possession of property is inapplicable.[47]

According to a different theory, non-fungible tokens could be classified as atypical debt securities, attributable to the documents of legitimation used to identify

https://tinyurl.com/2s3k5r9c (last visited 20 September 2023). See also Supreme Court of Singapore, *Janesh s/o Rajkumar* v *Unknown Person* [2022] SGHC 264. On this judgment, see P. Mezei, Hop up the Roller Coaster- New Hopes for digital Exaustion? *GRUR International*, 71(11), 1017–1018, (2022),

[45] The judgement says that 'Ozone has no presence in the English jurisdiction, and therefore the ability of the Court to enforce any order it makes against Ozone is, by definition, a limited one, and the Court will decline to make orders which are, by their nature, futile'.

[46] On this topic, P. Perlingieri, *Introduzione alla problematica della proprietà* (Napoli: Edizioni Scientifiche Italiane, 1971), 37; V. Zeno Zencovich, 'Cosa' *Digesto Discipline privatistiche, sez. civ*. (Torino, UTET, 1989), IV, 438; G. De Nova et al , *Dalle res alle new properties* (Milano: Giuffrè, 1991); A. Zoppini, 'Le "nuove proprietà" nella trasmissione ereditaria della ricchezza (note a margine della teoria dei beni)' *Rivista di diritto civile*, 185-248 (2000); O. Clarizia, 'Il diritto di proprietà dal codice civile alle nuove forme di appartenenza' in S. Pagliantini et al eds, *Scritti in onore di Marco Comporti*, (Milano: Giuffrè, 2008), 787; U. Mattei, 'Proprietà (nuove forme di)' *Enciclopedia del diritto*, Annali (Milano: Giuffrè, 2012), V, 1118; G. Resta, *Nuovi beni immateriali e numerus clausus dei diritti esclusivi* (Torino: UTET, 2010); F. Piraino, 'Sulla nozione di bene giuridico in diritto privato' *Rivista critica del diritto privato*, 459-494 (2012). See also C. Camardi, 'Proprietà, appartenenza e processo di oggettivazione dei beni. Suggestioni a partire dalla «Introduzione alla problematica della proprietà» di Pietro Perlingieri' in G. Carapezza Figlia, G. Frezza and P. Virgadamo eds, *A 50 anni dalla «Introduzione alla problematica della proprietà* (Napoli: Edizioni Scientifiche Italiane, 2021), 63.

[47] E. Damiani, 'Cripto-arte' n 3 above, 359.

the person entitled to the service since the contract is formed in a separate act.[48] According to this reconstruction, an NFT does not incorporate the digital content transferred between the parties. Still, it represents only a computer sequence subjected to a hashing process and some algorithmic properties of the token. This certificate is then uniquely connected via a link to an off-chain site where the digital product, an object of the transaction, is stored. Additionally, the smart contract is limited to executing the contractual provisions governed by the parties in separate natural language contracts. Therefore, the NFT would not incorporate any rights, but would result in an enabling title allowing access to digital content. This approach leads the NFT to a 'digital key' that allows access, for instance, to the 'hotel room booked on the basis of a natural language contract with the manager of the accommodation facility', allowing those identified as entitled to benefit from the digital content.

Another approach defines the non-fungible tokens as financial products, with the consequent applicability of the regulation contained in decreto legislativo no 58/1998 (TUF).[49]

Given the possibility of identifying different types of tokens that perform different functions, identifying the legal nature of non-fungible tokens is not a simple matter. It requires a case-by-case approach, as suggested by the European Union, to identify the most suitable discipline for protecting the interests involved. Although for some types of NFTs, their qualification as digital properties seem simple, other NFTs make this classification more problematic. Take, for example, the use of NFTs for the service of judicial documents, recently permitted by some courts in the United States and the United Kingdom.

VI. NFTs and Succession Law

The issue of the juridical nature of NFTs also becomes relevant regarding the *mortis causa* transmissibility of these assets.

In general, the mortis causa succession of digital heritage is a complex issue,[50]

[48] G. Nava, n 3 above, 269.

[49] P. Carrière, n 5 above.

[50] A. Zoppini, n 46 above, 185; M. Martino, 'Le «nuove proprietà', in G. Bonilini ed, *Trattato* delle successioni e donazioni (Milano: Giuffrè, 2009), 355; D. Corapi, 'La trasmissione ereditaria delle c.d. «nuove proprietà»' *Famiglia, Persone e Successioni*, 379-383 (2011); M. Cinque, 'La successione nel «patrimonio digitale»: prime considerazioni' *Nuova giurisprudenza civile commentata*, I, 645-655 (2012); Ead, 'L'«eredità digitale» alla prova delle riforme' *Rivista di diritto civile,* 72-100 (2020); V. Zeno-Zencovich, 'La successione nei dati personali e nei beni digitali' *Rivista giuridica sarda*, 448-453 (2014); G. Resta, 'La «morte digitale»' in Id, *Dignità, persone, mercati* (Torino: Giappichelli, 2014), 375; Id: 'La successione nei rapporti digitali e la tutela post-mortale dei dati personali' *Contratti e impresa*, 85-105 (2019); L. Lorenzo, 'Il legato di password' *Notariato*, 147-151 (2014); Id, 'L'eredità digitale' *Notariato*, 138-153 (2021); A. Magnani, 'L'eredità digitale' *Notariato*, 519-532 (2014) and Id: 'Il patrimonio digitale e la sua devoluzione ereditaria' *Vita notarile*, 1281-1307 (2019); S. De Plano, 'La successione a causa di morte nel patrimonio

which brings with it the need to coordinate the traditional provisions on succession not only with the particular nature of certain digital assets, which include a plurality of very different situations united by the characteristic of immateriality, but also with the protection of personal data and privacy of the *de cuius*.[51]

A preliminary reflection on the content of the will is necessary, setting aside the idea that it must be an act with exclusively patrimonial content and that the atypical content can only be that which is legally established;[52] this would be ill-suited to the current value system of the legal order and the implementation of the interests of the person. There is, therefore, no doubt that in the will a subject can provide for the succession in his digital heritage, whether or not the content is patrimonial; the problem concerns the concrete modalities of transmission of such a heritage.

Some legal theories consider it appropriate to distinguish between personal digital goods,[53] which assume a moral, affective value, such as emails or

digitale'. in C. Perlingieri and L. Ruggieri eds, *Internet e diritto civile* (Napoli: Edizioni Scientifiche Italiane, 2015), 427; C. Camardi, 'L'eredità digitale. Tra reale e virtuale' Il *diritto dell'informazione e dell'informatica*, 65-93 (2018); D. Marino, 'La successione digitale' *Osservatorio deldiritto civile e commerciale*, 165-202 (2018); S. Nardi, 'Volontà oltre la morte e rapporto contrattuale' (Napoli: Edizioni Scientifiche Italiane, 2019), 77; Id, 'Successione digitale e successione nel patrimonio digitale', in E. del Prato ed, *Le successioni* (Bologna, Zanichelli, 2020), 592; F.P. Patti and F. Bartolini, 'Digital Inheritance and Post Mortem Data Protection: The Italian Reform' *European Review of Private Law*, 1181-1193 (2019); F. Mastroberardino, *Il patrimonio digitale* (Napoli: Edizioni Scientifiche Italiane, 2019), 169; I. Maspes, 'Successione digitale, trasmissione dell'account e condizioni generali di contratto predisposte dagli Internet Services Providers' *Contratti*, 583-590 (2020); Ead, 'Morte digitale e persistenza dei diritti oltre la vita della persona fisica' *Giurisprudenza italiana*, 1601-1609 (2021); Ead, 'Digital Inheritance, Right of the Heirs to Access to the Deceased User's Account, Non-Transferability Clauses: An Overview in the Light of Two Judgments Issued by Italian Courts' *The Italian Law Journal,* 408-423 (2022); A. Spatuzzi, 'Patrimoni digitali e vicenda successoria' *Notariato*, 402-409 (2020); A. Vesto, *Successione digitale e circolazione dei beni online. Note in tema di eredità digitale* (Napoli: Edizioni Scientifiche Italiane, 2020); A. D'Arminio Manforte, *La successione nel patrimonio digitale* (Pisa: Pacini editore, 2020); R.E. De Rosa, 'Trasmissibilità mortis causa del patrimonio digitale' *Notariato*, 495-510 (2021); F. Pinto, 'Sulla trasmissibilità mortis causa delle situazioni giuridiche soggettive digitali' *Rivista del notariato*, 701-718 (2021); V. Confortini, 'L'eredità digitale (Appunti per uno studio)' *Rivista di diritto civile*, 1187-1200 (2021); A. Spangaro, 'La successione digitale: la permanenza *post mortem* di aspetti della personalità' *Giurisprudenza italiana*, 1365-1370 (2022). See also U. Bechini, 'Password, credenziali e successione *mortis causa'* - Studio del Consiglio Nazionale del Notariato n. 6-2007/IG, available at https://tinyurl.com/ywc82r6c (last visited 20 September 2023).

[51] F. Trolli, 'La successione *mortis causa* nei dati personali del defunto e i limiti al loro trattamento' *Jus civile*, 313-342 (2019); A.A. Mollo, 'Il diritto alla protezione dei dati personali quale limite alla successione mortis causa' *Jus civile*, 430-454 (2020).

[52] On this topic, G. Giampiccolo, *Il contenuto atipico del testamento* (Milano: Giuffrè, 1954), 12; A. Cicu, *Il testamento* (Milano: Giuffrè, 1942), 13; L. Barassi, *Le successioni per causa di morte* (Milano: Giuffrè, 1947), 303; C. Gangi, *La successione testamentaria nel vigente diritto italiano* (Milano: Giuffrè, 1962), I, 27; V. Cuffaro, 'sub art. 587', in Id and F. Delfini eds, *Delle successioni*, in E. Gabrielli ed, *Commentario del codice civile*, II (Torino: UTET, 2010), 168; V. Barba, 'Interessi post mortem tra testamento e altri atti di ultima volontà' *Rivista di diritto civile*, 340-349 (2017); E. Damiani, 'Il contenuto atipico del testamento', in E. del Prato ed, *Le successioni* (Bologna: Zanichelli, 2020), 339.

[53] F. Mastroberardino, n 50 above, 126; A. Spatuzzi, n 50 above, 402.

photographs, annotations of personal ideas and thoughts, and digital assets, characterized by their economic value, such as, for example, a bitcoin wallet or a work of crypto-art NFT or a crypto-fashion item. Other authors consider this distinction only possible in the abstract, since, in practice, a digital good can fall into both categories simultaneously.[54]

It is also possible to distinguish between online digital goods, existing only in the network, and offline goods, those stored on physical media (a hard disk, a flash drive). The latter do not pose particular problems since the content of the media can be freely transmitted *mortis causa*. More complex, however, is the issue of the transmission of digital assets online, whether it is personal assets, cryptocurrencies, or NFTs.

In these cases, service contracts with providers (social networks, other platforms) are also involved, as well as issues related to the protection of personal data. For example, in a well-known case heard by the Probate Court of Oakland County of Michigan, the Court ordered Yahoo, a service provider, to disclose the electronic correspondence of Marine who disappeared in Iraq to the Marine's parents. This occurred despite the general conditions of use established by Yahoo in the event of owner's death, namely the cancellation of the email account, and deletion of its content. The platforms have tried to contain the problem by providing in the contractual clauses the possibility for the holder to decide what will happen to his account after his death. Facebook, for instance, allows the user to decide whether to have the account permanently deleted or to appoint a legacy contact to manage the account in commemorative mode.[55] In the latter case, the legacy contact, to whom Facebook provides credentials other than the original ones for accessing the memorial account, can only perform a series of actions (write a post, update the profile image) but cannot access the original account or the messenger conversations of the deceased subject. In this regard, there are two interesting jurisprudential cases, one dealt with in Germany in July 2018,[56] and the other decided by the Court of Milan in 2021.[57]

[54] G. Resta, 'La successione nei rapporti digitali' n 50 above, 85.

[55] On this topic, V. Barba, n 52 above, 341. S. Nardi, 'Successione digitale' n 50 above, 597.

[56] 'Bundesgerichtshof, 12 July 2018, III ZR 183/17' *Nuova giurisprudenza civile commentata*, 691-708 (2019), annotated by R. Mattera, 'La successione nell'account digitale. Il caso tedesco'. On this topic S. Delle Monache, 'Successione mortis causa e patrimonio digitale' *Nuova giurisprudenza civile commentata*, I, 461-468 (2020).

[57] Tribunale di Milano 10 February 2021 *Famiglia e diritto*, 622 (2021), annotated by F. Mastroberardino, 'L'accesso agli account informatici degli utenti defunti: una prima, parziale, tutela. See also V. Putortì, 'Patrimonio digitale e successione mortis causa' *Giustizia civile*, 163-193 (2021); A. Vigorito, 'La 'persistenza' postmortale dei diritti sui dati personali: il caso Apple' *Il diritto dell'informazione e dell'informatica*, 27-47 (2021); S. Bonetti, 'Dati personali e tutela post mortem nel novellato codice privacy: prime applicazioni' *Nuova giurisprudenza civile commentata*, I, 557-565 (2021); G. Resta, 'L'accesso *post mortem* ai dati personali: il caso Apple' *Nuova giurisprudenza civile commentata*, 678-680 (2021); A. Maniaci and A. D'Arminio Monforte, 'La prima decisione italiana in tema di 'eredità digitale': quale tutela *post mortem* dei dati personali?' *Corriere giuridico*, 658-670 (2021); I. Maspes, 'Morte "digitale" ' n 50 above, 1601.

The first case concerned the request by parents to access their daughter's Facebook account after their daughter died in a tragic accident in the Berlin subway. At the time of the request, the account was already turned into a commemorative mode and, according to Facebook, no longer accessible. Facebook also asserted the non-transmissibility *mortis causa* of the account, in addition to the non-disclosure to third parties of the data stored in the user's profile according to the legislation on processing personal data. The request by the girl's parents was granted in the court of first instance and denied on appeal. The judgment was again overturned by the German Federal Court of Justice which ruled that the heirs of the account holder are entitled to access the account itself, as they automatically assume the position of the deceased subject in all aspects related to it, including, the contract entered into by the deceased with the social network; a contract that cannot be defined strictly personal. According to the last Court, moreover, the chosen solution would not even conflict with the EU Regulation no 2016/679 (General Data Protection Regulation).

This perspective could be considered applicable if the deceased has decided nothing in concerning the fate of their digital assets.

The case dealt with by the Court of Milan concerned an appeal against Apple. The parents of a deceased young chef requested access to his iPhone data to recover photos, videos, personal notes and recipes to create a collection in memory of their son. Apple denied their request, and to establish legitimate consent to access the cloud, as defined by US law (the Electronica Communications Privacy Act), Apple requested a court order specifying that the deceased owned all accounts associated with the Apple ID and that the family members were administrators or legal representatives of the *de cuius*. Now, it is necessary to clarify that in our legal system, the question of the succession of digital heritage is dealt with at a regulatory level, only within the Decreto Legislativo no 196/2003 Art 2-*terdecies* on the protection of personal data of deceased persons, added by Decreto Legislativo August 10, 2018, no 101,[58] which adapts national legislation to the provisions of the GDPR. The article provides that the rights referred to in Arts 15-22 of the Regulation, referring to personal data concerning deceased persons, may be exercised by those with a personal interest or act to protect the data subject as his agent or for family reasons worthy of protection. However, the exercise of these rights may be expressly prohibited by a revocable written declaration by data subject submitted to the data controller. In the present case, the Court of Milan, referring both to the GDPR and to Art 2-*terdecies*, upheld the appeal, stating that in the absence of any legally expressed opposition by the son, the parents' request to access their son's photos, videos, and recipes for the purpose of creating a collection that keeps

See also Tribunale di Bologna 25 November 2021, *Famiglia e diritto*, 710-721 (2021), annotated by A. Vignotto, 'La successione digitale alla luce delle prime pronunce giurisprudenziali italiane'.

[58] On this topic, V. Cuffaro, 'Quel che resta di un codice: il d.lgs. 10 agosto 2018, n. 101 detta le disposizioni di adeguamento del codice della privacy al regolamento sulla protezione dei dati' *Corriere giuridico*, 1181-1185 (2018).

his memory alive, is a legitimate interested protected by Italian law. According to Italian law, this allows the surviving members access to the personal data of the deceased. Moreover, the Court of Milan stated that a family reason worthy of protection cannot be made subject to requirements, such as those required by Apple, which introduce conditions other than those indicated by the Italian legislature and which refer to institutions of a legal order other than the legal system before which the right is being exercised.

As for the transmissibility of cryptocurrencies and NFTs, it should be noted that even in this case, the credentials of access to the wallet are essential. The account, however, implies a contractual relationship between the online service provider and the user, by which the latter can enjoy a service and a virtual environment, the use of which is governed by the contract with the user. Access credentials are, therefore, essential, as they how digital goods are accessed. With regard to NFTs, let us consider the case in which a subject does not plan the delivery of access keys to works of crypto art or property in the metaverse to their heirs. In this instance, the heir could not access these assets. But we must ask ourselves how in practice, a subject can plan the succession *mortis causa* of an NFT or Bitcoin wallet considering the necessary permanence of the secrecy of access keys. In general, some legal theory holds that the provision by which a subject has the credentials of a digital account to transmit its content is qualifiable as a 'legato di specie' (legatum) to atypical content: the so-called 'legato di password'.[59]

While the mere provision of credentials for one's account management would create a postmortem mandate which requires the designated person to perform certain acts, the special provision concerning access credentials does not regard any enrichment of the beneficiary, but only access to an account for the management of certain data. But, this is not the case, for example, with an account that generates profits. In that case, as in the case of the Bitcoin wallet, profits or the asset linked to the account are attributed to the entity. In this case, there could be a provision by way of *legatum* in which the legacy consists of an immediate object (the password) and a mediated object (the content to which the password gives access).[60] This type *legatum* can be considered as a case of *relatio*, constituting the credentials only as a criterion for the identification of the *legatum*'s object. One could speculate that anyone who wants to transfer an NFT to their heir will include this provision in their will, indicating access credentials in a separate document sealed and guarded by another person in charge, who will be obliged to hand them over to the heir indicated in the estate certificate. We also need to ask ourselves what would happen if an individual programmed a smart contract stating that a certain NFT would be automatically transferred to others at the time of his death. In such a case, if it were necessary to recover the asset, all the

[59] L. Di Lorenzo, n 50 above, 144; S. Delle Monache, 56 above, 461. See also U. Bechini, 'Password, credenziali e successione *mortis causa*' n 50 above.

[60] L. Di Lorenzo, n 50 above, 144.

problems already highlighted relating to the rigidity of smart contracts and the blockchain technology's characteristics manifest.

VII. NFTs, Copyright and Trademarks

Although in circulation since 2014, it is from 2021 that non-fungible tokens have established themselves on the market, giving new life to the artistic-creative sector. Among the various questions raised by NFTs, one of the most interesting concerns the possible safeguards in case of copyright infringement.[61]

Let us consider the hypothesis of the minting of an unauthorized work.[62] In this regard, *Quentin Tarantino* v *Miramax* and *Hermès* v *Metabirkin* represent some interesting examples.

The first case arises from a well-known Tarantino's sale of a series of NFTs with cut scenes and exclusive content from the film Pulp Fiction.[63] As a result, the production company of the film, Miramax, sued Tarantino before the United States District Court - Central District of California for breach of contract, copyright infringement, trademark infringement, and unfair competition.[64]

According to Miramax, Tarantino, having sold the film rights to Miramax, could not create and sell NFTs.

According to Tarantino, the sale of non-fungible tokens was a legitimate right under the same contract, in which he retained the possibility of creating internal publications. In response, Miramax dismissed the possibility that NFTs fell under the concept of 'screenplay publications' and argued that they were outside the director's 'reserved rights'. The case resulted in a settlement between the two parties.

[61] On nfts and copyright, P. Liberanome, n 3 above, 93; N. Muciaccian, n 3 above, 839. See also P. Caglayan Aksoy and Z. Ozkan Under, 'NFT e copyright: challenges and opportunities' 16:10 *Journal of Intellectual Property Law & Practice*, 1115-1126 (2021); M.R. Garcia Teruel and H. Simon-Moreno, 'The digital tokenization of property rights. A comparative perspective' *Computer Law and Security Review*, 41, 1-21 (2021); M.D. Murray, 'NFT Ownership and Copyrights' (July 2, 2022), available at https://tinyurl.com/2u6jmtbk (last visited 20 September 2023); A. Alpini, 'NFT and NFTed artworks' n 1 above; A. Guadamuz, 'The treachery of images: non-fungible tokens and copyright The treachery of images: non-fungible tokens and copyright' 16(12*) Journal of Intellectual Property Law & Practice*, 1-19, (2021); B. Bodo et al, n 3 above, 282.

[62] On intellectual property in general, T. Ascarelli, *Lezioni di diritto commerciale. Introduzione* (Milano: Giuffrè 1954), 206; Id, 'Teoria della concorrenza e interesse del consumatore' in *Saggi di diritto commerciale* (Milano: Giuffrè, 1955), 35; G. Oppo, 'Creazione ed esclusiva nel diritto industriale' *Studi in memoria di Tullio Ascarelli* (Milano: Giuffrè, 1969), III, 1419; G. Ferri, 'Creazioni intellettuali e beni immateriali' *Studi in memoria di Tullio Ascarelli* (Milano: Giuffrè, 1969), 288. More recently, E. Fusar Poli, 'Forme giuridiche dell'immateriale. Creazioni dell'intelletto e vis poietica del diritto', in A. Sciumé ed, *Il diritto come forza. La forza del diritto* (Torino: Giappichelli, 2012), 111; M. Stella Richter Jr, 'Tullio Ascarelli e i beni immateriali', in A. Sciumé and E. Fusar Poli eds, *'Afferrare...l'inafferrabile'. I giuristi e il diritto della nuova economia industriale fra Otto e Novecento* (Milano: Giuffrè, 2013), 53.

[63] E. Dieli, 'Tarantino v. Miramax: The rise of NFTS and their copyright implications' *Boston College Intellectual Property & Technology Forum*, 27th June 2022.

[64] *Complaint Miramax, LLC* v *Tarantino*, Case no 2:21-cv-08979 2021 (16th November 2021).

The second case concerns the sale of the Metabirkin, inspired by the Hermès Birkin model, created by Mason Rothschild and sold as NFTs.[65] The famous fashion house Hermès brought Rothschild, the creator of Metabirkin, before the District Court in New York for trademark infringement, although on Rothschild's site there is a disclaimer stating that 'in no way are Metabirkin associated with Hermès'.[66]

In a motion to dismiss, Rothschild argued that he could use the term 'Metabirkin' pursuant to the 1989 *Rogers* v *Grimaldi* case.[67] More specifically, he argued that using the name of a famous trademark connected to a work of art does not constitute an infringement of the trademark, according to the First Amendment, if the name does not mislead with regard to the association with the mark itself. According to Rothschild, the Metabirkin is an autonomous work of art, comparable to the paintings of Andy Warhol's Campbell soups, and their association with the Birkin brand could not mislead anyone. The District Court denied his motion.

Hermès won the lawsuit against Rothschild.[68] The District Court found that Rothschild's NFTs were not protected speech under the First Amendment and ordered Rothschild to pay damages to Hermès for trademark infringement, trademark dilution, and cybersquatting.[69]

At European the level, in the matter of NFTs,[70] the Court of Rome issued its first decision on trademark protection on July 20, 2022.

In this case, Juventus Football Club owned 'JUVE', 'JUVENTUS' and the team's trademark, and requested that the Court prohibit the unauthorized production and marketing by another company of NFT cards depicting a photograph of a former player wearing the Juventus jersey. The main issue concerns the extension to NFTs of the classic brand protection.

The Court of Rome pointed out that the registration of trademarks also pertains

[65] *Hermès International et al* v *Mason Rothschild*, 1:22-cv-00384 (SDNY).

[66] On Rothschild's site there is the following disclaimer: 'We are not affiliated, associated, authorized, endorsed by, or in any way officially connected with the HERMES, or any of its subsidiaries or its affiliates. The official HERMES website can be found at https://www.hermes.com/'.

[67] *Ginger Rogers* v *Alberto Grimaldi*, *Mgm/ua Entertainment Co., and Pea Produzioni Europee Associate, S.R.L.*, 875 F.2d 994 (2d Cir. 1989), United States Court of Appeals, Second Circuit, 5th of May 1989.

[68] *Hermes International et al* v *Rothschild*, Case 1:22-cv-00384-JSR (United States District Court Southern District of New York) Document 144 Filed 8 February 2023, available at https://tinyurl.com/y363u6pa (last visited 20 September 2023).

[69] The jury found the defendant Mason Rothschild liable for trademark infringement, trademark dilution and cybersquatting and awarded Hermès with $110.000 for trademark infringement and trademark dilution and with $23.000 for cybersquatting.

[70] Tribunale di Roma, 20 July 2022, *Diritto & giustizia,* 197 (2022), annotated by V. IAIA, 'La tutela del marchio Juventus si spinge nel metaverso'; *Diritto industriale*, 487-502 (2022), annotated by A. Rainone, 'Uso illecito del marchio altrui sulla blockchain: il principio di neutralità tecnologica e la rivoluzione mancata dei registri distribuiti'; Giustiziacivile.com 16 January 2023, annotated by L. Pandolfelli, 'La tutela del marchio nella creazione e commercializzazione di non-fungible token (NFT)'. On this topic, see also G. Facci, 'Il diritto d'immagine dei calciatori al tempo degli NFT (Non-fungible token)' *Responsabilitò civile e previdenza*, 179-196 (2023).

to 'downloadable electronic publications' and that the Juventus football club itself is active in the field of crypto games and non-fungible tokens. As a result, the creation and marketing of the cards leads to the counterfeiting of Juventus Football Club's brands, concretizing the risk of confusion caused by the identity of the signs used. According to the Court, as the football club operates in the NFT sector, the marketing of NFT cards constitutes a hypothesis of unfair competition as a result of the unauthorized use of other people's trademarks and the appropriation of the merits related to the trademarks used. There is also a danger of damage related to the possible vulgarisation of the trademark and in relation to the infringement of the rights of exploitation of the trademark itself.

It, therefore, seems appropriate to affirm the extension of trademark and intellectual property protection to non-fungible tokens, as an artist who sees their work reproduced in NFT without authorization could sue the person who carried out the unauthorized minting. More complex, however, is the question which also emerges from the Metabirkin case concerning protecting the non-fungible token as an autonomous work of art.

VIII. NFTs: Liability Issues

There can also by many liability issues regarding NFTs which are difficult to solve. For instance, we must reflect upon what would happen in the case of a subject that purchases a work of crypto art, but in reality, after payment, receives only a jpeg file not linked to an NFT or an NFT different from the one they intended to buy.

Now, we are in the field of contractual liability, so, in applying the sales rules, the purchaser could invoke the termination of the contract and the return of the price for the sale of *aliud pro alio,* in addition to compensation for the damage. The difficulty may lie, in identifying the alienating subject, given the pseudonym of the blockchain. Here, we find the issues related blockchain accountability, as examined above.

At that point, the buyer could sue the platform where the NFTs were put on sale, asking for the seller's identification, as happened in the case of the stolen NFTs examined by the United Kingdom Supreme Court.

Another issue could be the following: in theory, given the characteristics of the blockchain outlined above, NFTs could overcome the traditional problems concerning the certification of the authenticity and origin of the work. However, this would be reliable only if the initial information recorded on blockchain were true, as these technologies are limited to recording what is entered, not certifying its veracity.

However, it must be pointed out that NFTs could also be used to enhancement the cultural heritage, for example, by selling fractions of NFTs reproducing a work of art.

Given the success they are experiencing, the NFT phenomenon, although

considered by some as an ephemeral bubble, represents a turning point in the creative market, but as discussed in this article there are many juridical issues that must be taken into account.

In this regard, in the absence of specific legislation, jurists can only rely on a case-by-case interpretation to protect the interests of individuals. Of course, it is the legislator who can find a uniform solution, and we can only hope for an intervention that balances interests between the need for rapid adaptation of laws to technological evolution and their fundamental certainty and stability.