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THE RISE OF NFTS: THESE AREN'T THE DROIDS YOU'RE LOOKING FOR

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Abstract: Non-fungible tokens (NFTs) are hailed as revolutionary tools that will empower artists and revolutionize copyright management and remuneration. This article explores their copyright relevance, and it describes how copyright might apply in relation to NFT creation and trading. In doing so, it provides an overview of the ecosystem of actors built around NFTs, and it analyzes the role of these actors according to the European copyright normative framework.

Key words: Non-fungible tokens, blockchain, copyright, digital art

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1. Introduction

From relative obscurity before 2020, public awareness of non-fungible tokens (NFTs) has risen dramatically. This has come about following their use in connection with the transaction of different types of digital content (including artworks), often for exorbitant amounts. The constant online news stream on NFTs is hard to miss, as illustrated by coverage in the New York Times,[2] BBC,[3] The Guardian,[4] CNN,[5] Wired,[6] The Verge,[7] the MIT Technology Review,[8] and even on Saturday Night Live,[9] to name but a few examples. It is perhaps unsurprising that "NFT" was named "word of the year" for 2021 by the Collins dictionary[10] and that ERC-721, the technical specification behind NFTs, has been placed on top of the ArtReview's Top 100 list of the contemporary artworld's most influential players[11].

It is difficult to point to a single justification for the NFT mania. Beyond the observations that it has coincided with the COVID-19 pandemic, and that it constitutes a novel type of blockchain-based experimentation and asset diversification[12], partly enabled by relatively recent standardization efforts (see below), it is probably too early to tell.

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[2] Scott Reyburn: Art's NFT Question: Next Frontier in Trading, or a New Form of Tulip?, The New York Times, March 30, 2021. <https://www.nytimes.com/2021/03/30/arts/design/nft-bubble.html>

[3] What are NFTs and why are some worth millions?, BBC News, September 23, 2021 <https://www.bbc.com/news/technology-56371912>

[4] James Ball: How non-fungible tokens became the latest tech speculation bubble, The Guardian, March 13, 2021 <https://www.theguardian.com/technology/2021/mar/13/how-non-fungible-tokens-became-the-latest-tech-speculation-bubble>

[5] Rishi Iyengar and Jon Sarlin: NFTs are suddenly everywhere, but they have some big problems, CNN Business, March 30, 2021 <https://edition.cnn.com/2021/03/30/tech/nft-hacking-theft-environment-concerns/index.html>

[6] Gregory Barber: NFTs Are Hot. So Is Their Effect on the Earth's Climate, WIRED, March 6, 2021 <https://www.wired.com/story/nfts-hot-effect-earth-climate/>

[7] Mitchell Clark: NFTs, explained, The Verge, August 18, 2021 <https://www.theverge.com/22310188/nft-explainer-what-is-blockchain-crypto-art-faq>

[8] Abby Ohlheiser: Some artists found a lifeline selling NFTs. Others worry it's a trap, MIT Technology Review, March 25, 2021 <https://www.technologyreview.com/2021/03/25/1021215/nft-artists-scams-profit-environment-blockchain/>

[9] See <https://twitter.com/nbcsnl/status/1376032888764960769?s=20>.

[10] See <https://blog.collinsdictionary.com/language-lovers/get-your-crypto-at-the-ready-nfts-are-big-in-2021/>

[11] See full list: < https://artreview.com/power-100?year=2021> Accessed 15 January 2021

[12]Listen here: <https://podcasts.apple.com/us/podcast/mint-burn-episode-8-nfts-as-new-markets-prof-jason/id1539371172?i=1000513229135>

Nevertheless, reports on NFTs range between two extremes. On the one hand, they are hailed as potentially revolutionary tools to empower artists, improve their remuneration, disintermediate and reshape the digital arts market. On the other hand, they are viewed as the latest example of the numerous structural challenges associated with blockchain-based technologies: their (potential and actual) use for fraudulent or at least speculative purposes,[13] their disproportionately negative effects on the environment[14], and the uncertainties, misinformation and often outright deception around the relationship of NFTs and the legal rights on the tokenized asset, in this case the copyright ownership and rights to the tokenized artworks.

When Chris Torres, the Nyan Cat gif creator, published its corresponding token on the Foundation platform to celebrate the ten-year anniversary of the success gif, he could not have foreseen that the final selling bid would reach 300 ETH (about $590,000) on February 19, 2021.[15] Since then, high profile NFT transactions and auctions are being carried out at the speed of light for a variety of digital objects, covering a broad spectrum of creative expression. To name a few prominent examples: a tokenized version of Jack Dorsey's first tweet was sold on the Valuables platform for 1630 ETH (almost $3 million);[16] Ross Ulbricht's "Genesis NFT Collection" -tokenizing his artwork created in prison- sold for almost $6 million[17]; digital artist Beeple has sold multiple NFT digital art pieces, including the piece "Everydays – The First 5000 Days" for an astounding $69.3 million in a Christie's online auction (then the third-highest auction price for a living artist's work);[18] a New York Times column was tokenized and sold on the Foundation

[13] Ben Munster: NFT art bubble? 2017 crypto bust could spell out the future of current boom, The Art Newspaper, March 31, 2021

[14] Justine Calma: The climate controversy swirling around NFTs, The Verge, March 15, 2021 <https://www.theverge.com/2021/3/15/22328203/nft-cryptoart-ethereum-blockchain-climate-change>. NB The environment impact of blockchain technologies is not the focus of this paper.

[15] See <https://foundation.app/@NyanCat/~/219>.

[16] See <https://v.cent.co/tweet/20>.

[17] For more details on the collection, see <https://freeross.org/genesis-collection/>. The auction was facilitated by the SuperRare platform: <https://superrare.com/artwork-v2/ross-ulbricht-genesis-collection-30841>

[18] Scott Reyburn: JPG File Sells for $69 Million, as 'NFT Mania' Gathers Pace, The New York Times, March 11, 2021 <https://www.nytimes.com/2021/03/11/arts/design/nft-auction-christies-beeple.html>.

platform for 350 ETH (about $623,014)[19]; or Bored Ape Yacht Club NFTs are sold in the value of six-digit US dollars[20].
In the music sector, NFT transactions by the artist Grimes[21] and the band Kings of Leon[22] (offering, for example, seats for future tours and vinyl records) have been highly publicized, but many more examples exist[23]. Other illustrations include the sale of digital collectibles by the project NBA TopShots[24] and the *resale* of different types of digital files, such as Beeple's crypto artwork "Crossroads"[25] or the now famous "Homer Pepe" digital card[26]. Recently, the decision to dismantle the controversial "Vessel"[27] was followed by an announcement that a digital rendering of the design will be minted and auctioned as an NFT[28]. In contrast, when the popular director Quentin Tarantino announced that he would be proceeding to minting an NFT of his hand-written script of the movie Pulp Fiction, the producing company Miramax filed a lawsuit against the director[29].

Because much of the digital content linked to NFT transactions relates to creative expression, the question arises of how to consider NFTs from the perspective of

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[19] See <https://foundation.app/@kevinroose/~/13129>.

[20] Ambrose Leung: Steph Curry Just Bought a Bored Ape Yacht Club NFT for $180,000 USD Worth of ETH, Hype Art, August 30, 2021, <https://hypebeast.com/2021/8/stephen-curry-bored-ape-yacht-club-nft-55-ethereum-purchase>; Ambrose Leung: Future Just Dropped $200,000 USD on Bored Ape Yacht Club NFT #4672, Hype Art, November 28, 2021, <https://hypebeast.com/2021/11/future-bored-ape-yacht-club-nft-200k-usd-49-eth-purchase>.

[21] Alex Hern: Grimes sells digital art collection for $6m, The Guardian, March 2, 2021 <https://www.theguardian.com/music/2021/mar/02/grimes-sells-digital-art-collection-non-fungible-tokens>.

[22] See <https://opensea.io/assets/0x557430421f8f3ed0a92aca211f1c05ad7b606288/0>.

[23] Tatiana Cirizano: Tracking Music's NFT Gold Rush: A Timeline of Recent, Record-Breaking Sales, Billboard Pro, March 5, 2021, <ttps://www.billboard.com/pro/nft-music-gold-rush-sales-timeline-grimes-3lau/>

[24] See <https://nbatopshot.com/>.

[25] Joel Stonington and Kevin Reilly: We talked with Beeple about how NFT mania led to his $69 million art sale, Business Insider, March 15, 2021 <https://www.businessinsider.com/beeple-nft-mike-winkelmann-digital-art-christies-2021-3>.

[26] Chris Williams: Rare Homer Simpson Pepe NFT Sells for $320,000, CryptoBriefing, March 2, 2021 <https://cryptobriefing.com/rare-homer-simpson-pepe-nft-sells-320000/>.

[27] See <https://en.wikipedia.org/wiki/Vessel_(structure)>.

[28] Hakim Bishara: Hudson Yards Vessel to Be Dismantled and Sold as NFT, Hyperallergic, April 1, 2021 <https://hyperallergic.com/632718/hudson-yards-vessel-to-be-dismantled-april-1/>.

[29] Raustiala, K. & Srigman, C. (2021), Guest Column: Tarantino vs. Miramax — Behind the NFT 'Pulp Fiction' Case, and Who Holds the Advantage, The Hollywood Reporter, November 24, 2021 (https://www.hollywoodreporter.com/business/digital/tarantino-miramax-pulp-fiction-nft-1235052378/).

copyright law, in particular the EU copyright *acquis*. The concern is particularly relevant in the (digital) art market, where NFTs have taken center stage.[30] The well-established universal Non-Fungible Token standard on the Ethereum network has been partially repurposed in the artworld - without adjusting the standard to copyright relevant applications by, for example, making copyright licensing information mandatory to include in the token description[31] This has created a challenging situation, where, on the one hand, tokenized artworks generate high-priced transactions and are gaining notoriety as financially and artistically independent creations, but on the other hand they leave traditional copyright-related questions and practices unaddressed. Such questions relate to the copyright status of tokenized artworks; the legal relationship of an NFT, the tokenized creative expression, and the intellectual property (IP) rights related to the creative expression. More generally, these questions relate to the applicability of copyright law to this new reality, and to what role it can and should play in determining ownership of NFTs, in structuring NFT transactions (including remuneration), and in resolving liability issues associated with such transactions. Relatedly, it has also become clear that even where copyright law is not explicitly (or correctly) applied to order NFT transactions, it influences the practices surrounding how they are conceptualized and designed. This paper addresses these questions from the perspective of EU copyright law, with a particular focus on NFTs transactions in online platforms.

The paper is structured as follows. After this introduction, we provide a description of what NFTs are and how they are created (2). Then, we explore how NFTs are traded and map the NFT marketplace ecosystem (3). In doing this, we highlight different copyright licensing choices that are determined by the relevant NFT creator and/or the marketplace where the NFT first was created and put on sale. Then, we analyze the application of EU copyright rules to the processes of NFT trading through these different intermediaries (4), followed by a critical reflection on the relationship between copyright norms and code-created norms in NFT trading (5). The paper closes with our conclusions (6).

2. What are NFTs?

Before diving into the intricacies of copyright law, it is important to understand what exactly an NFT is and what type of operations, uses or transactions it

[30] See this recent study mapping NFT market trends: 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). https://doi.org/10.1038/s41598-021-00053-8

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[31] For more details on the Ethereum standard, see the following section. Also, see the specifications here: <https://eips.ethereum.org/EIPS/eip-721>.

enables. NFTs are created through and used in blockchain-based systems[32]. In simple terms, a blockchain is a distributed database that can record any type of information, where a consensus mechanism[33] ensures that each added entry abides by and is consistent with earlier records on that same database. Depending on the type of blockchain, any entity/user that has access to the distributed ledger can inspect and verify all elements recorded on it, and potentially add to the existing records[34].

The basic characteristics of NFTs, as stated in their name, are the following: they are (a) cryptographic tokens of the (b) non-fungible type. Tokens can be defined as "digitally scarce units of value the properties and circulation of which are prescribed via computer code"[35]. Tokens come in different varieties and flavors[36], ranging from coin-related tokens, to securities, assets, shares, etc. The common feature of different types of tokens is that they are computer code constituting a digital representation (of something) registered on a distributed ledger. This digital representation can be — if size permits — the digital object itself, its digital fingerprint (or so-called hash); and most importantly, metadata which both describes the chosen attributes of the tokenized object, as well as a pointer to the real-world object which is tokenized. An example of the latter is Mattereum which aims to provide token-based representations of physical assets without restrictions, to enable[37] the automated transactability of physical objects through their tokenized representations.[38]

One method to ensure the compatible use of tokens across different blockchains is to develop technical standards. Currently common NFTs are based on the ERC721 standard developed for the Ethereum blockchain for generic non-fungible

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[32] Valiente, M.-C. & Tschorsch, F. (2021). Blockchain-based technologies. Internet Policy Review, 10(2). DOI:10.14763/2021.2.1552

[33] See for instance the consensus mechanism explanation provided for the Ethereum blockchain: <https://ethereum.org/en/developers/docs/consensus-mechanisms/>

[34] This mechanism is what produces trust in the reliability of the system and in the accuracy of the information recorded. See Becker, M. & Bodó, B. (2021). Trust in blockchain-based systems. Internet Policy Review, 10(2). DOI:10.14763/2021.2.1555

[35] Ferrari, V. (2020). The regulation of crypto-assets in the EU – investment and payment tokens under the radar. Maastricht Journal of European and Comparative Law, 27(3), 325–342. DOI:10.1177/1023263X20911538

[36] Lee, J.Y. (2019), 'A Decentralized Token Economy: How Blockchain and Cryptocurrency Can Revolutionize Business' 62 Business Horizons 773.

[37] See <https://eips.ethereum.org/EIPS/eip-1523#mandatory-parameters>

[38] Available here: < https://mattereum.com/>

tokens[39] In contrast, domain specific NFTs have also been proposed, such as the Standard for Insurance Policies as ERC-721 Non-Fungible Tokens, which includes mandatory requirements for insurance policy relevant metadata. At the moment, we are not aware of any standards or proposals which prescribe copyright relevant metadata for NFTs.

This brings us to the second feature of NFTs: non-fungibility. Fungible tokens can be replaced by an identical token and can therefore be exchanged with any other item that corresponds to its value. One good example is the bitcoin cryptocurrency[40]: you can freely divide each bitcoin into smaller fragments (i.e., "satoshis") and you can exchange one bitcoin for other (crypto)currencies, usually through the services of an intermediary. Conversely, *non-fungible* tokens are intended to constitute non-divisible tokens, unique and distinguishable representations of a digital or physical asset (e.g., an artwork or a house). In other words, you cannot interchange one NFT with another NFT, nor can you sell parts of it.

As noted, for NFTs to perform their intended function, they require a blockchain-based system. This system provides a technical environment that allows NFT transactions to take place securely. In practice, NFTs are first "minted", meaning that they are created or generated, and such act is recorded on a blockchain[41]. This means, in practical terms, that NFTs are constituted by code (i.e., the smart contract[42]) that is timestamped on the blockchain along with additional information, (i.e., the metadata), which on the one hand points to where the digital object resides, and on the other, describes additional details that might appear relevant to the NFT creator. These details generally include the title, the author, and a description, and they may (but generally don't) also contain copyright-related information. As succinctly put by Guadamuz, "the NFT is not the

[39] Available here: <https://eips.ethereum.org/EIPS/eip-721>. ERC stands for 'Ethereum Request for Comments'.

[40] Pernice, I. G. A. & Scott, B. (2021). Cryptocurrency. Internet Policy Review, 10(2). DOI:10.14763/2021.2.1561

[41] According to Guadamuz, "minting a work as an NFT means that a creator uses a digital work to generate a unique number that is then written into the blockchain in the shape of a smart contract using the ERC-721 standard, and this is done using a unique digital signature that belongs only to the person minting it. In principle, this is what gives the NFT its "scarcity" value, it's supposed to be unique. In reality, anyone can mint as many versions of the same work as one wishes". Guadamuz, A. (2021), The treachery of images: non-fungible tokens and copyright, Journal of Intellectual Property Law & Practice, DOI:10.1093/jiplp/jpab152

[42] De Filippi, P. & Wray, C. & Sileno, G. (2021). Smart contracts. Internet Policy Review, 10(2). DOI:10.14763/2021.2.1549

work itself: it is the metadata file that contains the unique combination of tokenID and contract address"[43].

NFTs can then be the object of transactions, usually using the services of specific intermediaries, which are generally service providers operating as digital marketplaces[44]. All potential subsequent NFT transactions are recorded on the same distributed ledger or blockchain, signaling the respective ownership of the token in question. Both the minting process and ensuing transactions of the NFT will usually be paid in what is called "gas", i.e., the Ethereum-introduced unit of measure based on the computational power needed to perform a specific operation on the Ethereum blockchain[45]. So, even the simple creation of an NFT usually requires funds that will be used to pay for gas. The gas needed for each transaction will vary depending on the congestion of the network. The busier the network, the higher the fees. Overall, authorized currency for performing these operations is decided on a platform level, and these can include stablecoins, cryptocurrency or fiat money.

3. Mapping the NFT space

Once minted, NFTs can then be the object of transactions, which most prominently take place using the services of different intermediary platforms. This results in the rapid (re)intermediation of the NFT space, with an initially diverse, but rapidly consolidating range of providers offering services related to a booming NFT economy. In this section, we provide an overview and mapping of the NFT intermediary ecosystem and applicable EU copyright rules. In doing so, we consider not only EU law instruments but also select platforms' terms and conditions (T&Cs), which help illustrate the type of private ordering that shapes NFT transactions and is relevant for copyright purposes.

3.1. NFT intermediary ecosystem: an overview

The rapid growth of the NFT market has been facilitated by the (still) growing network of actors constituting the current NFT ecosystem. Despite the initial discourse that proclaimed the merits of disintermediation and defined it as a

[43] "It is important to point out that the resulting NFT can contain other information such as the name of the work, the name of the author, the copyright status of the work, and as many other details as one feels like including. The tokenID and the contract address are the most important elements, as they are linked specifically to both the original work and the signature used to generate the token." Guadamuz, A. (2021), The treachery of images: non-fungible tokens and copyright, Journal of Intellectual Property Law & Practice, jpab152, DOI:10.1093/jiplp/jpab152.

[44] For an overview of the digital marketplaces, see Section 3.

[45] See here: <https://ethereum.org/en/developers/docs/gas/>

foundational objective of this technology, there are a number of clearly identifiable intermediary service providers operating within the broader NFT market. These intermediaries facilitate the minting process, determine marketplace rules, define the techno-legal regime for both NFTs and the underlying files or content they refer to. They also enforce the private ordering rules specified in their T&Cs[46], which regulate the daily functioning of the market[47]. These marketplace operators are oftentimes intervening more substantially in these processes, by promoting works on their properties, by enforcing their own originality standards, offering template copyright licenses for the underlying work (in the file the NFT points to), detecting copyfraud[48] and policing minting, as well as deploying notice and action mechanisms to remove or disable access to content that is illegal or in conflict with their T&Cs.

Looking at the most prominent service providers enabling NFT transactions[49], we have identified the following categories of NFT intermediaries according to their function and subject matter interest: (i) platforms that operate as open marketplaces for all minted NFTs; (ii) platforms that operate as collection-based marketplaces; (iii) platforms that operate as curated marketplaces.

As a preliminary remark, it is important to note that all these platforms are dual in nature, to the extent that they run what can be called a front-end and a back-end. At the front-end, they operate like an online marketplace. The OpenSea marketplace, for instance, displays information on countless NFTs that are up for sale[50]. Its function is to publicize all necessary information regarding the object, creator, price, and potentially copyright status of the NFT, and to mediate the transaction with potential buyers. At the back-end, they operate like

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[46] We use here the notion of terms and conditions with a similar meaning to the broad definition in art. 2(q) DSA: "'terms and conditions' means all terms and conditions or specifications, irrespective of their name or form, which govern the contractual relationship between the provider of intermediary services and the recipients of the services."

[47] As will be shown later, there are various instances during which platforms and marketplaces operate based on notice and takedown copyright rules or even enforce bans on specific NFTs. See for instance Guadamuz, A., Platform is Law: The cautionary tale of stolen NFTs, TechnoLlama Blog, (2 November 2021), <https://www.technollama.co.uk/platform-is-law-the-cautionary-tale-of-stolen-nfts>.

[48] See A. Guadamuz, "Copyfraud and copyright infringement in NFTs", Technollama Blog, 14 March 2021, <https://www.technollama.co.uk/copyrfraud-and-copyright-infringement-in-nfts>

[49] See table below, based on the list provided by dappradar: <https://dappradar.com/nft/marketplaces/1>

[50] See for instance: <https://opensea.io/assets/0xb47e3cd837ddf8e4c57f05d70ab865de6e193bbb/1204>

decentralized applications (dApps)[51], which run on a blockchain network. Any marketplace that offers to mint and/or to trade NFTs is necessarily interacting with one or more underlying blockchains and requires the use of a digital crypto wallet[52] for account registration.

(i) Platforms that operate as open marketplaces

Open marketplaces allow anyone to mint or trade (elsewhere minted) NFTs. They are the eBays of the NFT ecosystem. A handful of platforms, such as OpenSea[53], Rarible[54], and Foundation[55] dominate this segment by volume. Several factors appear to drive the growth of these marketplaces. The open, streamlined mining process attracts many often technically inexperienced individual creators or companies. NFTs minted elsewhere can also be easily listed. These factors contribute to the variety and amount of the NFT supply. Such diverse supply attracts many different buyers, concentrating demand. These factors may lead to a vicious circle, and the consolidation of this segment into a few major players in the long run. Category (i) platforms impose the fewest restrictions as regards third-party minted NFTs and distinct types of NFTs. This openness allows them to operate on a larger scale.

(ii) Platforms that operate as collection-based marketplaces

Collection-based marketplaces create, curate, mint, and promote specific, unique NFT based digital collectibles. CryptoPunks, CryptoCats, and NBA TopShots are famous digital collectibles, each tied to its own standalone platform/marketplace. The particularity of these platforms is the *a priori* close control that they perform, which affects platform design decisions such as the application of content recognition[56], the determination of the conditions of entry for interested parties in the marketplace, and the articulation of the community norms destined to govern the behaviour of artists, rightsholders, users, buyers, and sellers. It is important to highlight that this category also covers traditional gallery NFT

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[51] Decentralized applications (dApps) are essentially software applications running on blockchains instead of a single computer.

[52] Wallets are fundamental in blockchain-based transactions. Fundamentally, a wallet is a cryptographic address stored in the blockchain, which refers to its owner through a set of keys that are used to sign every transaction. The wallet can store any type of token. This means that it can hold both cryptocurrencies such as Bitcoin and Ether, and NFTs.

[53] <https://opensea.io/>

[54] <https://rarible.com/>

[55] <https://foundation.app/>

[56] For a definition of "illegal content" that encompasses copyright infringement, see art. 2(g) and Recital # DSA.

marketplaces, such as Sotheby's Metaverse. These spaces operate as the digital equivalent for specialized galleries focusing on commissioning and selling art by select artists.[57]

The hype surrounding NFTs could not have escaped the virtual gaming world, with major platforms proceeding to tokenizing virtual assets that appear in their respective virtual games. These marketplaces have often embedded NFTs in their preexisting platforms. In parallel, new games have been created with a priori tokenized (or tokenizable) characters, features, and assets. Marketplace NFT games like Axie Infinity, Wave Ducks or Gods Unchained (to name a few) are combining traditional in-game trading features with novel tokenized (NFT) trades combined with mode user control over the character development and new asset creation and subsequent trading. The NFTs from these assets can also be traded in open marketplaces of the type identified in category (i).[58]

(iii) Platforms that operate as curated marketplaces

Curated marketplaces' business model hinges on a high degree of curatorial control over the entities that have the right to create, mint, and trade an NFT through their service. Examples of curated marketplaces are platforms like SuperRare, Foundation, and Nifty Gateway. The difference between curated marketplaces and the category of collection-based marketplaces is the fact that these curated marketplaces do not claim exclusive NFT creation and selling privileges. They instead exercise control over the entities that will be allowed to mint NFTs, post and directly sell them. In practice this means that marketplaces like SuperRare have implemented an ex-ante audit mechanism on the types of artists and types of content that can be traded on the platform. Also, they have created dispute resolution mechanisms and community guidelines (as part of their T&Cs) to facilitate ex post copyright enforcement. As with the previous marketplace category, the NFTs traded in curated platforms are also free to appear on open marketplaces identified in category (i).

NFT types in the ecosystem

[57] While many galleries offer and auction NFTs, the creation of a separate platform such as the one from Sotheby's is not a necessary precondition. For instance, Christie's has performed the highest bidding NFT auction for Beeple's artwork named 'Everydays- The First 5000 Days' by using open marketplaces.

[58] See for instance the Axie Infinity collection at the Open Sea marketplace: <https://opensea.io/collection/axie>. Interestingly, the Axie Infinity game became a sensational world hype that started with the promise of big earnings from promotional videos in the Philipinnes. It soon grew exponentially in the country, and then the rest of the world. See Gelo Gonzales, What is 'Axie Infinity' and how is it different from traditional video games?, 23 August 2021, <https://www.rappler.com/technology/gaming/things-to-know-axie-infinity>

Overall, the types of content that are tokenized and traded in any of the platforms are remarkably diverse. There are NFTs of digital art, physical art connected to the digital token, other digital content such as in-game collectibles, memes, videos, and even human body parts.[59] In practice, the open NFT marketplaces [*category (i)*] are facilitating NFT trading associated with any object or type of work, within the confines of the law. However, there appears to emerge a content-specific separation with many popular intermediaries in the NFT ecosystem of *categories (ii)* and *(iii)*. For instance, the NBA TopShot marketplace is only geared towards enabling NBA digital collectibles trading, and MegaCryptoPolis is a game-specific marketplace. These content-specific providers appear to rarely (if at all) interact with each other, but they frequently are featured in open marketplaces such as Rarible and OpenSea.

The type of marketplace is largely defined by the policies around access to content creation and trading, as well as by restrictions placed on the type(s) of work allowed to be featured on each of them. These factors are all relevant in the design of copyright licensing options of the marketplace (if any) and on their subsequent liability obligations. Based on our prior categorization, it can be said that marketplaces of categories (ii) and (iii) keep control of the entry point of NFTs on their platforms. This way, by only enlisting tokenized works of their creation or by creating tightly controlled permission systems around the authors that are permitted in the tokenization and trading of their NFTs, these marketplace categories ensure some clarity over the copyright rules that govern the traded NFTs. Category (i) open marketplaces on the other hand, more clearly remove themselves from tightly controlling the tokenization and trading occurring in their marketplace, and rather govern and enforce copyright rules on their services through their T&Cs, as well as notice and action mechanisms. The effect that these different choices have on copyright management operated by different marketplaces will be elaborated in section 4 below.

3.2. Navigating copyright management terms related to NFTs

There are three types of licensing of rights relevant for NFT creation and trading: (i) the software license on the smart contract, i.e., the code owned by the developer entity; (ii) the copyright license agreement (if any) signaling a shift on the copyright status of the work underlying the traded NFT; and (iii) the license agreement necessary to display the (copy of the) work underlying the NFT as an icon or avatar on the respective marketplace or other social media platforms. Occasionally tokenized art can also be procedurally generated. In this case the relationship between the art generating source code, and the generated artwork

[59] The Polish singer Dorota Rabczewska made a 3D scan of her body, and is selling her body parts as NFTs. See here: <https://dodanft.com/>

also comes to play.[60] This section deals specifically with type (ii), as it is most relevant from the standpoint of copyright law implications. For the rest, it can be said that the software licensing of type (i) is usually an open source or free software license, whose status does not appear to have any further influence on the transaction. The need for a type (iii) license to display the copy of a work associated with an NFT is usually either addressed by the type (ii) copyright[61] or by the platform's T&Cs.[62]

As previously explained (at 2), the technical features of NFTs offer little structural guidance for maneuvering copyright specificities and pose no obligations to include copyright relevant metadata. The tokens at hand may include a copyright license of the tokenized work memorialized in the permanently stored metadata[63], but this is rarely the case. A commonly found method to address copyright uses within NFT trading (if any) is through the voluntary use of licenses. These can be designed on a case-by-case basis by the author trading an NFT, or they can be proposed by the chosen marketplace. In this latter scenario, it is usually the collection-based or curated marketplaces [*categories (ii) and (iii)*] that offer concrete licensing agreements accompanying the traded NFTs. On the other

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[60] See for an interesting example the GenerativeFish project, which tried to tokenize the output of an MIT licensed software. This has met with the disapproval of the software creator and artist, who (despite the permissive software license) successfully blocked the tokenization of the output. See here: <https://twitter.com/GenerativeFish/status/1435271703785926667?s=08> Another notable example is the Botto Project which uses AI and community voting to generate NFTs. See here: <https://botto.com/>

[61] See, for instance, section 3.a of the NFT license: General Use. Subject to your continued compliance with the terms of this License, Creator grants you a worldwide, non-exclusive, non-transferable, royalty-free license to use, copy, and display the Art for your Purchased NFTs, along with any Extensions that you choose to create or use, solely for the following purposes: (i) for your own personal, non-commercial use; (ii) as part of a marketplace that permits the purchase and sale of your NFTs, provided that the marketplace cryptographically verifies each NFT owner's rights to display the Art for their Purchased NFTs to ensure that only the actual owner can display the Art; or (iii) as part of a third party website or application that permits the inclusion, involvement, or participation of your NFTs, provided that the website/application cryptographically verifies each NFT owner's rights to display the Art for their Purchased NFTs to ensure that only the actual owner can display the Art, and provided that the Art is no longer visible once the owner of the Purchased NFT leaves the website/application. Available here: < https://www.nftlicense.org/>

[62] See, for instance, the SuperRare platform's T&C's: <https://www.notion.so/SuperRare-Terms-of-Service-075a82773af34aab99dde323f5aa044e>

[63] See, for instance, the metadata associated to the NFT "Conceptual artist pulling ideas out of his head": As the sole owner of the copyright in the work of art associated with this NFT, I hereby grant to the respective owner of the NFT a non-exclusive, worldwide licence to use, in particular to reproduce, distribute, publicly perform, broadcast and make available, this work of art in unaltered form, as is customary in the museum and exhibition activities of an internationally renowned art museum. Available here: < https://ipfs.io/ipfs/QmWkTTSjJyWUtfPgUrA7XfWPaySiFeFrBhsPK5vZdrPyfq>

hand, open marketplaces do not impose any licensing restrictions on their platforms, but simply purport that NFTs appearing on their platform exclusively or in parallel with other marketplaces are traded under the same licensing provisions that the seller imposed (if any). This means that any type of license can be imported from a different marketplace along with the NFT, and that rightsholders are not constrained in how to license their tokenized works these open marketplaces. This situation has led to many NFTs being minted and traded without any copyright-related information mentioned in the metadata in the token. This puts NFT marketplaces at the forefront of setting and enforcing copyright through their technical design, T&Cs, and daily moderation practices.

A close reading of the licenses that govern NFTs in different marketplaces reveals similarities in the treatment of NFTs on platforms belonging to each of the above *categories (i), (ii) and (iii)*. Open marketplaces like OpenSea tend to highlight their copyright policies on their T&Cs[64]. Category (i) platforms try to steer clear from actually verifying user-provided copyright relevant information, such as checks on originality, authenticity, and other rights necessary to participate in the NFT market. By minting an NFT or by placing an NFT for sale on OpenSea, the user declares that they own the necessary rights related to the art underlying the NFT[65]. In case of conflict, the OpenSea marketplace promises to respond to notices from rightsholders with takedowns of the information at issue or other corresponding actions.[66] It is important to note that despite the global reach of the NFT market, the open marketplaces studied and listed under *category (i)* appear to be US-oriented in their rules and procedures regarding copyright moderation and enforcement.[67]

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[64] For an overview, see §9 of the T§Cs: User information and copyright of the T&Cs. Available <https://opensea.io/tos>

[65] "You represent and warrant that you have, or have obtained, all rights, licenses, consents, permissions, power and/or authority necessary to grant the rights granted herein for any User Information that you submit, post or display on or through the Services. You agree that such User Information will not contain material subject to copyright or other proprietary rights, unless you have necessary permission or are otherwise legally entitled to post the material and to grant OpenSea the license described above". See §9. 'User information and copyright' section of <https://opensea.io/tos>

[66] "OpenSea reserves the right to remove content without prior notice. OpenSea will take down works in response to formal infringement claims and will terminate a user's access to the Services if the user is determined to be a repeat infringer". Available here <https://opensea.io/tos>

[67] See for instance §3.6 of the T&Cs of Rarible: "Takedown Requests. Rarible Company will respond to notices of alleged copyright infringement under the United States Digital Millennium Copyright Act." <https://static.rarible.com/terms.pdf>

See also similar discussion on the Foundation marketplace: <https://help.foundation.app/en/articles/5151857-guide-digital-millennium-copyright-act-or-dmca>

As for collection-based marketplaces [category (ii)], there is a remarkable diversity in licensing copyright-protected content referred to in the NFT. The first thing to notice is the fact that while the open marketplaces are opting for the delicate balance between their large-scale operations and copyright liability risk, these specialized marketplaces are less prone to risk because the platform provider is either the rightsholder of the works associated with the transacted NFT or because they tightly control the parties who are authorized to trade on it. Consequently, the copyright licenses appearing on these marketplaces clearly reflect the relationship between the rightsholder and the tokenized work. To be more precise, when the rightsholder is exclusively the platform provider in question, the copyright licensing will be embedded in the marketplace T&Cs or through inserting a mention of a specific license to the collection of tokenized works. When the rightsholder is expected to be only a marketplace-authorized content creator[68], the marketplaces ensure through their T&Cs that the NFT creator attests to also being the rightsholder for the tokenized work. Subsequently, a license is incorporated by reference in all works through T&Cs of the marketplace[69].

In some instances, special NFT-focused licenses emerged to standardize rights' licensing options. Take, for instance, the NFT license agreement offered by Larva Labs[70], the company behind the Cryptokitties and the CryptoPunks NFT collections sold across all categories of marketplaces. This license agreement, originally drafted for the Cryptokitties collection, grants a worldwide, non-exclusive license to "use, copy, and display the Art" for non-commercial purposes. In parallel, there is a limited license for commercial use offered by the rightsholder "to use, copy, and display the Art for your Purchased NFTs for the purpose of commercializing your own merchandise that includes, contains, or consists of the Art for your Purchased NFTs ("Commercial Use"), provided that such Commercial Use does not result in you earning more than One Hundred Thousand Dollars ($100,000) in gross revenue each year". Note that this license excludes the NFT resale and is limited to revenues that are directly earned by the artwork.[71] There is evidence that other projects use more permissive licenses[72] though rarely embedded in the NFT as a license metadata.

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[68] See for instance the verification process on Rarible: < https://rarible.com/how-it-works/safety-security-and-policies/verification-request-rejected>

[69] See for instance the section entitled 'What are the intellectual property rights on the Platform? Creator Rights' in the T&C's of Foundation: <https://foundation.app/terms>

[70] See the NFT license as created for the CryptoKitties NFT collection, available here: <https://www.nftlicense.org/>

[71] See section 3b of the NFT license.

[72] See for instance the doge pound NFT collection, which –on its terms- permits both commercial and non-commercial uses as well modifications on both the artwork and the NFT. Available here: < https://thedogepoundnft.com/terms>

The lack of copyright license in the NFT means that licenses are spelled out in the T&Cs of the collections, and respective marketplace. This licensing mechanism, however, poses the following challenge: when the NFTs leave the environment in which they were created, they do not carry with them the licenses granted by the T&Cs of their originating marketplace. This creates legal uncertainty concerning what is the copyright regime governing the NFT and its associated work, especially where different platforms (of distinct categories) do not ensure interoperability between licensing agreements for the tokenized work.[73] In open marketplaces such as OpenSea, it is the seller (and presumptive rightsholder) that bears the responsibility of communicating the licensing terms that apply to the traded NFTs, including tokenized works.

There can be discrepancies throughout this license communication process, even if the seller endeavors to be transparent. For instance, the Avastart NFT collection is a software used to randomly generate unique avatars, the Avastarts. While the software is released under a proprietary license[74], the derivative avatars are licensed under the Digital Asset Ownership License[75]. This license is applicable to the Avastarts, even if it is not directly associated with the works on the project website. When project avatars appear on sale on OpenSea, the accompanying copyright notice merely states that "Avastars come licensed for use commercially by their owners"[76], but without directly referencing or linking to the applicable license.

This dissonance between the applicable license agreement and its communication via the chosen marketplace is the main driver of legal uncertainty in NFT transactions. Putting aside the legally dubious basis for many provisions in NFT licensing agreements, these licenses are often hard to locate, do not clearly refer to a specific NFT, and rarely interoperable across different platform marketplaces. The rapid growth of the NFT community and trading volume can only lead to magnifying any copyright enforcement legal uncertainties between users, rightsholders, NFT traders, and marketplace platforms.[77]

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[73] For instance, the same Meebits NFT collection is also sold on OpenSea but there is no reference to this underlying license which only appears on the respective Meebits terms of service.

[74] Available here: <https://github.com/NFT42/Avastars-Contracts/blob/master/README.md>

[75] Available here: <https://nft.substack.com/p/the-digital-asset-ownership-license>

[76] See for instance Avastar #23800 and the details of the sale. Available here: <https://opensea.io/assets/0xf3e778f839934fc819cfa1040aabacecba01e049/23800>

[77] Bodó, B., Gervais, D., & Quintais, J. P. (2018). Blockchain and smart contracts: The missing link in copyright licensing? International Journal of Law and Information Technology, 26(4), 311–336.

4. Copyright Law, Blockchain and NFTs

NFTs are used in a variety of ways that have potential implications for copyright. Authors can publish works on a blockchain-based system creating a quasi-immutable record of initial ownership and use smart contracts to license the use of works. Remuneration may happen on online distribution platforms where the smart contracts reside. In theory, such an automated setup allows for the private ordering of copyright. Blockchain technology, like Digital Rights Management some 20 years before, was presented as an opportunity to reduce market friction, and increase both licensing efficiency and the autonomy of creators. However, many of the old problems remained even in the face of this new technology. As noted elsewhere, it is challenging to reconcile the hyper-fragmentation of copyright law — as regards for example territoriality, subject matter, exclusive rights and context-based exceptions — with the impersonal, borderless, standardized, and automated regulatory solution offered by blockchain technology.[78]

During the first cycle of blockchain hype, multiple projects popped up promising to upend existing copyright-based business models, from registration of works to individual and collective licensing. Some then-prominent examples included: dot blockchain;[79] jaak;[80] the joint venture between the collecting societies ASCAP, SACEM, and PRS for Music;[81] Imogen Heap's Mycelia;[82] Ujo Music;[83] and EY and Microsoft's blockchain solution for content rights and royalties' management for the media and entertainment industry.[84] To the best of our knowledge, none of these (nor any other similar project) was particularly successful. Many are no longer in existence and the initial excitement for the technology in the field of copyright exploitation had mostly quietened down.[85] The reasons for the initial

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[78] Ibidem

[79] See https://dotblockchainmusic.com/.

[80] See https://jaak.io/.

[81] See <https://www.ascap.com/press/2017/04-07-ascap-sacem-prs-blockchain>.

[82] See <http://myceliaformusic.org/2018/06/20/mycelia-imogen-heaps-blockchain-project-artists-music-rights/>.

[83] See <https://mesh.xyz/>.

[84]See <https://www.ey.com/en_se/news/2018/06/ey-and-microsoft-launch-blockchain-solution-for-content-rights>.

[85] One notable exception is the development and ongoing work of a Blockchain Task Force by WIPO. See <https://www.wipo.int/cws/en/taskforce/blockchain/background.html>. This is part of a push to use this technology for registration of IP rights and strengthen the protection of unregistrable IP rights, such as copyright. See <

enthusiasm and the later disillusionment around the use of blockchain for copyright are related. Blockchain-based systems are promising technologies to manage copyright metadata in a scalable and transparent manner. The system is useless if it cannot rely on or ensure high-quality metadata. But the problem of metadata quality is more institutional than technological. As such, the technology is only useful if the conditions for its use are present. This does not seem to be the case in the copyright space.

It is against this backdrop that NFTs emerged, raising anew many of the same copyright law questions.[86] In this section, we build on our previous explanation of NFTs and their marketplaces and focus our legal analysis under EU copyright law on the following issues: application of copyright law to NFTs (4.1.); ownership, digital exhaustion, and resale (4.2); and liability and infringement (4.3).

4.1. Application of copyright law to NFTs

A preliminary step in our analysis is to establish to what extent copyright law concepts may apply to NFTs. In simple terms, although the NFT itself is merely metadata and not subject to copyright protection per se, the content associated or linked to an NFT can qualify as a "work" and attract protection under copyright law.

As amply discussed in the literature, the EU standard of originality is low under the existing case-law of the Court of Justice of the European Union (CJEU), comprising several judgements from *Infopaq*[87] to *Brompton Bicycle*[88].[89] Even pixel-based artworks can meet the requirements of originality and amount to a sufficiently precise expression of the "free and creative choices" of their (human) authors, as required by the Court.

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https://www.wipo.int/wipo_magazine_digital/en/2020/article_0002.html>. Along similar lines, the EUIPO is also developing an IP register in Blockchain project, aimed at trademarks and designs. See < https://www.youtube.com/watch?v=uWGfDaZNAA8>

[86] For recent analysis of the copyright implications of NFTs, see Guadamuz, A. (2021), The treachery of images: non-fungible tokens and copyright, Journal of Intellectual Property Law & Practice, jpab152, DOI:10.1093/jiplp/jpab152

[87] Case C-5/08 - Infopaq International A/S v Danske Dagblades Forening, Judgment of the Court (Fourth Chamber) of 16 July 2009, ECLI:EU:C:2009:465.

[88] Case C-833/18 - SI and Brompton Bicycle Ltd v Chedech / Get2Get, Judgment of the Court (Fifth Chamber) of 11 June 2020, ECLI:EU:C:2020:461.

[89] See, for a recent analysis of the CJEU case law as it applies to AI-assisted works, see Hugenholtz, B. & Quintais, J.P. (2021), Copyright and Artificial Creation: Does EU Copyright Law Protect AI-Assisted Output?, IIC - International Review of Intellectual Property and Competition Law, 52(9):1193-1200.

In some cases, the content associated with the NFT is generated or its production is assisted by artificial intelligence (AI) systems[90]. Famous examples include CryptoPunks and the Bored Ape Yacht Club[91]. In such cases, the algorithmic production of this output (e.g., the random changing of features of certain characters) may lack causal contribution by one or more human(s). If that is the case, the lack of sufficient human creative intervention expressed in the output may mean the absence of copyright protection for failure to meet the originality standard.[92]

As a rule, however, much of the content associated with an NFT of the type traded in the marketplaces examined in this paper is likely to attract copyright protection and qualify as a "work". In other words, a substantial portion of tokenized digital artworks are subject to traditional concepts and rules of copyright law. While some of these concepts and rules are harmonised at EU level, others are not. Non-harmonised rules include for instance those on moral rights and most of copyright contract law.[93] Although the focus of our analysis is on harmonised EU law, it is worth mentioning that rules on moral rights may at national level play an important role in copyright litigation on NFTs. Examples include provisions on misappropriation or "copyfraud" (that is, minting by non-owners of artworks),[94] or distortion, mutilation, or other derogatory modification. In such situations, the author/rightsholder might be able to enforce their non-waivable moral rights of paternity or integrity under national laws against the online or offline user of its artwork. As for rules on contract law, our study of licensing agreements accompanying NFTs and associated works, as well as platforms' T&Cs is used below in connection with the determination of issues of ownership, digital exhaustion and the resale royalty right (4.2.), and copyright liability and infringement (4.3).

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[90] Compare to nftjedi: NFT Factories: How randomly generated NFTs, 10,000 per collection, have taken over crypto art, Nou Nft, 6 September 6 2021. <https://nounft.com/2021/09/06/nft-factories-how-randomly-generated-nfts-10000-per-collection-have-taken-over-crypto-art/>.

[91] nftjedi: NFT Factories: How randomly generated NFTs, 10,000 per collection, have taken over crypto art, *nou nft*, 6 September 2021. <Https://nounft.com/2021/09/06/nft-factories-how-randomly-generated-nfts-10000-per-collection-have-taken-over-crypto-art/>.

[92] See Hugenholtz, B. & Quintais, J.P., (2021), Copyright and Artificial Creation: Does EU Copyright Law Protect AI-Assisted Output?, IIC - International Review of Intellectual Property and Competition Law, 52(9):1193-1200. See also Mezei, P. (2020), From Leonardo to the Next Rembrandt - The Need for AI-Pessimism in the Age of Algorithms, UFITA – Archiv für Medienrecht und Medienwissenschaft, Issue 2(84):390-429.

[93] An exception to the latter category is rules on contracts regarding authors remuneration in arts 18 ff CDSM Directive.

[94] Andres Guadamuz: Copyfraud and copyright infringement in NFTs, *TechnoLlama*, 14 March 2021. <https://www.technollama.co.uk/copyrfraud-and-copyright-infringement-in-nfts>.

4.2. Ownership, Digital Exhaustion and Resale Royalty Right in the NFT Space

Based on our earlier analysis, one central topic where NFTs give rise to challenges concerns copyright ownership of the tokenized work. This question is of utmost importance in light of the numbers and values of "sales"[95] on NFT platforms. For instance, an empirical analysis of the traffic of SuperRare by the Barabasi lab found that "[b]y April 15 of this year, according to our analysis, 16,198 works created by 887 artists had changed ownership on SuperRare, involving 3,210 collectors and more than 23,000 transactions."[96] Indeed, Statista has reported that the value of the sales of NFT artworks between 15 August 2021 and 15 September 2021 has reached 774 million USD, with approximately 4/5 of this value stemming from resales.[97]

Due to their technical characteristics, NFTs do not easily match existing conceptions of ownership as they relate to digital objects. This has important legal implications as regards transfer of copyright ownership. First, the seller of an NFT may not have a proprietary interest in the underlying digital content. In other words, they may not be the copyright owner of a work attached to an NFT. There are already multiple high-profile cases of unauthorized NFT auctions of museum collections.[98] A comparable situation stems from the minting of public domain works by public museums.[99] For the remainder of this analysis, however, we assume that the seller of an NFT is also the copyright owner of the tokenized work, as this appears to be the most common scenario.

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[95] Since sales on blockchain based system often involve anonymous parties, using often single-use accounts, it is difficult to say what percentage of the transactions involves self-dealing, artificially inflating the price of the asset. In any case there is strong economic interest in such fraudulent practices, including creating a false impression of demand before selling, money laundering, or tax evasion. For these reasons we suggest to treat actual sales values and volumes with extreme caution.

[96] Albert-Laszlo Barabasi, The Art Market Often Works in Secret. Here's a Look Inside, The New York Times, 7 May 2021. <https://www.nytimes.com/2021/05/07/opinion/nft-art-market.html>.

[97] Total value of sales involving a non-fungible token (NFT) in the art sector worldwide over the previous 30 days from 12 April to 15 September 2021, Statista. <https://www.statista.com/statistics/1235263/nft-art-monthly-sales-value>.

[98] Jim Richardson: NFT "Art Heist" sees famous artworks sold online, *Museum Next*, 13 March 2021. <https://www.museumnext.com/article/nft-art-heist-museums/>.

[99] Compare to the collaboration of the State Ermitage Museum and Binance NFT on the tokenization and marketing of public domain tangible artworks preserved and displayed by the Russian museum. See Binance NFT Marketplace to Feature Tokenized Art, Including Leonardo da Vinci, from The State Hermitage Museum, Binance Blog, 26 July 2021. <https://www.binance.com/en/blog/421499824684902408/nft/binance-nft-marketplace-to-feature-tokenized-art-including-leonardo-da-vinci-from-the-state-hermitage-museum>.

Second, the purchase of an NFT grants the acquirer at best a quasi-ownership interest only in the set of information or metadata in the tokenized work. Unless (i) the transaction is accompanied by contractual stipulations regarding the transfer of the tokenized work that are valid under the applicable national law, or (ii) the applicable national law somehow configures an NFT transaction (absent other contractual stipulations) as the transfer of the tokenized work, then the acquirer of an NFT obtains only a right over the metadata pointer to a digital object. They do not obtain either ownership or exclusive rights on the tokenized work, unless otherwise stated on the contract terms. For instance, the tokenized work may still be viewed on YouTube, downloaded, or tweeted by third parties without infringing on the rights of the NFT owner.

As NFTs per se do not represent a valid copyright ownership title over the tokenized work,[100] the latter theoretically remains under the control of the author/rightsholder that minted the NFT and offered it for sale on an online marketplace. The metadata, however, may grant certain rights to the acquirer of the token. As regards the tokenized work, these rights amount in most cases to limited licenses to use the work in specified ways, often restrictive as it concerns commercial exploitation.

Questions on the validity and execution of such licenses will have to be determined under national copyright laws. In theory, assuming these online agreements meet the formal requirements of national copyright contract rules, their validity and execution (as aided technologically by the associated smart contract) should be unproblematic and well within parties' freedom of contract. On the other hand, that freedom of contract is limited by mandatory statutory provisions. These include, on the side of authors, provisions on unwaivable remuneration or moral rights. On the side of users, they would include for instance the right to exercise statutory exceptions and limitations.

This analysis appears to be supported by our review of contractual relationships above at 3.2. Consider first the T&Cs of platforms operating as open marketplace [*category (i)*]. As a rule, these T&Cs do not place express limitations on what the NFT sale might entail. This means that the purchaser of an NFT does not acquire specific rights over the tokenized work by default, but rather the express provisions accompanying an NFT sale would have to be assessed under applicable

[100] Andres Guadamuz, Can copyright teach us anything about NFTs?, *TechnoLlama*, 7 March 2021. <https://www.technollama.co.uk/can-copyright-teach-us-anything-about-nfts>; Gibson, J. (2021), The thousand-and-second tale of NFTs, as foretold by Edgar Allan Poe, Queen Mary Journal of Intellectual Property, 11(3):255.

law.[101] Consider also platforms that operate as collection based or curated marketplaces [*categories (ii)* and *(iii)*], which often allow for standard or tailor-made licenses to accompany the tokenized work. Even in those cases, such agreements only set out limited licenses to use the accompanying work.[102]

To be sure, there are exceptions to the rule, including services like Bluebox, which expressly advertise their model as allowing for the "trade" of copyrights.[103] But the legal validity of such a transfer is doubtful and would have to be assessed against the formal and substantive requirements for a transfer of copyright under the applicable national law.
Therefore, in the scenarios above, the acquirer of an NFT associated with copyright-protected content (e.g., a digital artwork) will have no copyright ownership of the tokenized work or the right to enforce it against potential infringers.

Similarly, in EU law at least, the offer for sale of an NFT attached to a work is not covered by the *right of distribution* (Art. 4 InfoSoc Directive), with the consequence that such right is not exhausted by the virtual sale either. Indeed, after the CJEU judgment in *Tom Kabinet*,[104] the argument for *digital exhaustion* would already have been difficult to make even if the NFT was itself a representation of a digital work. This is because outside the specific subject matter of software, the EU right of distribution (subject to exhaustion) appears to apply only to tangible objects, whereas the right of communication to the public in Art. 3 InfoSoc Directive (not subject to exhaustion) applies to online dissemination of protected content. Considering that NFTs are metadata pointing to a (copy of a) work, the digital exhaustion argument appears untenable.

As noted, sellers of NFTs might also set their own licensing agreement for the tokenized work, as occurs often in the context of collection based or curated marketplaces [*categories (ii)* and *(iii)*]. These agreements will nevertheless have limited relevance from a copyright perspective for the purpose of exhaustion of the distribution right. For instance, Mike Shinoda from the band Linkin Park, who

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[101] Jeremy Goldman: A Primer on NFTs and Intellectual Property, *Lexology*, 11 March 2021 <https://www.lexology.com/library/detail.aspx?g=d96ed012-8789-4e87-bc1d-70ba76569c0f>.

[102] See §2. Ownership of the NFT license used by Larva Labs on their NFT collections. < https://www.nftlicense.org>

[103] Compare to <https://xd.adobe.com/view/9aff754b-c04a-4b3c-9f23-a2204eafeb5f-cfac/?fullscreen>.

[104] Case C-263/18 - Nederlands Uitgeversverbond and Groep Algemene Uitgevers v Tom Kabinet Internet BV and Others, Judgment of the Court (Grand Chamber), December 19, 2019, ECLI:EU:C:2019:1111.

successfully sold the audio clip "Happy Endings" accompanied by his artwork,[105] published the terms of his NFT sales as follows:

> *"Only limited personal non-commercial use and resale rights in the NFT are granted and you have no right to license, commercially exploit, reproduce, distribute, prepare derivative works, publicly perform, or publicly display the NFT or the music or the artwork therein. All copyright and other rights are reserved and not granted."106*

These terms, especially the expressed exclusion of the right to distribute the NFT or the underlying work and the limitation of "resale rights" are clearly restrictive for NFT purchasers, and expressly distinguish the NFT and the underlying work. Although the terms do not expressly mention it, it is noted that the purchase of the autographed tangible copy that the successful acquirer received remains subject to exhaustion.

Another notable issue related to the tokenization of artworks arises from the harmonized *droit de suite* regime in EU law. Under Directive 2001/84/EC,[107] authors of artworks are granted an unassignable, inalienable and unwaivable right to receive a royalty for any future resale(s) of their artwork, provided the resale meets the requirements set out in the Directive. These requirements are related to the contribution of art market professionals to the resale, the elapse of three years since the original acquisition of the artwork, and a minimum threshold for the purchase price of the artwork. The relevance of the *droit de suite* with respect to NFT resales is far from theoretical. The cited research of the Barabasilab found that

> *"[a]s in the traditional art market, a majority of these collectors "buy and hold" — here, the figure is over 60 percent — meaning that the digital art they purchase does not re-enter the market. But as in the traditional art market, there is also a lively secondary market for NFTs. In March 2020, the secondary-market activity accounted for 9 percent of sales on SuperRare. By March of this year, the secondary market was booming: resales accounted for 36 percent of the art sold on the platform."[108]*

Like with distribution, the concept of *droit de suite* is generally based on the transfer of ownership of works of art as physical objects.[109] As such, this legal

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[105] Mark Yarm: WTF is an NFT? Allow Linkin Park's Mike Shinoda to Explain, Input, 26 February 2021 <https://www.inputmag.com/culture/linkin-park-mike-shinoda-happy-endings-nft-interview>.

[106] Compare to <https://www.mikeshinoda.com/NFTTerms>.

[107] Directive 2001/84/EC of the European Parliament and of the Council of 27 September 2001 on the resale right for the benefit of the author of an original work of art.

[108] Barabasi (note 96).

[109] See recital 2 of Directive 2001/84/EC.

regime is not applicable to the *resale of NFTs*. No doubt, however, some of the assets NFTs link to will have the required "objecthood". But that does not mean that these tangible items will always meet the requirements of the Resale Rights Directive. On the one hand, the vinyl records and backstage tickets for Kings of Leon (mentioned above at 1.) do not fit into the concept of artwork that might be subject to the directive.[110] On the other hand, a signed copy of a visual artwork (e.g., Mike Shinoda's) might be eligible for the resale right royalty.

In the cases where the object associated with the NFT transaction meets the requirements of the Resale Rights Directive it may very well be that the transfer of the NFT also amounts to a simultaneous sale of the artwork, provided all other legal requirements are met. If that is the case, *resales* of artworks occurring in tandem with NFT transactions may trigger the resale right and associated remuneration. To be sure, this presupposes that the owner of the on-chain NFT is also the owner of the attached artwork off-chain, with legal rights to resell it. If the on/off chain ownership of NFT/artwork does not align, then the resale rights regime does not apply.

Still, even if the resale right and royalty do not apply *as a matter of law*, a similar mechanism may apply as a matter of code. In the current highly intermediated environment of NFT minting and transactions, the resale conditions of NFTs (and of the digital artworks they refer to) appear to emerge *as a service*. This means that during the minting process of an NFT, platforms offer the possibility for authors to receive a "commission" for each resale. For instance, OpenSea has established the following process: it provides the possibility for developers who create their own marketplace on OpenSea to determine the commission percentage which will then be attributed to the NFT creators.[111] According to the Foundation.App, NFT creators "receive 85% of the final sale price which means 15% goes to Foundation. On top of that, a 10% royalty fee is also imposed. This means that you will receive an additional 10% of the sale price if the NFT is resold in the future".[112] As a notable example, the NFT of the global meme "Disaster Girl", which was purchased for 180 Ether (worth $430.000) on April 17, 2021, was coded to reserve 10% share of any future digital resales of the said NFT.[113]
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[110] See Article 2(1) of the Directive 2001/84/EC.

[111] Compare to <https://docs.opensea.io/docs/frequently-asked-questions>.

[112] Foundation.app – Get invited to one of the largest NFT marketplaces in the world, *Fortune.my*, 1 September 2021 <https://www.fortune.my/foundation-app-get-invited-to-one-of-the-largest-nft-marketplaces-in-the-world.htm>.

[113] Marie Fazio: The World Knows Her as 'Disaster Girl.' She Just Made $500,000 Off the Meme, *The New York Times*, 29 April 2021. <https://www.nytimes.com/2021/04/29/arts/disaster-girl-meme-nft.html>.

4.3. Copyright Liability and Infringement

From the perspective of copyright liability and infringement, the most significant tensions arise from the dissemination of NFTs on online platform marketplaces. These can give rise to copyright liability and infringement questions for both users and platforms of the distinct categories described above. We look at each in turn, focusing on potential liability for communicating works to the public under EU copyright law.

4.3.1. Liability of users for posting links in NFT metadata

As results from our technical description above, NFTs might be differentiated by the depth of their metadata. That metadata will usually (but not always) contain a link the tokenized work. Our analysis focuses on this most common scenario.
From the perspective of users minting an NFT, the main issue is whether by doing so they are communicating the associated work to the public under art. 3(1) InfoSoc Directive, namely via the link in the metadata. The exclusive right of art. 3(1) InfoSoc Directive applies to communication at a distance, covers online use and is not subject to exhaustion.[115] The "making available" prong applies to interactive "on-demand" use (e.g. uploading), but does not require reception of or access to the work by the public. There is a vast body of CJEU case law on the right and on the concept of communication to the public as this appears across different directives, including on its applicability online.[116] As confirmed by CJEU case law, from *Svensson* (C-466/12) to *VG Bild-Kunst* (C-392/19), the posting of hyperlinks (of any type) to protected content without the permission of the rightsholder meets the legal requirements of the concept of communication to the public and triggers the application of the exclusive right in art. 3 InfoSoc Directive.[117]

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[115] Art. 3(3) and Recital 29 InfoSoc Directive. NB since the judgments in Coditel I and II, the CJEU has considered communication to the public to be a service and, therefore, not subject to exhaustion.

[116] See generally Quintais, J.P. (2018) 'Untangling the Hyperlinking Web: In Search of the Online Right of Communication to the Public', 21 Journal of World Intellectual Property 385; Eleonora Rosati, 'When Does a Communication to the Public Under EU Copyright Law Need to Be to a "New Public"?' [2020] European Law Review <https://papers.ssrn.com/abstract=3640493>.

[117] See, e.g., Giancarlo Frosio, 'It's All Linked: How Communication to the Public Affects Internet Architecture' (2020) 37 Computer Law & Security Review 105410; Miquel Peguera, 'Hyperlinking under the Lens of the Revamped Right of Communication to the Public' (2018) 34 Computer Law & Security Review 1099; Sebastian Felix Schwemer, 'Linking: Essential Functionality on the Internet and Never-Ending Story?' in M Rosenmeier (ed), *Festskrift til Jørgen Blomqvist (Ex Tuto, 2021), pp. 623–640* (Ex Tuto 2021) <https://papers.ssrn.com/abstract=3844548> accessed 11 October 2021.

If an NFT individually identifies certain content behind the token and contains a link to that content stored on a third-party server, they will represent a "link" to the work itself and be in theory a restricted act of communication to the public. Of course, this is the case under our operating assumption that the NFT metadata contains a link to the tokenized work. If that is not the case, then the mere posting of metadata probably does not qualify as a communication to the public.

Naturally, the posting of such a link only gives rise to liability if the person posting the link is not the rightsholder of the work in question. In other words, issues of liability arise predominantly for users that mint NFTs from digital objects for which they have no valid copyright ownership claim and for follow-on purchasers of those NFTs. But there is also an important legal certainty challenge here, which comes from the possible lack of synchronicity[118] between the legal claim to the NFT itself and the legal status of the associated artwork. In other words, there may be cases where someone is both a lawful acquirer of the NFT but qualify as infringing the right of communication to the public on the associated artwork, entering in effect a legal "twilight zone".[119]

4.3.2. Liability of marketplace platforms

We refer here to our categorization of platforms and their copyright management terms above at section 3. From the perspective of copyright law, the most relevant acts of platforms are their facilitation of the minting process and hosting of digital copies of tokenized works, both in locations where the NFT points to and on the front-end website of the platform for purposes of operating the marketplace. In both cases, although there are reproductions involved, the

[118] On the licensing coordination and synchronicity of marketplaces for blockchain-based copyright management in general, see: Bodó, B., Gervais, D. & Quintais, J.P. (2018), Blockchain and smart contracts: the missing link in copyright licensing?, International Journal of Law and Information Technology, 26(4):311–336. DOI: 10.1093/ijlit/eay014

[119] According to Guadamuz, there is a strong counter-argument to be made in considering the link insertion in the code, as communication to the public. He argues that "as the link differs greatly from a normal hyperlink that is found online, as it has been explained the link is sometimes contained in the code that makes up the token. While this is often public, it may not be as easy to find as one would expect. And even if the work is online, the link may be in a smart contract that has not been shared with the public. In order to extract the link, one has to have some knowledge of the technology, and sometimes one may require knowing both the unique tokenID and the smart contract address. Most of the cases dealing with hyperlinks described above are related to common web links, or even embedding and framing, so accessing the work could be much easier. One could argue that if this is a communication to the public, then this is limited to a relatively small public, in which case the threshold of what 'public' means has not been met". Guadamuz, A. (2021), The treachery of images: non-fungible tokens and copyright, Journal of Intellectual Property Law & Practice, DOI:10.1093/jiplp/jpab152, p.15.

predominant copyright relevant act is the making available to the public of the copies of the work.

In this light, as regards the copyright liability of marketplace platforms for communicating works to the public, the first issue to address concerns their legal qualification. There are two potential regimes that may apply to the platforms examined in this paper. First, they may fall under the definition of "online content sharing service providers" (OCSSPs) in art. 2(6) CDSM Directive, in which case they are subject to the specific liability regime of art. 17 of that directive.[120] If they do not qualify as OCSSPs, they are subject to the regime of art. 3 InfoSoc Directive (discussed at 4.3.1.) as interpreted by the CJEU.

OCSSPs are defined as providers of an information society service whose main purpose is to store and give the public access to a large amount of protected content by its users, provided it organises and promotes that content for profit-making purposes. The definition also contains several exclusions covering services that are either not aimed primarily at giving access to copyright-protected content and/or are primarily not for-profit.[121] Although theoretically within the scope of the open-ended definition of OCSSPs, NFT platforms may fit into two of the exclusions in the definition. First, the provision of back-end services as a dApp arguably qualifies these platforms as "open-source software-developing and-sharing" platforms. Second, the front-end provision of NFT trading services would qualify NFT platforms as "online marketplaces". The Commission's Guidance on Article 17 CDSM Directive provides no real guidelines on how to interpret these excluded categories[122], but given our factual analysis above at section 3, it seems difficult to argue against the application of these exclusions to NFT platforms. As a result, these platforms are arguably outside the scope of art. 17 CDSM Directive. The question therefore arises how NFT marketplaces fare under the regime of art. 3 InfoSoc Directive. Having established that the potential direct liability for linking via the metadata on NFTs is attributed to the user minting the token (4.3.1.), the main issue relates to the potential liability of NFT platforms for linking and hosting digital copies of works on their front-end website. The key question is whether by doing so NFT marketplaces are communicating works to the public or, rather, whether they qualify as hosting service providers that in principle benefit from the liability exemption or hosting safe harbour in art. 14 e-Commerce Directive.

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[120] Art. 17 states that OCSSPs carry out acts of communication to the public when they give access to protected content uploaded by their users. As a result, these providers become directly liable for their users' uploads. They are also expressly excluded in paragraph (3) from the hosting safe harbour for copyright relevant acts, previously available to many of them under art. 14(1) e-Commerce Directive.

[121] OCSSPs are defined in art. 2(6) CDSM Directive, with further guidance in recitals 62 and 63.

[122] See the interpretative guidelines provided by the Commission in Communication from the Commission to the European Parliament and the Council, Guidance on Article 17 of Directive 2019/790 on Copyright in the Digital Single Market, COM/2021/288 final.

For the assessment of direct liability of these platforms under art. 3 InfoSoc Directive, the CJEU's judgment in *YouTube and Cyando* is most relevant.[123] In that judgement, the Court ruled that service providers such as YouTube and Uploaded are in principle not directly liable for copyright infringements resulting from uploads by their users. The crux of the analysis is found in the "act of communication" requirement, and in particular the "deliberate intervention" criterion. The Court stated that end-users make the (primary) act of communication; the platform does play an "indispensable role", but its intervention is not necessarily "deliberate". To assess whether there is a "deliberate intervention", the Court developed a multi-factor test[124].

For instance, there is a deliberate intervention if the platform operator, despite general or constructive knowledge of illegal content available via its platform, refrains from putting in place the appropriate technological measures that can be expected from a reasonably diligent operator in its situation to counter credibly and effectively such infringements. It is also relevant that such operator: (i) participates in selecting protected content illegally communicated to the public, and provides tools on its platform specifically intended for the illegal sharing of such content; *or,* alternatively, (ii) knowingly promotes such sharing, which may be attested by the fact that it has adopted a financial model that encourages users illegally to make available infringing content on its platform[125].

The Court further noted that for the purposes of finding a "deliberate intervention" it is not enough to establish that the provider has "general knowledge" of illegal content on platform, or that it has a profit-making nature[126]. On the other hand, it also stated that "actual knowledge" via a sufficiently substantiated notice, followed by the lack of appropriate (i.e., not expeditious) action by the platform provider, is sufficient to establish a "deliberate intervention". In the end, it will be up to national referring courts to assess the factors to establish whether a platform operator carries out a deliberate intervention leading to direct liability. Still, the CJEU did offer some clarification in relation to the facts referred, suggesting that neither YouTube nor Cyando appear

[123] Joined Cases C-682/18 and C-683/18 (22 June 2021) ECLI:EU:C:2021 (*YouTube and Cyando*).

[124] *YouTube and Cyando*, paras 84ff.

[125] *YouTube and Cyando*, para. 84.

[126] *YouTube and Cyando,* paras 85ff. This point is important, as the Court sets aside the application of the *GS Media* rebuttable presumption of knowledge to this effect. Id, paras 89. On the role of knowledge in the Court's case law on communication to the public, see C Angelopoulos, C. (2021), Primary and Accessory Liability in EU Copyright Law, in Rosati, E. (ed(s)), The Routledge Handbook of European Copyright Law.

to have made a contribution that leads to the qualification of their activities as making a "communication to the public".[127]

Confronting the CJEU's analysis, especially the multi-factor test for "deliberate intervention" criterion, with our description of NFT marketplaces of different categories above (at section 3) it is likely that in most cases such platforms are not directly liable for communicating works to the public. As noted, many such platforms either require or attempt to control that copyright ownership of the tokenized work rests with the person minting and trading such work on their services. Moreover, with different degrees of sophistication and success, the platforms under scrutiny put in place some or a combination of the following measures aimed at curbing infringement on their services: T&Cs for lawful conduct on the platform[128]; licensing terms for the tokenized works to ensure lawful transactions; notice and action measures to enable rightsholders to enforce claims against infringers (e.g. notice and takedown); and technological solutions to identify and remove or block infringing works.

To be sure, eventual liability assessments would have to be carried out on a case-by-case basis. But considering the available information and assuming the adequate deployment of the measures above by platforms (e.g., expeditious takedowns of content on the front-end website following sufficiently substantiated notice by the rightsholder), the probable outcome is that the NFT marketplaces examined would qualify as hosting service providers benefiting from the liability exemption in art. 14 e-Commerce Directive, as interpreted by the CJEU. In its case law on the topic, the CJEU has noted that safe harbours require a sufficient degree of "neutrality" from the intermediary. This approach creates a grey area for the qualification of certain online platforms as "neutral"/"passive" v. "active" intermediaries for the purposes of the hosting safe harbour. The approach finds its legal basis in recital 42 e-Commerce Directive, according to which the directive's safe harbours are applicable only if the platform's activities are of "a mere technical, automatic and passive nature".[129]

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[127] *YouTube and Cyando*, paras 90-102.

[128] Interestingly, and while the Sotheby-owned NFT marketplace Metaverse applies a traditional entry-side enforcement (i.e. by curating and controlling which artists will see their works tokenized on the gallery digital platform), the terms of each sale contain many reservations, warranties, or waivers of responsibility. See Conditions of sale, section 'Disclaimer of Warranties' (ii): <https://www.sothebys.com/en/buy/auction/2021/natively-digital-a-curated-nft-sale-2?showDetails&locale=en>

[129] In its case law, the CJEU has applied art. 14 of this directive to a search engine's advertising service, an online sales platform, and a social networking platform. See Joined Cases C-236/08, C237/08 & C-238/08, *Google France SARL v. Louis Vuitton Malletier SA*, 2010 E.C.R. I-2417; Case C-324/09, *L'Oreal SA v. eBay International AG*, 2011 E.C.R. I-6011; Case C-360/10, *Belgische Vereniging van Auteurs,*

Although the distinction between "active" and "passive" role in this context is unclear, the CJEU has provided some guidance in this respect, namely in *L'Oréal/eBay* and *Google France/Louis Vuitton*.[130]

Contrasting that line of case law with the case on art. 3 InfoSoc Directive, especially *YouTube and Cyando,* there appears to be some alignment between the determination of direct liability for communicating works to the public, on the one hand, and the "active" role of a platform that disqualifies it for the hosting safe-harbour, on the other hand. Likewise, where there is no sufficient contribution for attribution of direct liability, it appears likely that – from the copyright perspective at least – a platform's role is deemed predominantly passive, and therefore worthy of safe-harbour protection.

In our view therefore, NFT platforms that do not cross the threshold of deliberate intervention for art. 3 InfoSoc Directive will likely be qualified as sufficiently "passive" to justify protection under the hosting safe harbor under art. 14 e-Commerce Directive. That appears to be the case for most of the NFT marketplaces we have examined.

5. Beyond copyright

As we have seen, the relationship between the NFT-based private ordering regime of creativity and its traditional (at least in the West) copyright-based approach is sketchy at best. This, however, does not mean that there will not be rules, both technological, and social / institutional, which try to address the emerging conflicts, potential threats in this domain. In the following we'll briefly discuss two challenges which need to be tackled, even if the links between the NFT world and copyright remain weak. While we can witness the emergence of "copynorms" to define the rules which set the contours of creative practices, methods to limit fraud in trade still pose a serious threat to the health and future of the NFT space.

Smart contracts and tokenization have long been one of the key selling points of the blockchain-based, web 3.0 revolution.[131] The possibility of creating unique, cryptographically secure, programmable representation of both physical objects, and associated rights and titles was heralded by blockchain enthusiasts as a way

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Componisten en Uitgevers CVBA v. Netlog NV, 2012 EUR-Lex CELEX LEXIS 85 (Feb. 16, 2012). See generally van Hoboken, J. and others, Hosting Intermediary Services and Illegal Content Online: An Analysis of the Scope of Article 14 ECD in Light of Developments in the Online Service Landscape (BrusselsEuropean Commission 2018) <https://dare.uva.nl/search?identifier=db3fa078-e225-4336-95ec-5d6f25731799>.

[130] See e.g. *L'Oréal/eBay*, paras. 115-116; and Google France/Louis Vuitton, paras. 116-118.

[131] Wright, A., & De Filippi, P. (2018). Blockchain and the Law: The Rule of Code. Harvard University Press.

to map the real-world circulation of objects, and related rights onto a digital infrastructure.

Already at the very early days of the blockchain hype, countless initiatives, both scholarly, and commercial[132] invested substantial amounts of time, money and expertise into systems which hoped to tokenize copyrights and facilitate the blockchain-based circulation of IP rights, creative works, and monies related to the transfer, use or commercial exploitation of creative works. We have also warned that even if it may be possible to create a digital representation of all IP rights which are associated with a single work, there are substantial, potentially insurmountable institutional hurdles[133] which might ultimately stand in the way of programmable circulation of creative works and copyrights.

Fast forward a couple of years, and the blockchain revolution in the copyright domain took a rather unexpected turn. The initial promise of NFTs was that they would create an inseparable link between the circulation of two types of commodities: digital files, and the copyright rights, which in the digital domain became disentangled, as file started to circulate without licenses, and licenses were traded without a corresponding effect on the circulation of files. The projects, startups, initiatives, which hoped to implement this vision have all but disappeared by the beginning of 2021.

The current, second generation of copyright related blockchain innovation doesn't try anymore to use cryptographic tokens and smart contracts to link up existing flows. Instead, NFTs have essentially become an independent, third asset, with its own markets, flows, value expectations, norms, rules and key stakeholders. The confusion of what exactly the copyright relevance of an NFT creation and transaction could be is elegantly bypassed by the T&Cs of many NFT marketplaces which for the most part explicitly warn their users that an NFT transaction does not mean a corresponding transaction of copyrights of any kind. So, for most tokenized creative works there are now not two, but three

[132] See supra the many examples listed at the introduction to Section 4.

[133] We noted that absent of the cooperation of existing stakeholders, it would be impossible to maintain the synchronicity between the real-world circulation of rights and works, and what is recorded on blockchains. See Bodó,B., Gervais,D. & Quintais, J.P. (2018), Blockchain and smart contracts: the missing link in copyright licensing?, International Journal of Law and Information Technology, 26(4):311–336. DOI: 10.1093/ijlit/eay014

independent flows: the digital files, the copyrights, and the NFTs all circulate independently from each other.[134]

NFTs are seen by many as a new possibility to attach value to creative expressions and extract value from their circulation. Value creation and extraction, in turn, depend on the norms which emerge to structure this space, norms which can effectively penalize fraudulent practices and reward honest creators and buyers. As the analysis so far has shown, existing copyright laws have a rather limited role in setting and enforcing rules around acceptable / fraudulent creative practices in the NFT space. Therefore, this task will have to be fulfilled by copynorms which inevitably emerge through the interaction of different actors. Fraudulent market activity, on the other hand, is a more difficult challenge, with no clear solution in sight.

Copynorms emerge and become a dominant framework to organize social relations in spaces which are not covered by the existing copyright laws, where their interpretation is uncertain, where they seem to be irrelevant, where their application is rejected by the participants, or where their enforcement is impractical or impossible. Copynorms thus are a set of bottom-up, more-or-less formalized rules, negotiated by a community to structure certain interactions in the absence of, or instead of top-down legal frameworks. Such norms predate the first copyright law and have become a main source of social order in various digital communities, from peer-to-peer file sharers via the manga, and anime or fanfic subcultures to subtitling.[135] Within the NFT domain, we can also witness the emergence of copynorms, mainly around three content-creation related issues:

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[134] To complicate things further, new projects are starting to emerge, describing technical architectures that could create further fractionalization of NFTs into tokenized 'shards'. See <https://www.paradigm.xyz/2021/10/ricks/>

See also the market created around fractionalized NFTs: For instance, Nftfy is a permissionless Decentralized Application (DApp) that fractionalizes Non-Fungible Tokens, generating ERC20-compliant fractions fully backed by the NFTs. Available here: <https://www.nftfy.org/>

[135] Bodó, B. (2014). Set the fox to watch the geese: Voluntary IP regimes in piratical file-sharing communities. In M. Fredriksson & J. Arvanitakis (Eds.), Piracy: Leakages from Modernity (pp. 241–264). Litwin Books. Bodó, B. (2016). Pirates in the Library An Inquiry into the Guerilla Open Access Movement. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2816925>. Johns, A. (2010). Piracy: The Intellectual Property Wars from Gutenberg to Gates. University Of Chicago Press. Lee, H.-K. (2011). Cultural consumer and copyright: A case study of anime fansubbing. Creative Industries Journal. <http://www.ingentaconnect.com/content/intellect/cij/2011/00000003/00000003/art00006>. Meister, A. (2013). Interviews with E-Book-Pirates: "The book publishing industry is repeating the same mistakes of the music industry." Netzpolitik.Org. <https://netzpolitik.org/2013/interviews-with-e-book-pirates-the-book-publishing-industry-is-repeating-the-same-mistakes-of-the-music-industry/> Schultz, M. F. (2006). Copynorms: Copyright and Social Norms. In P. K. Yu (Ed.), Intellectual property and information wealth: Issues and practices in the digital age. Praeger Publishers.

originality, fraud and intermediary liability. Since the creation and circulation of NFTs are made possible by NFT marketplaces which let users mint, showcase and trade NFTs they are in the frontline of conflicts that arise around content creation, i.e.: someone trying to sell a famous artwork, or a duplicate of another NFT, or create derivative works. Since the copyright status of NFTs is still debated, and clear-cut legal cases are practically absent, online marketplaces have to define for themselves the criteria by which they take (or not) action in such debates. Per our overview, by the end of 2021 many NFT platforms recognized that if they want to preserve the trust of their buyers, they need to take steps against clearly fraudulent sellers. Marketplaces started to take some responsibilities around policing content, even if those rules are often vague, and ill-defined. They sometimes include an originality clause in their T&Cs, they define categories of prohibited content (related to harmful content or porn), more often spell out their right to remove listings from their marketplaces, even if the removal criteria are undefined, and the right is arbitrarily exercised (if at all).

One of the major challenges for copynorms in this space will be the definition of originality. What is an original creation, what counts as an homage, a reference, a critique, a pastiche, is an age-old debate, with some guidance on existing laws, and court cases, but also with no universally applicable rules, which could guide decisions under all circumstances. Techies, more likely be interested in building blockchain applications, have now the responsibility to adjudicate originality disputes. This inevitably leads to uncertain definitions, and arbitrary decisions, as observable, for example in the T&Cs of The Sandbox Marketplace: "New Assets being sufficiently different from existing Assets will be determined in the sole discretion of TSB"[136]. [137]

Fraudulent trading activities pose the second major challenge for the long-term health of the NFT space. Though the problems here are not copyright related, they are endemic to the traditional art market as well, so we'll only discuss the issues here briefly. The blockchain-based trade of NFTs takes place between accounts which can be anonymous. This makes NFTs perfect vehicles to launder crypto

[136]See < https://www.sandbox.game/en/terms-of-use/>

[137] One such conflict around originality emerged between the infamous CryptoPunks - a collection created by LarvaLabs, and traded on both their own platform and on open marketplaces-, and CryptoP*h*unks, a conceptual derivative project under the headline: "the treachery of NFTs". The conceptual work, in principle is covered by fair use, but nevertheless received a DMCA takedown notice and a formal letter from LarvaLabs. Ultimately the artist successfully contested the removal, managed to get the conceptual project reinstated.

money and evade taxes.[138] If one buys their own NFT, ill-gotten money suddenly appears as a legitimate income, which, being an artwork, might also be tax-deducible in some jurisdictions. Others may be engaged in fraudulent pump-and-dump schemes, pumping the price of an NFT through a series of self-dealings, only to dump it on a clueless investor. There have been claims of NFT marketplaces front running NFTs they would feature on the front page of their services.[139] These dangers are especially pronounced with regards to collections, where an individual NFT's price closely correlates with the prices of other NFTs in the same collection,[140] meaning that the issuer of the collection has both the means and incentives to manipulate all the prices in a collection by manipulating the prices of only a few items.

Though we are not aware of any comprehensive analysis which looks at the NFT markets with the aim of differentiating these different activities, based on the available information we have little reason to treat NFT marketplaces as marketplaces of art and creativity. This also means that maybe copyright is not the only, and perhaps even not the best legal framework through the lens of which NFTs should be considered. Consumer protection, anti-fraud legislation, or financial regulation seems to be as appropriate a regulatory framework as copyright, at least for the moment.

6. Conclusions

Dave Peck, a software engineer, summarized the web3 environment as follows: "Web3's culture is young and vibrant. It's reminiscent of the earliest days of the web and of many of the things that made the 90s internet fun: small communities, weird new technology, lots of blue-sky experimentation, a sense of cultural

[138] Mr Whale. (6 August 2021). Money Laundering Tutorial: How to Launder Millions With NFTs. *Medium*. <https://cryptowhale.medium.com/money-laundering-tutorial-how-to-launder-millions-with-nfts-7530b7079a78>
Handwerger, S. (2021). *NFTs and US taxes: What you should know*. Cointelegraph. <https://cointelegraph.com/news/nfts-and-us-taxes-what-you-should-know>

[139] See: Matney, L. (2021). OpenSea admits incident as top exec is accused of trading NFTs on insider information. TechCrunch. <https://social.techcrunch.com/2021/09/15/opensea-admits-incident-as-top-exec-is-accused-of-trading-nfts-on-insider-information/>. Also, the price of an NFT by the New York City based artist and coder Dmitri Chernia, unapologetically called "The Eternal Pump #11" went from 2 ETHs (~3400 USD) to 450 ETH (~1.6 million USD) in the matter of a few months over the course of 4 transactions. <https://nonfungible.com/project/artblocks/BLOCKS/22000011>. Another example would be CryptoPunk #9998 (<https://www.larvalabs.com/cryptopunks/details/9998>) the price of which at one point reached $500M thanks to a clever self-dealing trick.

[140] Nadini, M., Alessandretti, L., Di Giacinto, F., Martino, M., Aiello, L. M., & Baronchelli, A. (2021). Mapping the NFT revolution: Market trends, trade networks, and visual features. Scientific Reports, 11(1):20902. DOI:10.1038/s41598-021-00053-8

motion, the excitement of discovery, and new ways to express oneself."[141] The comparison between the early internet days and the current web3 hype reveals striking similarities as well as differences. First, it seems that the tension between copyright and digital practices is back, albeit with a twist. While 20 years ago the problem was whether exclusive rights can be reconciled with digital abundance and infinite copyability, today the issue is whether copyright is compatible with the newly discovered digital scarcity. The answer to this dilemma seems beyond reach at the moment, and it does not solely depend on either the future of copyright, or the future direction of technology. The currently missing synchronicity between the two types of scarcity is first and foremost an institutional challenge, which has no solution in code or copyright law. Second, in the early internet days, bottom-up creativity was free from financial concerns: although the zeitgeist dictated a commons-based approach, the means to monetize digital creativity were largely missing. Today, the tables have turned. NFTs are instruments of financialization by design. Third, when peer-to-peer file sharing and Digital Rights Management (DRM) technologies entered the picture, the conflict was between individual consumers and big copyright holder corporations. NFTs are similar to DRM: they cannot limit the circulation of files, but they do create a unique, assignable digital representation of a copyright-protected work. Though this technology was invented and first embraced by the outsiders of the technology- and art worlds, large copyright holders also clearly see NFTs as a useful way to monetize their IP. Unlike with technologies before, the NFT space can apparently accommodate very different stakeholders and interests.

It remains to be seen whether these three factors: scarcity, hyper-financialization and a consensus on the usefulness of technology will give birth to a form of digital creative ecosystem, which can operate without the reliance on the existing copyright frameworks, or we'll ultimately have to prepare for another war between copyright and technology.

[141] <https://www.psl.com/feed-posts/web3-engineer-take>