

Blockchain solutions for the online music industry

REVOLUTIONISING THE VALUE CHAIN THROUGH BETTER PROTECTION OF ARTISTS' RIGHTS, A CREATION OF A FAIRER MUSIC ECOSYSTEM AND FRICTIONLESS ROYALTIES PAYMENT.

By Silvia A. Carretta

ABSTRACT

New technological developments are changing the legal status of copyright. As blockchain technology seems to be revolutionising modern times, it is difficult to underestimate the hype around this technology.

This article introduces various legal aspects of the application of blockchain technology in the copyright sphere, with specific reference to the analysis of the online music industry in its modern status. Within this framework, it could be assumed that blockchain technology might represent an opportunity to reimagine and revamp the protection of copyright by implementing a blockchain-enabled system with the characteristics of being trustworthy, transparent, more affordable, highly standardised, time-stamped and automated.

Although still in its infancy, the potential application of this technology in relation to the music industry is of particular interest, as it appears to offer solutions to problems that artists, musicians, performing artists, and composers have encountered for decades. It promises a way out of the current deadlock between artists and intermediaries and it offers a foundation that can bring together the entire value chain and revamp the music industry by letting go of the outdated, hierarchic framework.

The complexity of the current system will take some time to unravel and rebuild. Nevertheless blockchain applications could lead to better protection of ownership, to artists having more say in deciding how and to whom the works are licensed and to faster, prompter remuneration of holders in the music industry, allowing artists to make a living out of creating music.

way works of music² are created, produced, distributed, and exploited online. For quite some time now, artists have struggled to protect their digital works, often finding them appropriated and republished without their permission across the web over user-upload content platforms. This exploitation is often free of charge or subject to a comparatively lower remuneration.

Today, the music industry is estimated to be worth US\$45 billion worldwide, of which the record industry is responsible for approximately US\$19.1 billion in revenues. 2019 was the fourth consecutive year of global growth and the highest rate of growth since 1997.³ This growth was predominantly driven by a 32.9% rise in paid streaming that now accounts for 37.0% of total revenue.⁴ It is therefore evident what enormous sums are involved and how a central role new, digital ways of exploiting music play in the modern online music industry (such as copying, distribution, paid download, free or paid streaming etc.). From this, stems the need to create a proper legal framework that includes all these new uses and types of exploitation.

This article investigates how the advent of blockchain technology might present an opportunity to revamp the framework of the music industry and reimagine the protection and use of copyrighted works. It is argued that blockchain might introduce long-awaited transparency, trust, and certainty in matters of protection of copyright ownership, and transfer of contractual obligations, thus leading to fairer trade in the negotiation of licensing terms. Such a blockchain-enabled system is tamper-free, immutable, trustworthy, and transparent, as well as more affordable, highly standardised, and automated. Clarity and transparency in information leads to easier identification of right holders, which in turn leads to fairer remuneration of royalty revenues on a planetary scale. Moreover, by using the instrument of smart contracts, blockchain could introduce a contractual adjustment mechanism that would estimate the real value of rights; automatic calculation of revenue for each use of a work depending on the instruction stored on the code by the parties; and automatic redistribution of royalties in a fast, frictionless way.

In synthesis, blockchain has been presented as a sophisticated, dynamic technology, to be used as a constraining force to better protect and revamp the online music industry by shaping the way users interact with this technology. Nevertheless, it should be kept in mind that only

1. INTRODUCTION

Nowadays, digitalisation and the internet have fundamentally transformed the way listeners access and listen to music. The need for a proper legal framework for protection of artists' and copyright holders has arisen from rapid technological developments that transformed the



a few of the hypothetical developments discussed today are viable and could be developed from a technical, and legal point of view.⁵

This article aims to understand the current trends in blockchain technology and to anticipate the changes that it can bring to the music industry. Initially, it describes the main technical features of blockchain by explaining keywords. Then, current legal problems within the music industry are discussed. Afterwards, technical solutions of blockchain that might impact the value chain are introduced, first from the point of view of artists, then from that of record labels, producers, and collective management organizations (CMOs). Furthermore, there is consideration of how blockchain could upset the powers within the value chain through disintermediation, by allowing artists to connect directly to listeners. Jointly, it is debated whether it is likely that complete disintermediation is reached soon. Real life scenarios are analysed for each case. The last section investigates the possibility of using smart contracts to enable automatic execution of agreements through code and to facilitate near-instant micropayment of royalties. In the end, a broad discussion is introduced over unresolved legal and technical issues that might hinder the use of smart contracts and consequently affect future implementation of blockchain. In particular weight is given to the fact that blockchain could be a positive and fruitful technology if concrete legal issues are overcome and the current legal paradigm is adapted to the new needs of the music industry.

2. TECHNICAL FEATURES OF BLOCKCHAIN

Technology and law have always been closely connected through reciprocal developments. Fast technological changes call for a change in the status of the law as these technological changes require in some way to be 'legalised' in order to be normalised in our own lives. The same change is happening nowadays with blockchain technology, defined by Don and Alex Prescott as "*the second era of internet*".⁶

The first time someone wrote about blockchain was in 2008. Author Satoshi Nakamoto, the pseudonymous mastermind behind the theory of bitcoin cryptocurrency, discussed in his famous White Paper⁷ for the first time the possibility of creating a new technical infrastructure for cash payments. This method allowed for a more secure, traceable, and transparent payment as a by-product of the fact that all transactions were saved on various computers and were verifiable in a reliable and secure way by all parties of the chain.

Contrary to the traditional belief of most, distributed ledgers technology – and its more commonly known version i.e. blockchain technology⁸ – is not a unique technology, but is better thought of as a class of technologies that vary widely in their technical and governance configurations.

¹ The term artist is a comprehensive term for composer (writer of music and/or lyrics of a work) and performing artist (any person who sings, delivers, declaims, plays in, or otherwise performs artistic works). It includes also professional and amateur DJs and, in general, any person who creates, reproduces, adapts, performs a work of music, in accordance with the definitions provided by international treaties and conventions, in particular by Art. 3 of the Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations (1961).

² A work of music is defined as a phonogram, with or without lyrics (i.e. any exclusively aural fixation of sounds of a performance or of other sounds). In particular under Art. 2 (1) of the Berne Convention for Protection of

Literary and Artistic Works (1886) the expression 'work' defines "every production in the [...] artistic domain, whatever may be the mode or form of its expression, such as [...] musical compositions with or without words".

³ IPFI Global Music Report 2019.

⁴ Although physical format revenue declined in 2018 by 10.1%, it is to be said that the Global Recorded Music Revenues from physical sale of recorded music still accounts for around a quarter of the total market [24.7%].

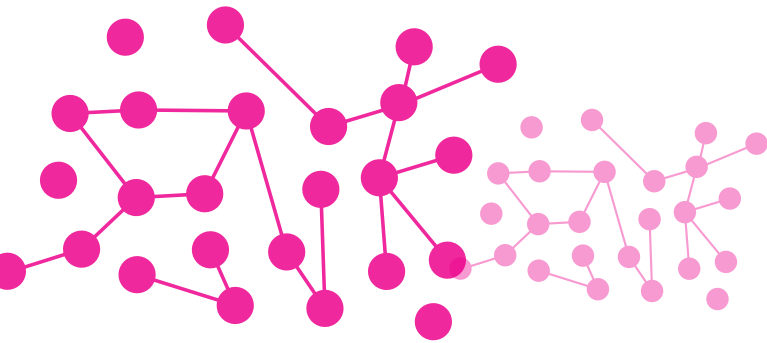
⁵ Although some of the scenarios imagined so far are still just speculation and not presently viable, one practical case for the use of smart contracts for sale of Works on a blockchain in the liberal arts environment has been explored at the University of Milan with impressive results: see A. PONZO, with

the supervision of PH.D. A. BELLACICCA, *Multichain con nodi ad accesso condiviso* (trad.: "Multichain with shared access Nodes"), Università degli Studi di Milano – Bicocca (Milan), 2019.

⁶ D. & A. TAPSCOTT, *What the Blockchain Means for Economic Prosperity*, Coin Desk, December 24, 2015.

⁷ S. NAKAMOTO, *Bitcoin: A Peer-to-Peer Electronic Cash System*, Bitcoin.org, 2008. Although, it is to be noticed that the term 'blockchain' does not explicitly figure in the paper.

⁸ Under a technical point of view, there can be nuances between a blockchain and distributed ledgers technology. Nevertheless, here they are used as synonyms for the sake of simplicity and in accordance with conventional usage.



To define blockchain technology in simple words, one can say that it serves as a shared and synchronised common asset registry to track and store data in a trustworthy, transparent, and tamper-free way. The technology gets its name from the fact that multiple transactions are ordered together in so-called blocks (technically 'ledgers').

Of foremost importance is the characteristic that blockchain technology relies on consensus among a network of computers ('nodes'), taking part on a peer-to-peer basis in verifying the legitimacy of each transaction – in advance – before it is stored on the blockchain. Before creating the block, in fact, all nodes are required to compete with each other in order to solve a cryptographical puzzle to verify the transaction. Once a solution is found, its 'proof-of-work' is shared with the network of nodes. The latter will verify its validity and then approve the transaction to be chained to the existing blocks through a hashing process.⁹

In essence, the real innovation of blockchain technology is that it ensures the integrity of each ledger being "near un-hackable"¹⁰. Changing records on blockchain is prohibitively difficult and requires the consensus of the nodes, provided in accordance with the protocol (e.g. by the majority or totality of nodes). Thus, no single party has the ability to arbitrarily or unilaterally change any entries or tamper with the data in the blocks, ensuring therefore immutability of the records by intrinsic properties of the underlying code.

Furthermore, blocks are connected in a chronological order through tamper-proof time-stamps. They mark the time for each transaction on the blockchain, providing proof of what has happened and when on the blockchain. Given the time-stamp feature, blockchain is suitable to play the same role of a notary public but with stronger credibility since data is verified through consensus by all node and cannot be modified unilaterally.

Extremely important are the characteristics of decentralisation and disintermediation. Thanks to the former, each node participating in the blockchain stores a complete copy of the data.¹¹ Depending on the protocol underlying the structure of the blockchain, (most of or all) the nodes have access to (most or all) of the data of the chain and can request new transactions to be added, hence guaranteeing high levels of transparency within the chain. The main advantages of decentralisation are fault tolerance due to a system malfunction, attack resistance from malicious actions of third parties, and collusion resistance at the expense of other participants.

Furthermore, thanks to the second characteristic of disintermediation there is no longer any client-server hierarchy, removing the need for single authorities within the blockchain, decreasing transaction costs and risks associated with presence of such intermediaries ('middle men'). However, it does not mean that new kinds of intermediaries will not be created as a result of deeper implementation of blockchain technology in the social fabric, depending on which environment the blockchain is developed in.

In conclusion, trust is embedded in the blockchain, rendering unnecessary the existence of single authorities. In other words: one can trust that the data in each block has been verified by all nodes and cannot be tampered with. Thus, trust is created in the process and in the data.

3. THE ADVANTAGES CLAIMED BY ARTISTS ON BEHALF OF BLOCKCHAIN TECHNOLOGY

Recently, many artists inside the music industry have claimed that the framework of the industry is fundamentally in need of reform due to the many difficulties brought forth by the advent of the internet and due to the rigidity of the industry, unable to adapt to the surge of new technologies.¹² Senior Lecturer O' Dair affirmed in a statement:

*"Since the turn of the millennium, people trying to make money from recorded music have struggled with significant challenges. Music can be streamed and downloaded at the click of a button but payments to the people who actually make that music can be slow and opaque. There is also a major problem with copyright data."*¹³

⁹ Hashing can be defined as a one-way cryptographic function, designed to be impossible to revert. This creates a unique fingerprint that represents information as a string of characters and numbers and can't be modified once added to the block.

¹⁰ B. CLARK, Blockchain and IP Law: A Match made in Crypto Heaven?, WIPO Magazines, Issue 1/2018.

¹¹ Readers shall be aware that in this article the term 'database' with reference to blockchain is used a-technically. This facilitates regrouping of concepts (DLT, blockchain,

databases) that can be treated as the same under a legal point of view.

¹² J. SILVER, Blockchain or the Chaingang? Challenges, opportunities and hype: the music industry and blockchain technologies, CREATE Working Paper No. 2016/05, 2016, p. 21.

¹³ Interview of Marcus O'Dair by Richard Ward for '11 IS LOUDER THAN 10' in 2016.

¹⁴ Under Art. 2 (1) of the Berne Convention, the expression 'work' defines "every production in the literary, scientific and artistic domain, whatever may be the mode or form of its expression, such as [...] musical compositions

with or without words". All the convention and treaties hereinafter mentioned, make provisions for exclusive rights in respect of works of music.

¹⁵ As defined by M. SHAFFER VAN HOUWELING, Author autonomy and atomism in copyright law, Virginia Law Review, Issue 96, 2010, p. 549.

¹⁶ BERKLEE INSTITUTE OF CREATIVE ENTREPRENEURSHIP (BERKLEE ICE), Project 'Rethink music: transparency and payment flows in the music industry', 2015.

The need to revamp the music industry originates from the complexity of multiple copyrights over the same work of music.¹⁴ For instance, under the Berne Convention, the copyright holder enjoys a series of exclusive moral and economic rights instantly when the work is created, without the need to be registered or recognised by any authority. In particular, the right holder potentially gets 177 different national copyrights and related rights, summed up together in a ‘fragmentation’ of national copyrights at international level.¹⁵

Furthermore, the complexity of the music industry lies in the multi-layering of rights embodied in a single work, each of which corresponds to multiple right holders (performing artists, composers, musicians, producers and so on). It is important to understand that any work of music contains not one but two sets of copyrights: one for underlying lyrics and music composition and one for the sound recording itself. The former are called performance rights (performing on a recording as well as in public), created by composers and lyricists and are monetised by music producers; the latter are called mechanical rights (right to copy or reproduce and distribute), created by performing artists and are usually monetised by the record labels.¹⁶ Having to split the rights and profits among this multitude of players makes the ability to correctly identify the legitimate right holders of foremost importance.

Artists, record labels, producers and major music institutions are searching for solutions to a long-standing problem: the lack of unique and complete (national or international) databases containing a catalogue of works of music and data of the right holders. With data scattered all over various databases, it is extremely difficult for any willing party to ensure that all those involved in the creation process are acknowledged fully as well as to identify the legitimate right holder of authorship and creatorship rights over a work, in order to personally negotiate use and licensing terms.

The increased availability of music online in digital formats, via streaming services and downloading platforms, has made it more difficult for artists to make a living in the music industry.¹⁷ Currently, there is an increasingly fragmented industry in favour of few who retain most of the commercial and economic power by keeping most of the revenue,¹⁸ while many artists have difficulties obtaining

financial comeback for their work. To have the chance of achieving commercial success and making a name for themselves, most artists seek economic support and sponsorship in the market from big intermediaries, such as record labels, producers, CMOs and streaming platforms. This leads to unbalanced bargaining positions, often forcing artists to agree on economically disadvantageous contractual provisions and give up most of the control over the economic and licensing terms of the use of their work.

Lastly, another issue is the non-existence of data on the exploitation of the work (i.e. for how long, for which uses and by whom). This is a direct consequence of the aforementioned lack of reliable data on authorship, together with the inequitable contractual terms the artists are subject to. Without standardised reports from intermediaries and digital services, payment of royalties is disjointed, inaccurate, and incomplete.

In light of the aforementioned problems there is an emerging sense that the overall music industry model needs reform. Thanks to its intrinsic technical characteristics, blockchain technology is presently advertised as the solution to revolutionise modern times.¹⁹ Thus, it is difficult to underestimate the hype concerning this technology. Although still in its infancy, the potential application of this technology to the music industry is of particular interest, as it appears to offer solutions to long-standing problems that artists have encountered for decades and are still currently facing.²⁰

3.1 How blockchain can bring better recognition of authorship and proper tracking of rights, connecting artists directly to listeners

The music industry is growing and a new generation of artists are demanding more transparency in the recognition and protection of their rights. The law already protects artists and their copyright in *abstracto*,²¹ giving them exclusive rights towards their works. But the vagueness of how the music industry deals with those rights and the uncertainty as to who is the rightful owner give reason for this new generation of artists to demand a deep change in the way the music industry works.

¹⁷ The National Music Producers Association (NMPA) in the U.S. claims that as much of 25% of the activity on streaming platforms is unlicensed and this presents a problem for artists that don't obtain due revenue from usage.

¹⁸ The mentioned ICE Project of Boston's Berklee School of Music shows that record labels and producers keep 73% of royalties collected from streaming services, leading to an economic monopoly of record labels and producers over Artists. See: BERKLEE INSTITUTE OF CREATIVE ENTREPRE-

NEURSHIP, op. cit.

¹⁹ As maintained ex multis by: D.A. WALLACH, Bitcoin for rock stars: how cryptocurrency can revolutionise the music industry, Coin Desk, 2014.

²⁰ Such as lack of recognition of authorship; lack of transparency on the economic terms of the use of the works as well as difficulties in royalties calculations; lack of balance in the bargaining power with intermediaries that hold control over artists and over their relationship with the listeners. See: M. HVIID, ET ALL., Digitalisation and intermediaries in

the music industry, CREATE Working Paper, issue No. 07/2017.

²¹ Indeed, copyright law is territorial in nature but works are protected in multiple countries through international instruments. See for instance the provisions of Arts. 2, 3, 5, *6bis* Berne Convention; Arts. 3, 4, 9 TRIPs Agreement; Arts. 1, 6, 7, 8 WIPO Copyright Treaty; Arts. 2 to 5 Info Soc Directive as well as national copyright laws.

As mentioned, the problems that artists face originate mainly from the fact that there is no comprehensive database that shows copyright ownership of every track in existence, being connected to other databases in a complementary function.²² This is where blockchain technology can alter the existing framework by enabling artists to register ownership of their works without the need of middle-men authorities. As Fairfield put it, blockchain technology could be “a revolution in how to keep track of rights”.²³ In fact, blockchain provides the ability to digitise and securely store information of practically any IP asset, increasing availability of information about copyright ownership and allowing right holders to track the use of their work²⁴, solving most of the issues mentioned above.

Lately, this use of blockchain has been attracting the interest of many companies in the music industry which are investing funds to study further applications. One of the first companies to develop a prototype of a comprehensive database based on the Ethereum²⁵ blockchain is the platform Ujo Music. It aims to connect artists and listeners directly and determine ownership of creative works, using a unique ID hash to enable artists to manage their identities and works, as well as for users to instantly obtain information on songs, artists, and other right holders involved in the music production.²⁶

Besides the aforementioned example, other players in the value chain have started to realise the potential of blockchain to keep track of music and related data. One example worth mentioning is the service offered by Aurovine. The company launched in spring 2019 celebrates the ideal of having developed a system that simplifies music distribution to support artists and at the same time, it in-

centives buying works directly from artists. In fact, it permits users to “Listen, Rate and Share music in one go”²⁷ through social media and, in exchange, be rewarded with Audiocoins (crypto coin named ‘ADC’) in their digital wallet.

These examples might suggest that blockchain technology could indeed be used to create a single, universal database of music copyright and a modernised rights management solution for artists and intermediaries. Nevertheless, only time will tell if this financial investment will grow in acknowledgement by the music industry and become popular enough between users to develop its full potential, thus having a real impact on the value chain of music.

3.2 How blockchain can give artists increased control over the management of their works. The music ecosystem imagined by Imogen Heap.

A consequence of the aforementioned advantage of using blockchain in the music industry is that, if authorship is recognised and protected, artists can have more control over the terms of use of their work. Ergo, it is possible to envisage artists using blockchain technology to break the hold of record labels or producers, be more economically independent, and have a more important say over the use or licensing of their works, at prices of their own choosing. Although at the moment this possibility is still hindered by technical limitations and legal hurdles, which would need to be approached and solved as blockchain technology evolves, ideally this could create a direct connection between artists and listeners all across the world.

²² As reported by Khartanovich, information relating to compositions and songs is scattered across over 5,000 databases, online or offline. See: M. KHARTANOVICH, *Managed Chaos: Why the Music Industry Needs Blockchain*, CoinTelegraph, January 24, 2017.

²³ J. FAIRFIELD, *BitProperty*, Southern California Law Review, Volume 88, Issue 4, 2015, p. 4.

²⁴ P. GODSIFF, *Disruptive Potential*, in M. Waplor, *Distributed Ledger Technology: Beyond Blockchain*, Wordlink (London), 2016, p. 57.

²⁵ Ethereum is a decentralized blockchain-based platform, founded in 2014 by Vitalik Buterin.

²⁶ <https://ujomusic.com/>.

²⁷ <https://www.aurovine.com>.

²⁸ The notion that blockchain technology can create a ‘fair’ music trade has been proposed by artists such as Imogen Heap and Benji Rogers; as well as by companies like Aurovine; the music streaming platform Resonate and Stem, a start-up exploring the potential of blockchain for tracking revenue streams from digital service providers.

²⁹ The song, sold for \$0,60 each, gained total revenue of only \$133,20 due to the difficulties to obtain cryptocurrencies on the Ethereum platform to make the required payment.

³⁰ <http://myceliaformusic.org>.

³¹ As defined by J. BARTLETT, *Imogen Heap: Saviour of the Music Industry?*, The Guardian, September 6, 2015.

³² Consequently, artists have sometimes challenged the pricing policies of record labels and CMOs, claiming they violated Article 102 TFEU (rules on competition with regard to union policies and internal actions). The Court of Justice of the European Union has been requested to rule on excessive licensing fees: e.g. joined cases C-110/88, C-241/88 and C-242/88, *François Lucazeau v SACEM*; Case C-52/07, *Kanal 5 Ltd and TV 4 AB v STIM*; Case C-177/16, *Biedrība “Autortiesību un komunikācijas konsultāciju aģentūra - Latvijas Autoru apvienība” Konkurences padome*.

³³ See for instance the report prepared by Cooke to explain how music rights have been exploited in the past, how digital licensing has evolved, and what issues now need to be tackled for fair payment of royalties. C. COOK, *Dissecting the Digital Dollar Part One: How Streaming Services are Licensed and the Challenges Artists Now Face*, Music Managers Forum Report, CMU Insights, 2015.

³⁴ As defined by Berklee ICE in its project, where it is estimated that 20% to 50% of music payments don’t make it to their rightful recipients. See: BERKLEE INSTITUTE OF CREATIVE ENTREPRENEURSHIP, op. cit.

³⁵ Barry was interviewed by Gottfried for an article published on Billboard. See: G. GOTTFRIED, *How ‘The blockchain’ could actually change the music industry*, Billboard, May 8, 2015.

³⁶ For example, Paul McCartney filed a lawsuit against Sony to reclaim the copyright to some of his earliest songs from 1960s with the Beatles; Duran Duran lost the battle with Sony/ATV but are still pushing for another attempt to reclaim the publishing copyrights on over three dozen songs they licensed in UK; and Taylor Swift interrupted all collaborations with Spotify due to lack of fair payment of royalties for the streaming of her songs.

³⁷ As stated on their website: <http://dotblockchainmedia.com/main/#about-section>.

³⁸ The combined partners bring together a catalogue of more than 63 million recordings. With more than 150,000 new recordings added each month, dotBC is hoping to soon be working with the vast majority of the modern music library, ensuring comprehensive coverage of recorded works for the project.

Thanks to the potential benefits of blockchain technology, some distinguished persons in the music industry have suggested that blockchain could bring about a 'fair trade'²⁸ in the music industry for empowering artists. The first attempt to create a fair, sustainable, and vibrant music industry involving various online music interaction services came from the experiment of the British singer and technology advocate, Imogen Heap. She recorded a new song – 'Tiny Human' – and decided to release it for commerce only on a blockchain platform for music sharing (developed by Ujo Music on Ethereum). The experiment in itself was, from an economic point of view, not a success for Heap.²⁹ Nevertheless, it was a wake-up call for many, who started realising the real potential of blockchain and how the music industry might take advantage of the technological capabilities that this technology allows.

Savvy of her first attempt's positive impact, Heap went on with her ideal to reform the music industry and launched one (if not the main) blockchain-based project: Mycelia.³⁰ The project was developed together with the support of Ujo Music in an attempt to automate the background disbursement of royalties to the legitimate parties through the creation of music related metadata and by soon employing smart contracts for 'smarter', faster payments. The entire '*music eco-system*'³¹ of Mycelia proposes a database containing all data relating to the works (such as lyrics, music sheets and photographs) as well as giving full credit to artists (i.e. musicians, performing artists, composers, producers and so on). Mycelia, as well as the previously mentioned Ujo Music, hopes to use blockchain technology to create a system that enables listeners to better locate the right holders and more easily obtain a license for the use of the music for various purposes, ideally directly from the artist itself.

3.3 How blockchain can ensure a faster, more accurate system for royalties payment to artists

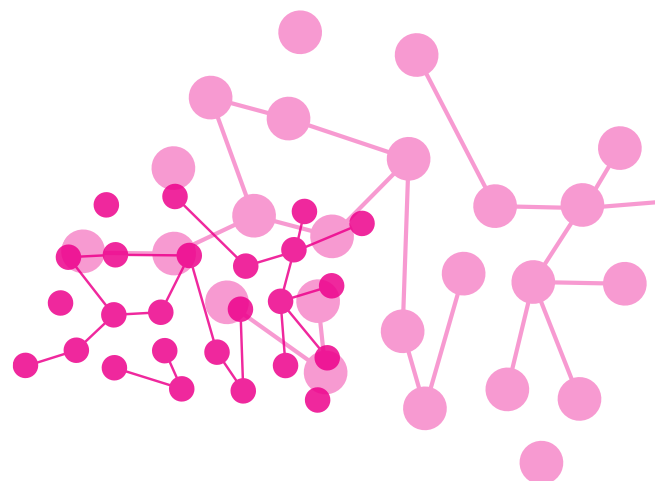
A second advantageous consequence of using blockchain in the music industry is that, if the identification of the person that owns the economic right to the work is made easier, it is also easier to ensure a faster and more correct payment of royalties.

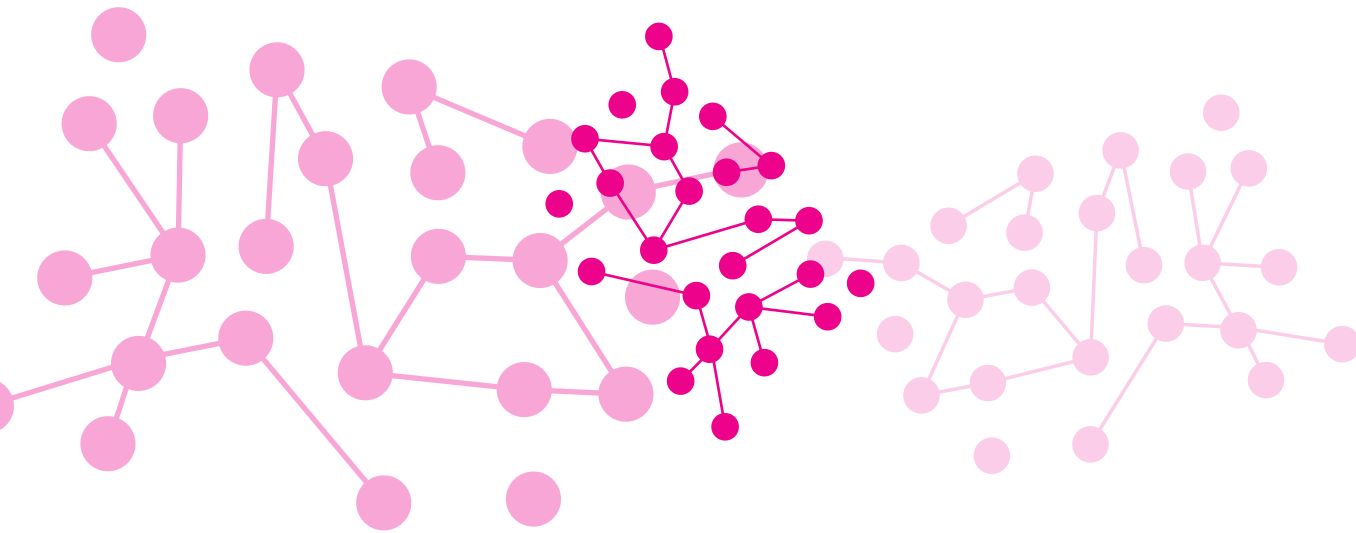
As mentioned above, the questionable economic framework of royalties causes the payment, for both the sound recording and the underlying words and music, to reach the right holders after an extremely long period of time, taking months or even years.³² Even more so, in a culture of confidentiality and non-disclosure agreements on details of many streaming deals, it is extremely difficult for artists or their managers to audit whether record labels, producers or CMOs are processing payments efficiently.³³ Worse, significant amounts of royalties repeatedly fail to reach legitimate recipients, even ending up in so-called 'black boxes'³⁴ in cases where the rightful owner of the rights is not identified accurately. The founder of Ujo Music goes as far as suggesting that approximately 12.7% of royalties currently disappear on the operating costs of a CMOs.³⁵ This is mostly due to the fact that the mechanism by which royalties are calculated and paid is often opaque. Nor does it help that there is no unique international

music database that could unequivocally determine the rights' ownership. Through adoption of blockchain technology, all these lost amounts could instead be made available for profit to artists and record labels. As a consequence, many artists are pushing toward transparency and fairness in their own ways, for instance by opposing major record labels or starting legal actions against streaming platforms.³⁶

An interesting attempt to contrast this lack of transparency is brought forth by DOT Blockchain Media Inc., a self-defined "*shared surface on which all parties in the music industry can collectively share and own information about the songs and artists they work with*".³⁷ Founded by Benji Rogers, the DOT Blockchain Music Project is a public benefit corporation that offers an open-source technology to support a new file format for music called '.bc' (i.e. Dot Blockchain), which contains digital audio along with metadata that points to entries in the blockchain denoting music rights transactions. This empowers the company in offering a service that uses existing industry standards for tracking of royalties (such as DDEX and CWR data) to ensure that all parties involved can obtain truthful collective data about a given song and/or recording and its right holders, through blockchain technology. The value of this project is reflected in the partnership signed in 2017 with the Canadian collecting management society SOCAN and its four partners (i.e. MediaNet subsidiary, Downtown Music subsidiary's Songtrust and digital distributors CD Baby and FUGA)³⁸ which provide technical and financial resources to Dot Blockchain Media Inc. to achieve its goal of music rights transparency.

In light of this, blockchain technology has the potential to change the current situation of the music industry in various ways. Most significantly, by introducing a new way of identifying the correct right holder, tracking the licensing and usage of the work through metadata and bringing transparency in royalties payments from record labels, producers, and CMOs. Finally, as described further on, blockchain eliminates the need for the mediation of 'middle-men' intermediaries between artists and their listeners. All these advancements together might finally help the music industry to evolve, creating fairer and more equal positions for each player in the value chain of music.





4. THE PLAYERS OF THE VALUE CHAIN: A BRIEF OUTLINE OF THE CURRENT MUSIC INDUSTRY

In the last twenty years, the music industry has made a shift to a model based on ‘access’ rather than ‘ownership’³⁹ and this has brought new significant challenges, in particular to the online music industry.

By necessity, artists are entrepreneurs. Their job is to create music and their income originates from listeners’ appreciation of their work. Sometimes they are able to match their passion with a serious career, taking on complicated tasks such as manufacture and distribution of the works or activities like marketing, press publicity, sponsoring and so on. Though oftentimes it seems that artists are constantly waiting for fair financial returns for their efforts.⁴⁰ In order to achieve commercial success and make a name for themselves, most turn toward intermediaries to obtain economic and commercial support. Artists become dependent on record labels and producers to promote, sponsor, and market their works to the public and at the same time they are dependent on CMOs to collect royalties for the use of their work by the public all over the world. Often, these collaborations between artists and intermediaries are presented as an investment in the artists’ success, but in reality, they are more akin to a loan, rather than an equity stake. In so-called ‘360-degree’ deals, intermediaries expand their economic rights on artists’ success: the money given is treated as a recouped account and the artists don’t see royalties until the intermediaries have recouped the entire amount given up front. Due to unbalanced bargaining powers, artists are thus forced to sign such economically disadvantageous contracts with the hope, in the future, of obtaining commercial success that would guarantee a fair return for their efforts.⁴¹

A study of the Institute for Creative Entrepreneurship at Boston’s Berklee School of Music⁴² shows that record labels and producers keep as high as 73% of royalties collected from streaming services, allowing these intermediaries to be entitled to disproportionately high amounts of revenue. The same goes for revenues of royalties collected and kept by most CMOs in various countries, which creates an enormous discrepancy between artists’ and intermediaries’ revenues.

For the sake of clarity, it is possible to summarise the critical points that create disparities in the music industry as follows: as discussed above, the lack of unique, complete, open-access database, with data scattered all over various databases, makes it difficult to identify legitimate right holders, whether they are affiliated with any collective management organizations, and which territory they have licensed, further complicating already convoluted rights tracking and preventing the correct licensing of works between record labels, producers, and CMOs.

Furthermore, the aforementioned lack of transparency on revenue data that affected artists also has a negative impact on the roles of intermediaries. The access to real-time, comprehensible information on the collection of royalties is anything but straightforward. Payment information is disjointed, inaccurate, and incomplete for lack of standardised royalties statements from intermediaries and digital services (explaining the details of the payment flows, of who is paying who and for what usage, and how royalties are calculated)⁴³.

Lastly, time is another major issue. It can take months or years for royalties to finally reach the intermediaries (and consequently their artists) due to bureaucratic administrative verifications, dramatically slowing down the recouping of investments made in artists and obstructing the continued investment in other emerging artists.

In light of this situation of disparity, there is an emerging sense that the music industry’s practices - which led to lack of equality and transparency between artists and intermediaries - do not fit any longer in the fast exchange of information of the digital economy. Thus, the need of a reform of the overall role of each party involved in the value chain is heightened.⁴⁴ So it follows the need for a new framework, in which blockchain will likely bring positive changes toward a future, reformed, artist-oriented scenario.

4.1 The potential of disintermediation within the value chain

Today, artists seek more transparency in the management of their rights and more say in the commercial and economic aspects related to the use of their works. Perhaps the most radical and controversial aspect of how blockchain technology could affect the structure of the music

industry relates to its potential for creating a direct link between artists and listeners, eliminating the need for intermediation by record labels, producers, or CMOs. As Wright and De Filippi put it, blockchain:

“has the potential to decentralise the way we store data and manage information, potentially leading to a reduced role for one of the most important regulatory actors in our society: the middle-men.”⁴⁵

The reduction in the number of intermediaries capturing economic gain in the value chain could be made a reality by blockchain through its characteristic of disintermediation. This technology could automate most of the processes between artists and listeners and equilibrate the powers in the value chain by removing the enormous power of such intermediaries, hence reducing disparity.⁴⁶ This would allow artists to (more) easily sell their work to listeners worldwide and receive direct and automated payments. The same would happen for all parties involved in the creation of the work (i.e. composers, performing artists, and producers etc.) that normally are not acknowledged nor involved in the negotiations with the intermediaries.

This has recently been made possible by a number of blockchain-based companies. One example is the service offered from the UK company Bittunes⁴⁷, which has assembled a number of independent indie bands from over seventy countries and is trading music on its blockchain-based platform. The company celebrates the ideal of having developed a system that simplifies music distribution to exclusively support artists that are not part of any major record label.

Similar to the previous company is PeerTracks,⁴⁸ a start-up worth mentioning due to the fact that it is the first streaming application that offers artists the possibility of entering into contact directly with their listeners and obtaining simultaneous payment of royalties. In fact, by utilising the SOUNDAC blockchain platform, royalties are paid immediately at the moment the work is streamed by users.

Lastly, another positive input comes from the aforementioned open access projects of the Institute for Creative Entrepreneurship at Berklee School of Music,⁴⁹ which has managed to gather almost every major party under the music industry to explain why blockchain is at least worth exploring and engaging with.

In conclusion, these ideals are pure, but only time will tell if blockchain will become popular enough between users to establish a change. The ideal of upsetting the entire status quo of the value chain system and reach complete disintermediation without ‘middle-men’ takes time, especially since it mainly needs acceptance by the general public to become a valid substitutive technological method and new legal paradigm, which will still need to be tried out and perfected over time.

4.2 The impact of blockchain over the roles of CMOs

CMOs face the same type of challenges that record labels and producers face due to disintermediation via blockchain. Artists and producers must go through hundreds of CMOs from all over the world to collect royalties for a work of music (assuming that the technology used by CMOs records all of the uses of the work, since most music consumption and distribution happens online). The administration of works requires extensive data processing capabilities and the ability to keep information up to date, thus uncertainty remains regarding the ability of CMOs to properly provide their services for online management of works.

Currently, there is a breakthrough under way in digital royalties tracking and collection and CMOs are being pressured to reduce overheads, become more competitive with each other, and more transparent toward artists.⁵⁰ Many CMOs around the world do not have the ability to quickly and accurately exchange electronic data with online service providers pertaining to online usage of works and verifying the existence of licenses. In the era of global digitalisation, right holders often have to rely on outdated collection methods and manual verification of the correctness of data that subsequently hinder the correct

³⁹ M. O'DAIR, Music on the blockchain. Blockchain for creative industries, Cluster, Middlesex University, Report N° 1, July 2016.

⁴⁰ M. O'DAIR, The networked record industry – How blockchain technology could transform the consumption and monetization of recorded music, in Special Issue: The Future of Money and Further Applications of the Blockchain, Nemode, Volume 26, Issue 5, 2017.

⁴¹ For instance, Schwartz analysed a royalties' statement sheet. The statement shows a song streamed 162,525 times on Spotify had a total of royalties reported for US\$11.46. Of those, the songwriter receives 50% of the royalties, which amount to US\$5.73. The value per stream is US\$0.000035. See: E. SCHWARTZ, Coda: fair trade music: letting the light shine,

Cambridge Intellectual Property and Information Law, Cambridge University Press (Cambridge), 2014, p. 314.

⁴² The report tries to exemplify payments from streaming services and relationship between the parties. BERKLEE INSTITUTE OF CREATIVE ENTREPRENEURSHIP, op. cit.

⁴³ Initiatives like Digital Data Exchange (DDEX) have attempted to establish some XML messaging standards for the communication among others, communications regarding electronic releases, digital sales, and music licensing in the digital supply-chain.

⁴⁴ M. O'DAIR, Music on the blockchain. Blockchain for creative industries, op. cit.

⁴⁵ A. WRIGHT, P. DE FILIPPI, Decentralized Blockchain Technology and the Rise of Lex Cryptographia (March 10, 2015). Available at SSRN: <https://ssrn.com/abstract=2580664> or

<http://dx.doi.org/10.2139/ssrn.2580664>, p. 6.

⁴⁶ Indeed, as Nakamoto believed, the ingenuity of blockchain lies in ‘allowing any two willing parties to transact directly with each other without the need for a trusted third party’. S. NAKAMOTO, Bitcoin: A Peer-to-Peer Electronic Cash System, op. cit., p. 1.

⁴⁷ <http://bittunes.co.uk/>.

⁴⁸ <https://www.peertracks.com/>.

⁴⁹ BERKLEE INSTITUTE OF CREATIVE ENTREPRENEURSHIP, op. cit., p. 10.

⁵⁰ Recital 3 and 46 and Arts. 16 – 18 – 20 of the Directive [EU] 2019/790 of the European Parliament and the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC, May 2019 (‘DSM Directive’).

processing of users' reports and related invoicing as well as delaying the correct distribution of due amounts.⁵¹

Pushed by this wave of old challenges and new technological developments, some CMOs have recognised the need for them to step up with their role in the music industry by improving their functioning and accountability, embracing new technologies, and establishing new collaborations to fill the gaps caused by a non-transparent and unbalanced market. Guidance and directions also came from the CMO Directive, which aimed to provide a response to the extensive fragmentation of national rules on collective right management but also on fragmentation of remedies against the inefficiencies of CMOs in copyright exploitation.⁵²

Remarkably, blockchain technology could assist CMOs in their daily activities, enabling advances in correct and automatic tracking of digital usage and generating fair compensation for artists in a cost-effective manner (through fingerprinting of works). Pre-agreed contractual rules put in place between CMOs and right holders, and imputed in the code, would facilitate fast and frictionless royalties collection.

For instance, Polaris Nordic⁵³ - a North European alliance of three collective societies - is driven by the idea of bettering its services towards artists. It seeks to develop a joint back-end system for music reporting and distribution of the revenues, in order to adapt collective rights management and licensing processes to the digital era. With the goal of reaching the European Commission's objectives stated in the DSM Directive,⁵⁴ in 2018, Polaris Nordic partnered with the blockchain-based company Revelator⁵⁵ which developed a first copyright application programming interface,⁵⁶ providing Polaris Nordic with a framework for upgrading its data management system. Only time will tell if this interface will really bring a change in these CMOs data management and royalties' collection, but the current preparatory work is already a

good step towards a very plausible right solution for revamping the relationship between CMOs and artists.

Another example of CMOs willing to partner up to explore the advantages of blockchain is PRS for Music, ASCAP, and SACEM.⁵⁷ In April 2017, they initiated a joint project to model a new system for improving the data accuracy for right holders and the processing of royalty matching, which will in turn speed up licensing, reduce errors and costs.⁵⁸ They are working with IBM - leveraging the open source Hyperledger Fabric blockchain platform from the Linux Foundation - to match, aggregate, and qualify existing links between various recording standard codes, and to solve the problem of data scalability. The project is currently entering its second phase, which will test a real-life situation, extending the library to millions of works.⁵⁹

In essence, these platforms show a new form of possible profit for intermediaries and demonstrate how blockchain could radically simplify the way music right holders are identified and compensated, resulting in sustainable business models for artists and intermediaries alike.

4.3 Complete disintermediation is unlikely at the moment

The main question is whether blockchain technology will be well received by record labels, producers, and CMOs. At present, the process of disintermediation that blockchain could generate is perceived by those same intermediaries as a threat.⁶⁰

In the light of the recent discussions, while the innovators of the music industry point optimistically to blockchain to offer potential transformation, such as challenging the economic models and bringing about more equal and fair solutions for all parties involved, this reasoning is at the same time too simplistic and underestimates the work currently carried out by record labels, producers, and CMOs.

⁵¹ This critical assessment is well described in EU Commission, Working Document, COM(2012) 372 final. p. 26.

⁵² Recital 5 of the Directive 2014/26/EU of the European Parliament and of the Council of 26 February 2014 on collective management of copyright and related rights and multi-territorial licensing of rights in musical works for online use in the internal market ('CMO Directive').

⁵³ Koda (Denmark), TEOSTO (Finland) and Tono (Norway). <https://www.polarisnordic.org/>.

⁵⁴ Namely the modernisation of EU copyright framework to take account of technological developments and new channels of distribution of protected content in the internal market. See Recital 2, DSM Directive.

⁵⁵ Revelator is a cloud-based digital asset platform founded in 2012, now leading provider of data services such as aggregating, processing, reporting and analysing of large volumes of data and of solution for achieving transparency in royalties' distributions. <https://revelator.com/>.

⁵⁶ The goal of the Polaris Nordic case study is to provide for much called transparency and efficiency, by offering to developers and enterprises tools to access and manage digital assets, including copyrights. <<https://revelator.com/case/3159/polaris>>.

⁵⁷ PRS for Music Limited, UK's leading CMO. ASCAP (American Society of Composers, Authors, and Publishers), American non-profit performance-rights organization. SACEM (Société des Auteurs, Compositeurs et Editeurs de Musique), French CMO.

⁵⁸ <https://societe.sacem.fr/en/press-resources/per-publication/press-releases/ascap-sacem-and-prs-for-music-initiate-joint-blockchain-project-to-improve-data-accuracy-for-rightsholders>.

⁵⁹ P.J. QUINTAIS, B. BODÒ, L. GROENEVELD, Blockchain Copyright Symposium: Summary Report', Kluwer Copyright Blog, August 4, 2017.

⁶⁰ C. SITONIO, A. NUCCIARELLI, The Impact of Blockchain on the Music Industry, Conference Paper: R&D Management Conference 2018, (Milan), July 2018.

⁶¹ Respectively Art. 12, Art. 8 and Art. 16 DSM Directive.

⁶² J. SILVER, Blockchain or the Chaingang? Challenges, opportunities and hype: the music industry and blockchain technologies, op. cit., p. 55.

⁶³ The value gap is the misalignment between the volume of creative content accessed globally by users through online service providers, that obtain unreasonable value from just enabling sharing of content, and the revenue that these accesses generate for the right holders.

⁶⁴ Recital 73 DSM Directive.

⁶⁵ Recital 75 DSM Directive.

⁶⁶ Recital 78 DSM Directive.

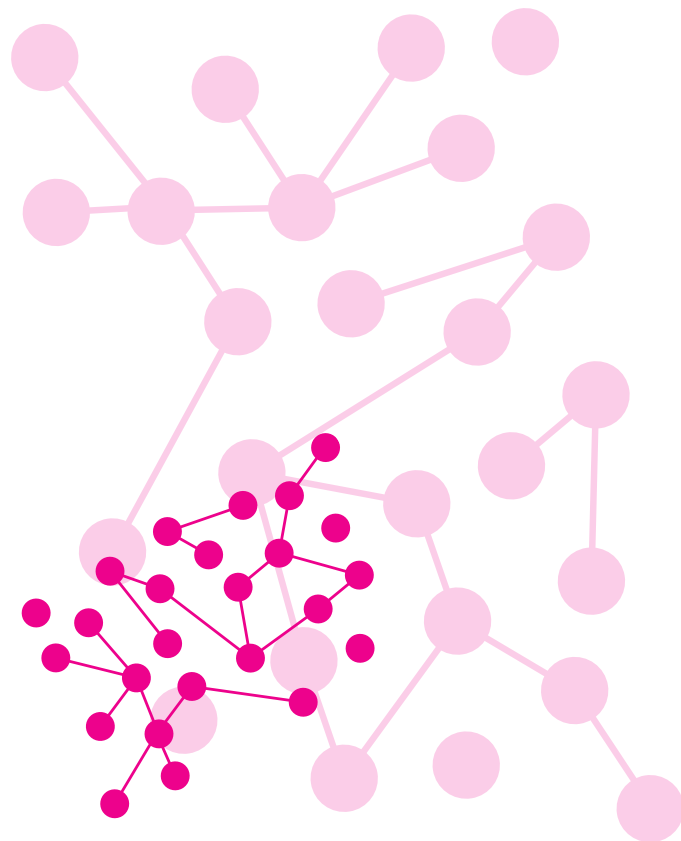
First of all, they are uniquely responsible for identifying artists' details, eligibility, and status for collecting in a particular territory. Then, there is the question of tracking down previously unrecognised contributors when data is lacking. Only manual work could allow this type of checks. Of primary importance is their role in managing claims over contributions and the power to decide in dispute resolution. Moreover, given the role that the DSM Directive gives to CMOs, for instance in collective licensing, protecting cultural heritage or achieving appropriate compensations for artists,⁶¹ it is clear that the legislator does not share this revolutionary idea of eliminating CMOs.

Nevertheless, there seem to be opportunities in blockchain technology that current CMOs, records labels, and producers indeed could and should explore. By implementing an efficient system via blockchain to create a system for royalties tracking, gathering and distribution, the benefits are likely to bring them more incremental return on investment. Even after the hypothetical adoption of blockchain, the complexity of the current system will take some time to unravel and rebuild. Provided that intermediaries are willing to step outside their roles and venture into a greater form of openness and transparency, they could achieve a higher level of trust between the parties in the value chain (nowadays lacking⁶²).

5. HOW BLOCKCHAIN CAN HELP IMPLEMENT THE GOALS OF THE DSM DIRECTIVE

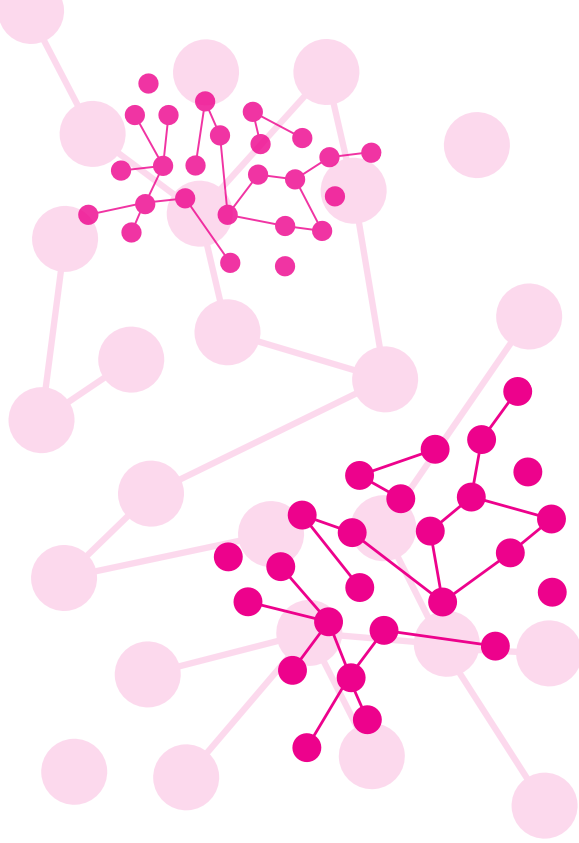
The EU institutions have recently addressed the need for a proper legal framework for the protection of artists and other copyright holders within the framework of the DSM Directive. In order to achieve a well-functioning, fair marketplace for copyright protected works, the EU legislator has introduced four innovative provisions that will improve protection on:

- i) the use of protected works by online content-sharing service providers storing and giving access to user-uploaded content (Article 17). This provision is easily the most controversial as it addresses the perceived 'value gap'.⁶³ By allowing its users to upload copyright protected works, service providers perform an act of communication or an act of making available to the public for the purposes of the DSM Directive. Hence, they must obtain an authorisation from the right holders in order to avoid liability for copyright infringement. This is the key obligation enshrined in the new DSM Directive. Where no authorisation has been granted to the service providers, it shall be assessed whether the latter has made its best efforts to prevent the availability of unauthorised works online.
- ii) artists' appropriate and proportionate remuneration (Article 18). This provision requires the implementation of different mechanisms that allow the supervision of the use of each work and easy determination of who uses the work and for what purpose. Appropriate and proportionate remuneration of artists is guaranteed in relation to the actual or potential economic value of the licensed or transferred rights,



taking into account all circumstances.⁶⁴ It also requires the creation of a database containing the correct information of the right holders so that the remuneration can be allocated in time.

- iii) transparency obligations for up-to-date, relevant and comprehensive information over the exploitation of the works (Article 19). As artists tend to be the weaker contractual party, it is important that they receive adequate and accurate information to assess the actual economic value of their rights. In order to achieve the requested level of transparency and balance in the remuneration of artists,⁶⁵ the latter shall receive on a regular basis comprehensive, up-to-date and comprehensible information on the exploitation of their works from third parties to whom they have licensed or transferred their rights. Thus, this provision requires to identify a technological instrument that would allow for easy, automated, immediate tracking of the use of works and automatic calculation of the amount of revenue originated for each right holder.
- iv) use of mechanisms for contract adjustment of economical remuneration (Article 20). These mechanisms allow artists to renegotiate with their contractual counterparts in the event that the economic value of the rights turn out to be significantly higher than initially estimated and the remuneration is therefore disproportionately low compared to all relevant revenues derived from the subsequent exploitation.⁶⁶ The assessment of proportionality should take account of all relevant revenues and specific circumstances.



In light of the above, it cannot be denied that the attempt to revise copyright law is a commendable effort by the EU Parliament to prevent artistic theft and increase the protection of artists and their IP rights. In this perspective, blockchain technology may play an important role in ensuring the protection of copyright protected works of music, thanks to its intrinsic characteristics.

In conclusion, blockchain is shaping up to be transformational and developments are currently moving fast, with concrete applications being developed. Even the EU Commission has recognised blockchain-based technologies as having significant potential for the purposes of the DSM Directive.⁶⁷ At the same time, it will be another couple of years before the DSM Directive takes effect across the member states. Only time will tell what the real and effective advantages brought to artists by this new legislation will be.

6. SMART CONTRACTS FOR AUTOMATIC EXECUTION OF OBLIGATIONS, STANDARDISED LICENSING AND NEAR-INSTANT PAYMENTS OF ROYALTIES

One of the first to theorise the concept of a contract that was created, executed, and maintained online was Nick Szabo. He conceived the term ‘smart contract’ back in 1994, to denote “*a computerised transaction protocol that executes the terms of a contract*”.⁶⁸ In spite of their name, in the blockchain context⁶⁹ smart contracts are not legally binding contracts but are algorithms commonly referred to as ‘executable software’ that express the content of a contractual agreement. As better explained by Cuccuru, a smart contract is a computer program, running as second level application and implemented on top of the chain.⁷⁰ It contains a set of rules provided by the parties, in regard to a specific contractual agreement. Upon the satisfaction of these predetermined rules, the agreement contained in

the smart contract automatically processes inputs and autonomously enforces the rules through the code of the blockchain. The main value of smart contracts is their automated execution of contractual obligations modelled after simple if-then rules,⁷¹ making them a useful tool for on-chain relationships in order to introduce higher efficiency in terms of cost, speed, and security.

The above has led to expectations that smart contracts, embedded on blockchain, may be used in the music industry to reliably enable automatic execution of a large volume of agreement transactions within the copyright domain. Even more so, as second-layer applications embedded on blockchain, they benefit from the same tamperproof nature of the underlying blockchain infrastructure. At the same time, thanks to the blockchain’s characteristic of time-stamping each transaction with the exact date and time, uncertainties about the temporal context and execution of the agreed obligations are prevented.

Moreover, as smart contracts leave no room for voluntary breaches of the agreement, they are a great tool to reduce the risk of non-compliance and interpretative uncertainty.⁷² Consequently, blockchain has the potential of playing a role in standardising licensing terms and conditions for protection of copyright protected works across various uses and different jurisdictions through licensing standards embedded in the software.⁷³ Following the example of Creative Commons licenses,⁷⁴ blockchain-based smart contracts can be used to generate customised smart contracts containing the terms of the license agreement, the obligations of each party, the time and place of execution, the terms of payment – possibly even its split between various beneficiaries – further lowering the number of intermediaries between the rights holders and their audience.⁷⁵

Finally, smart contracts allow the collection and distribution of rights in almost real time by introducing frictionless, near-instant micropayments that operate according to pre-agreed rules put in place by right holders to control who has access to their works and under which conditions. Thus, time for artists to get paid would likely decline drastically in comparison to the current timing within the value chain’s framework, which has inordinate delays in payments to artists.

In summary, blockchain technology could allow the music industry to capture greater upsides. This is undoubtedly good news for aspiring artists who often agree to disadvantageous contractual terms in order to get higher exposure.

6.1 Unresolved technical and legal issues related to smart contracts, and transversely to blockchain in general

Despite the advantages mentioned above, smart contracts also have certain limits that already draw boundaries in their innovative character and which mainly stem from both the intrinsic rigidity of the digital environment and the decentralised architecture they are included in. There remain substantial unresolved issues limiting the applicability of smart contracts in the music industry – and transversely of blockchain in general. It is known that legal

systems lack consensus on how code as contract fits into the traditional concepts of contract law. Furthermore, it is unclear how to resolve issues related to jurisdictional conflicts and determining applicable law, which are crucial questions for a markedly territorial right like copyright. As a consequence, at the moment the system lacks appropriate instruments to handle dispute resolution.

More broadly, it is necessary to univocally determine how to coordinate the provisions of a-territorial smart contracts, that restrict the use of the work in a way that conflicts with exceptions or limitations to the use established by the legislation of the country of each user.

Further, the rigidity of the code doesn't allow for easy adaption of the code to a peculiar situation when contractual parties are willing to provide a certain level of flexibility and vagueness in their contractual terms, for different reasons. Smart contracts structurally limit parties' discretion, as the code needs unequivocal and pre-defined propositions to follow instructions given and process them automatically.⁷⁶

Moreover, using blockchain technology for copyright licensing requires a massive amount of coordination between on-chain and off-chain transactions. To prevent potential conflicts (i.e. de-synchronisation), the reality as represented on a blockchain and the reality as represented through non-blockchain contracts and traditional institutions must always remain synchronous.⁷⁷ So far, the sys-

tem lacks remedial measures for upset coordination between on-chain smart contracts and off-chain traditional contracts.

Further, there are still other technical and legal questions that need to be resolved before blockchain could gain popularity. Blockchain can guarantee the existence of a work at a specific time (thanks to the time-stamp characteristic). Nevertheless, it cannot prevent the work from being copied off-chain. In order to do so, something akin to DRM would be required.

Of foremost importance, blockchain has two main points of tension with GDPR,⁷⁸ as identified by an EU Parliament study in 2019.⁷⁹ First, the GDPR requires that in relation to each personal data point, there is at least one natural or legal person (i.e. the data controller) that can be addressed by data subjects to enforce their rights. Blockchain, however, often seeks to achieve decentralisation and this makes the allocation of responsibility and accountability burdensome. Second, the GDPR guarantees that data can be modified or erased where necessary to comply with legal requirements (Articles 16 and 17 GDPR). Blockchain, however, renders such modifications of data purposefully onerous in order to ensure data integrity and increase trust in the chain. The study has concluded that it can be easier for private and permissioned blockchains to comply with these legal requirements as opposed to private and permission-less blockchains.

⁶⁷ On April 3, 2019 the EU Commission launched the International Association of Trusted Blockchain Applications (INATBA) with the aim of promoting a global model of governance for blockchain. <https://ec.europa.eu/digital-single-market/en/news/launch-international-association-trusted-blockchain-applications-inatba>. Also see the EU Policy on Blockchain Technologies: <https://ec.europa.eu/digital-single-market/en/blockchain-technologies>.

⁶⁸ N. SZABO, Smart contracts: building blocks for digital markets, King's College London, 1996.

⁶⁹ The need to specify smart contracts 'on blockchain' from other smart contracts originates from the fact that there are many other types of smart contracts in our daily life, even if most are not aware of. One instance of a smart contract could be a simple vending machine. When the 'if-condition' is triggered, i.e. money is inserted into the machine, the machine operates the 'then-condition', therefore a sale contract is executed automatically and the machine provides the consumer with the chosen product. This is a smart contract.

⁷⁰ P. CUCCURU, Beyond bitcoin: an early overview on smart contracts. An early overview on smart contracts, *International Journal of Law and Information Technology*, Volume 25, Issue 3, 2017.

⁷¹ Vitalik Buterin portrays smart contracts as "cryptographic 'boxes' that contain value and only unlock it if certain conditions are met". See: V. BUTERIN, Ethereum white paper. A next generation smart contract & decentralized application platform, Blockchain Research Network, 2013, p. 13.

⁷² The effectiveness of the relationships derives directly from formally embedding the instructions within the code. That is well exemplified by Lawrence Lessing's 'code-is-law' theory, which elevates technological architecture among the regulatory constraints that people's behaviours are influenced by (the others being law, market forces and social norms). See: L. LESSING, *Code: and other laws of cyberspace*, Basic Books (U.S.A.), 1999.

⁷³ B. ROSENBLATT, *Watermarking Technology and Blockchains in the Music Industry*, Digimarc, 2017.

⁷⁴ In 2001 a group of US Internet legal and IP experts, as well as other interested parties, established a non-profit corporation called 'Creative Commons' to draft a set of licences which could be used to modify the actual approach of 'All Rights Reserved' to a more flexible approach to copyright of 'Some Rights Reserved'. The central idea of Creative Commons is that copyright owners can, by attaching a CC licence to their works, explicitly and automatically give certain rights to licensees (i.e. anyone who accesses their work) while reserving certain other rights to

themselves (hence 'Some Rights Reserved') <https://creativecommons.org/>.

⁷⁵ A. I. SAVELYEV, Copyright in the Blockchain Era: promises and challenges, Higher School of Economics Research Paper No. WP BRP 77/LAW/2017, 2018, p. 4–12.

⁷⁶ Code lines are not able to render 'grey areas'; everything is either 1 or 0. See P. CUCCURU, *Beyond bitcoin: an early overview on smart contracts*. An early overview on smart contracts, op. cit.

⁷⁷ Where the on-chain token is simply the avatar of an off-chain work, the blockchain cannot prevent that copyright protected works, such as a song, is copied or sold without the update of the relevant information on the chain. See: A. I. SAVELYEV, Copyright in the Blockchain Era: promises and challenges, op. cit., p. 3 – 8.

⁷⁸ Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC ('GDPR').

⁷⁹ Study of the EU Parliament: Blockchain and the General Data Protection Regulation. Can distributed ledgers be squared with European data protection law?, Panel for the future of science and technology, European Parliamentary Research Service Scientific Foresight Unit (STOA), PE 634.445, July 2019.

Furthermore, there is the problem of cryptocurrency implementations and validation on the market that needs to be solved. Finally, one must consider the capacity of the system to support bigger and more numerous transactions if blockchain evolves in a popular method of music sharing and licensing.

Notwithstanding the serious legal and technical issues surrounding smart contracts and blockchain, this technology needs to reach mass use by a significant number of right holders and cover a significant amount of copyright protected works in order to unleash its full potential. Only then will it be possible to evaluate the consequences of its implementation and solve all relevant issues.

For the foreseeable future, this uncertainty surrounding the legal status of smart contracts is likely to limit the emergence of more complex and robust arrangements in the domain of music copyright protection on blockchain.⁸⁰ This cautious normative discussion leads us to embrace the description given by Quintais, Bodò and Groeneveld on the future of blockchain. They concluded that:

“at best, blockchain [was] is an opportunity for incremental improvement of efficiency and transparency of online music licensing and rights management, while offering artists an additional avenue for direct licensing. At worst, blockchain [was] is a seriously overhyped fad with none of the predicted revolutionary potential. A more measured, theoretical, normative analysis, [...] reveals both promises for improving copyright-based practices, and frictions between the design of the technology and the legal architecture.”⁸¹

In conclusion, only time and a higher number of applications of this technology will show if the promises are met for improving copyright-based practices, reducing frictions within the current framework of the value chain, and improving the legal architecture of copyright protection in the music industry.

7. CONCLUDING REMARKS

Blockchain technology, though in its infancy, seems to hold the potential to transform the entire music value chain drastically. By introducing a new legal paradigm for the protection of works of music, blockchain is likely to bring artists benefits, particularly in terms of better protection of authorship through the creation of a comprehensive database (with information about right holders, works, licensing terms, history of ownership, transferring of rights, and so on); implementation of an efficient blockchain system to create royalties tracking, gathering and distribution, radically simplifying the way right holders are identified and compensated, and resulting in fairer remuneration of artists through fast and frictionless payments of royalties. All this will have the consequence of enabling artists to make a living out of creating music and allowing the full development of the online music industry through the use of smart contracts, embedded on blockchain.

Albeit the advantages that blockchain technology could bring to the music industry, there are still some technical and legal questions to be resolved before this technology could be accepted by parties of the value chain and the general public as a valid substitutive technological method and new legal paradigm.

It takes time to adapt the legal paradigm to new social and technological situations and it takes even more time for the law to accept the technological changes, study them and their effects on real life, and find a way to legislate to accommodate them. In addition, one should take into consideration the fact that the public must support the change before it actualises. For instance, not all parties might welcome a shift toward a peer-to-peer digital networked music industry, as not all will benefit from it. Many key stakeholders are too hesitant to accept these new technological developments, afraid to see their *status quo* upset in the value chain. As discussed, the current framework of the music industry doesn't make it feasible to completely cut out these 'middle-men' in the near future,

⁸⁰ B. BODÒ, D. GERVAIS, P.J. QUINTAIS, Blockchain and smart contracts: the missing link in copyright licensing?, *International Journal of Law and Informatics Technology*, Volume 26, Issue 4, 2018, p. 13.

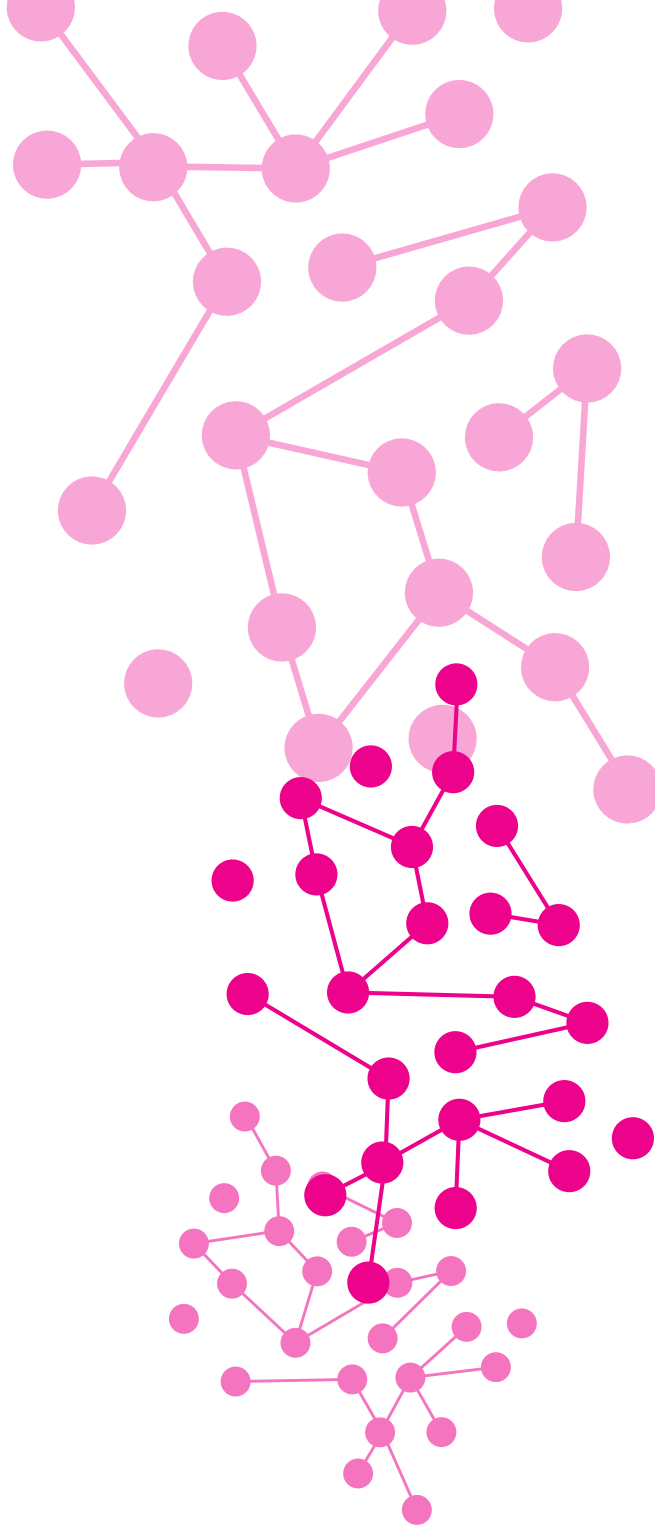
⁸¹ P.J. QUINTAIS, B. BODÒ, L. GROENEVELD, Blockchain Copyright Symposium: Summary Report', *op. cit.*

⁸² Exemplified by free streaming/download platforms that allowed users to access and download copyright protected works in violation of copyright legislations, such as Napster, Gnutella, Grokster, Limewire, as well as to the early 2000s types of BitTorrent networks i.e. Kick Ass Torrents or the infamous Pirate Bay platforms.

as many of their responsibilities cannot be easily replaced by the automatic computerised actions of blockchain technology and smart contracts.

The process of disintermediation that blockchain could enable will take time. Even after a hypothetical full adoption of blockchain, the complexity of the current system will take some time to unravel and be rebuilt, just as for a new legal paradigm to be instituted. The music framework first needs to achieve a high level of trust by the different parties involved in the value chain - nowadays lacking - in order for them to willingly cooperate and make the contribution of blockchain a really valuable instrument. Subsequently, blockchain applications need to be tried-out and perfected over time until they achieve a degree of development, scalability, reliability, and market adoption where all parties are equally represented, enabled, and protected in the music industry. In fact, aware of the impacts of the application of earlier technology novelties,⁸² the music industry is still trying to find a balance in accepting the inevitable role of new technological solutions in this industry. There are grounds to fear the risk and negative impact that these new solutions could bring about in the music industry – if not well moderated, adapted, and controlled – disrupting once more the value chain and the industry’s inner equilibrium.

It’s still too early to say how blockchain-based music platforms will perform, since most are very new and have yet to be widely recognised and implemented. Blockchain is probably not a panacea to all the problems plaguing the music industry. However, it promises a way out of the current deadlock between artists and intermediaries and it offers a foundation that can bring together the entire value chain and revamp the music industry by getting rid of the outdated hierarchic framework. Should blockchain technology reach its full market potential in the forthcoming years and be followed by a shift to a blockchain networked application, this may have a significant, transformative impact on copyright in the digital music industry, as well as on other creative industries entirely.



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