BLOCKCHAIN CHALLENGES TO COPYRIGHT
Revamping the online music industry

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ABSTRACT

As blockchain technology seems to be revolutionising the modern times, it is difficult to underestimate the hype concerning this technology. Although still at its infancy, the potential applications of this technology in relation to the music industry is of particular interest, as it appears to offer solutions to problems inside the music industry that Performing Artists, Composers and Producers have highlighted for decades. In fact, they have denounced the many difficulties to overcome in order to: i) obtain recognition of authorship over their Works as well as direct management of the licensing terms of said Works; ii) achieve a ‘fairer trade’ of Works of music, with transparency on the economic terms of the use of the Works as well as on the royalties calculations; and iii) modernize the value chain inside the music industry, which requires many efforts to re-evaluate the economic and bargaining power that intermediaries hold over Artists and over their relationship with the listeners.

This author takes the opportunity to discuss how new technological developments are changing legal paradoxes of copyright. The thesis introduces various legal aspects of the application of blockchain technology in the copyright sphere, with specific reference to the analysis of online music industry in its modern status. Within this framework, this thesis studies with a critical eye the technological changes brought by blockchain to the music industry, with particular attention to rules that such a disruptive innovation may have on the distribution of music industry revenue.

This thesis starts from a technical overview of the blockchain technology, proceeding then with studying the intersection between blockchain and the copyright environment, subsequently leading to an analysis of practical applications of the blockchain technology in the music industry. At the end conclusions are drawn.

It could be assumed that blockchain technology might represent an opportunity to reimagine and revamp the protection and use of copyright related intellectual property rights by implementing a trustworthy, transparent, more affordable, highly standardized, time-stamped and automated blockchain-enabled system. Such a system could lead to equality in protection of authorship of Works of music and fair remuneration of copyrights holders in the music industry, on a planetary scale.

Blockchain is 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 old, outdated ‘hierarchic’ framework. This would give every Artist the chance to offer their Works to the world; have more say in deciding how and to whom the Works are licensed; have their copyrights effectively protected and be fairly compensated for their Work, consequently being able to make a living out of creating music.
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## Abbreviations

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<tr>
<td>AMRA</td>
<td>American Music Rights Association</td>
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<tr>
<td>API</td>
<td>Application programming interface</td>
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<tr>
<td>BERKLEE ICE</td>
<td>Berklee School of Music – Institute for Creative Entrepreneurship</td>
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<tr>
<td>CMO</td>
<td>Collective Management Organization (or collective societies)</td>
</tr>
<tr>
<td>DESYNCHRONIZATION</td>
<td>Coordinate smart contracts and off-chain traditional contracts</td>
</tr>
<tr>
<td>DISINTERMEDIATION</td>
<td>Eliminating the need for intermediation of record labels, Producers or CMOs, between Artists and listeners</td>
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<tr>
<td>DLT</td>
<td>Distributed Ledgers Technology</td>
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<tr>
<td>DRM</td>
<td>Digital Right Management</td>
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<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>HASH</td>
<td>Hash pointers are technical link that link each ledger together</td>
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<tr>
<td>IP</td>
<td>Intellectual Property</td>
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<tr>
<td>IPR</td>
<td>Intellectual property rights</td>
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</table>
LEDGER: Block added to the existing chain of blocks, containing different data grouped together by Hash pointers.

OMI: Open Music Initiative.


ROYALTIES: All type of revenue related to the exploitation or use of the Work of music, by the rightholder or any authorized third parties, such as economical payments, income or retribution.

SIPR: Smart intellectual property rights.

SP: Online content-sharing service provider.


TOKEN: Raw data that can represent different forms of digital assets.


WCT: WIPO Copyright Treaty, adopted in Geneva on December 20, 1996 and entered into force on March 6, 2002. The WCT is a special agreement under the Berne Convention that deals with the protection of works and the rights of their authors in the digital environment.


DEFINITIONS FOR THE PURPOSE OF THIS THESIS

The following terms are used consistently with the definitions provided by international treaties and conventions, in particular by Art. 3 Rome Convention:

ARTIST: A comprehensive term for Performing Artist and Composer and in general any other person who creates, reproduces, adapts, performs a Work of music.

COMPOSER: A person that writes the music and/or the lyrics of a Work of music.

PERFORMING ARTIST: A singer, musician or Artist performing the Work by singing and playing musical instruments simultaneously, and any other person who sings, delivers, declaims, plays in, or otherwise performs artistic Works. This includes also professional and amateur DJs and any other person who...
adapts with personal variations or remixes one or more Works (whether of his/her own creation or created from another right holder)

**PRODUCER**
a person who, or the legal entity which, first fixes the Work of music

**WORK (OF MUSIC)**
a phonogram, with or without lyrics (i.e. any exclusively aural fixation of sounds of a performance or of other sounds)
CHAPTER 1

Introduction

1.1 BACKGROUND

As blockchain technology seem to be revolutionising the modern times\(^1\), it is difficult to underestimate the hype concerning this technology. Although still at its infancy, the potential applications of this technology in relation to the music industry is of particular interest, as it appears to offer solutions to problems inside the music industry that Performing Artists, Composers and Producers have highlighted for decades. In fact, they have denounced the many difficulties to overcome in order to: i) obtain recognition of authorship over their Works as well as direct management of the licensing terms of said Works; ii) achieve a ‘fairer trade’ of Works of music, with transparency on the economic terms of the use of the Works as well as on the royalties calculations; and iii) modernize the value chain inside the music industry, which requires many efforts to re-evaluate the economic and bargaining power that intermediaries hold over Artists and over their relationship with the listeners\(^2\).

Technology and law have always been closely connected, thus this author takes the opportunity to discuss in the thesis how new technological developments are

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\(^1\) As maintained \textit{ex multis} by: D.A. WALLACH, \textit{Bitcoin for rock stars: how cryptocurrency can revolutionise the music industry}, Coin Desk, 2014.

\(^2\) The origin of these problems is well summarized in a Working Paper by the UK Copyright and Creative Economy Centre at the University of Glasgow (CREATe): “Prior to digitalisation, the vertical structure of the market for recorded music could be described as a large number of Artists [Composers, lyricists and musicians] supplying creative expressions to a small number of larger record labels and Producers who funded, produced, and marketed the resulting recorded music to subsequently sell these works to consumers through a fragmented retail sector. [...] Digitalisation has led to a new structure in which the retail segment has also become concentrated. Such a structure, with successive oligopolistic segments, can lead to higher consumer prices through double marginalisation. We question whether a combination of disintermediation of the record labels function combined with “self-publishing” by Artists, will lead to the demise of powerful firms in the record label segment, thus shifting market power from the record label and Producer segment to the retail segment, rather than increasing the number of segments with market power” therefore giving back the economical and bargaining power to Artists. See: M. HVIID, S. JACQUES, S. IZQUIERDO SANCHES, \textit{Digitalisation and intermediaries in the music industry}, CREATe Working Paper, issue No. 2017/07, 2017.
changing legal paradoxes of copyright. The thesis introduces various legal aspects of the application of blockchain technology in the copyright sphere, with specific reference to the analysis of online music industry in its modern status. It could be assumed that blockchain technology might represent an opportunity to reimagine and revamp the protection and use of copyright related intellectual property rights (“IPR”) by implementing a trustworthy, transparent, more affordable, highly standardized, time-stamped and automated blockchain-enabled system. Such a system could lead to equality in protection of authorship of Works of music and fair remuneration of copyrights holders in the music industry on a planetary scale.

Within this framework, this thesis studies with a critical eye the technological changes brought by blockchain to the music industry, with particular attention to rules that such a disruptive innovation may have on the distribution of music industry revenue, e.g. how the Artists’ share of revenue may be affected and how to generate and collect higher revenues. The aim is to understand what current trends are and anticipate the changes within the industry due to blockchain.

This thesis begins with a technical overview of blockchain technology, followed by the intersection between blockchain and the copyright environment, subsequently leading to an analysis of practical applications of blockchain technology in the music industry. At the end conclusions are drawn.

1.2 Purpose and legal problems

As already stated, this thesis investigates the possible impact of blockchain technology on copyright protections, with particular reference to its challenges toward a future intensive application in the music industry and the possibility that it could introduce smoother streamlined solutions to revamp the music industry’s framework. This thesis demonstrates how the value chain structure of the music record industry might evolve with the advent of blockchain technology. Blockchain technology is still at its infancy and there are issue to deal with that affect the future development and employment of blockchain. For the sake of this analysis, it is assumed that blockchain applications will work as promised in the music industry field, while recognizing the optimistic and foretelling nature of this assumption.

Foremost, it is important to present where the need to revamp the music industry originates, starting from the assertion that digitalisation and internet have fundamentally
transformed the way listeners access and listen to music, while the framework of the industry has remained ‘stuck’ in the old structures.

First, the complexity of music copyright – with a multi-layering of rights embodied in a single track – corresponds to multiple right holders and licensees (Performing Artists, Composers, Producers) among whom the profits must be split, making of foremost importance the ability to correctly identify the owner of copyright and related rights, as well as guarantee the protection of authorship in the market. The lack of a complete international reliable database containing information on Artist and related rights, such as a catalogue of Works of music and of right holders, makes it extremely difficult for any willing party to identify the right holder to contact in order to negotiate use of the Work and licensing terms.

Second, the easier availability of music in digital formats online, via streaming services and downloading platforms, have made more it difficult for Artists to make a living in the recorded music industry. To have the chance to achieve commercial success and make a name for themselves, most Artists turn toward big intermediaries such as record labels, Producers, collective management organizations (“CMO”) and streaming platforms for economical support and sponsorship in the market. This leads to unbalanced bargain powers, forcing Artists to accept economically disadvantageous contracts and give up control over use of their Work and the economic and licensing terms of said use.

Third, as a consequence of the previous point, the music industry has most recently been dominated by big recording labels, Producers as well as other large organizations have gained enormous economic power, allowing them to keep most of

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3 In the past there had been a number of attempts at creating a unique international database but they all collapsed and suffered from failure due to insufficient number of CMOs willing to back the project and to pay the extremely high costs involved, with no tangible outcome. It can be cited the Global Repertoire Database (which estimated costs had reached £8 million), as well as similar broad attempts such as the World Intellectual Property Organization’s International Music Registry (IMR), and the International Music Joint Venture among royalties collecting societies from the US, UK, Canada, and the Netherlands. It can be argued that these failures are evidence of the impossibility of the task. Nevertheless with blockchain technology, by contrast, it is affirmed that it would be possible allow the process to occur incrementally and achieve time by time said aim, with much lower costs.

4 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 any revenue from the use of their work.

5 A study of Boston’s Berklee School of Music – Institute for Creative Entrepreneurship (“Berklee ICE”) 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
the revenue resulting from the exploitation of Work of music. Consequently, due to the
difficulties to keep up with the monopoly (economical and contractual) of these
intermediaries, Artists are losing power to have a say in how and to whom the Work is
licensed and/or sold as well as the direct contact with their listeners, leading to ‘unfair
trade’ of music.

Fourth, the aforementioned lack of reliable data on authorship and copyrights,
together with the inequitable contractual terms the Artists are subject to, lead to
disjointed, inaccurate and incomplete information on payment of royalties. Without
standardized reports from intermediaries and digital services, explaining where royalties
come from and how they are calculated, Artists are at loss to understand their royalties’
statement analysis sheets, this expanding more the gap between Artists and
intermediaries.

In light of the above, Artists, record labels, Producers and major music institutions
are searching for solutions to address these long-standing problems. Artists are
demanding more transparency in the management of their rights and more say in the
commercial and economic aspects related to the use of their Works, asking for a change
in the economic framework used in the music industry underpinned by copyright.

Recently, there has been an undeniable permeation of ideas that blockchain
technology could lead to positive outcomes in the music industry such as generating fair
remuneration for the copyright holder, creating global licensing standards for payment
of royalties, for long awaited transparency in the financial flow of the music industry, at
the same time substantially allowing easier coordination between Artists and listeners,
reducing the monopoly of intermediaries.

CREATIVE ENTREPRENEURSHIP (BERKLEE ICE), Project ‘Rethink music: transparency and payment flows
in the music industry’, 2015, p. 10.

6 Ibid. p. 18. Significant funds are often paid to the wrong party, while large amount of royalties end up in
a ‘black box’ in case where the rightful owner of the rights was not accurately identified. Berklee ICE in
its project estimated that 20 to 50% of music payments don’t make it to their rightful recipients.

7 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 had then be requested to rule on excessive licensing
fees on copyright in case such as: Case C-395/87, Ministère public v Jean-Louis Tournier,
ECLI:EU:C:1989:319; joined cases C-110/88, C-241/88 and C-242/88, François Luzeau and others v
Société des Auteurs, Compositeurs et Editeurs de Musique (SACEM) and others; ECLI:EU:C:1989:326;
Case C-52/07, Kanal 5 Lid and TV 4 AB v Föreningen Svenska Tonsättares Internationella Musikbyrå
(STIM), ECLI:EU:C:2008:70; and recently again in Case C-177/16, Autoritāciju un komunikācijas
konsultāciju agentūra and Latvijas Autoru apvienība v Konkurences padome, ECLI:EU:C:2017:689.
It is argued that blockchain might introduce long-awaited transparency, trust and certainty in matters of copyright ownership, management of Works of music, and fair trade in negotiation of licensing terms as well as for tracking progress of Works in the supply chain management to achieve better calculation of royalty revenues owed to the right holders.

In the abstract, the impact of blockchain technology on legal development of copyright could be huge, thus the purpose of this thesis to study the phenomenon of blockchain technology and how it can address the problems previously discussed. Copyright law has long leveraged the power of computer code to create binding norms for those that engage with computer systems. This new wave of technology brings forth new ways of protecting copyright works, as well as a new way of administrating and enforcing copyrights through computer code. This sophisticated, dynamic technology could be used as a constraining force to better protect and revamp the online music industry by shaping the way users interact with this technology. Evolution of human behaviour leads simultaneously to evolution of copyright protection.

Blockchain could be moulded into various possible structures. Consequently there are various ways to implement this technology in the copyright realm. The choice of structure to use should be evaluated in concrete, depending on the circumstances of the particular case/application needed to achieve the best possible copyrights protection. Nevertheless, it should be kept in mind that only a few of the hypothetical developments discussed today are viable and could be developed under a technical, and legal, point of view.

It should finally be kept in mind that the hypothesis of revolutionising copyright by use of blockchain technology has attracted many scholars and technicians. They all have speculated on how deeply and how fast blockchain technology could streamline copyright protection and in particular revamp the music industry. Although most of the scenarios imagined so far are still just speculation and are not presently viable, one practical case for the use of smart contracts for sale of Works on a blockchain in the artistic environment has been explored at the University of Milan with impressive

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Artchain Marketplace Platform is a distributed and decentralized platform that has been developed and tested for the sale of digital artistic Works from the moment the right holder put the Work on the marketplace, to the moment when the buyer purchases the work and transfer of property has taken place (see Chapter 5 and Annexes B and C below). The Artchain’s marketplace, in fact, allows the actors in the system to carry out transactions for the sale of said Works using smart contracts and cryptocurrencies, implemented in two different blockchains that are then technically connected in a ‘multichain’. Notwithstanding that the platform has been developed in the field of art, the founder and developer of the blockchain strongly believe that this blockchain platform could also be used by the music industry for sale and licensing of Work of music, with the same excellent positive results\textsuperscript{10}.

Figure 1: Scheme on how the Artchain Marketplace Platform works. It shows how the IP rights are transferred between seller and buyer within the blockchain and how the smart contract embedded in the blockchain allows for the execution of a sale and purchase agreement.

Source: A. Ponzo, Multichain con nodi ad accesso condiviso, 2019.

\textsuperscript{9} 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.

\textsuperscript{10} As maintained by Ph.D. A. Bellacicca, interviewed by this author on April 17, 2019.
1.3 **RESEARCH QUESTIONS**

In order to allow for a better understanding of the chosen topic, the research questions – that lead the development of this thesis – are introduced hereinafter.

The main question to evaluate with this thesis is how blockchain technology can change the way the online music industry works by introducing a new legal paradigm in the protection of Works of music. While researching this question, a number of secondary questions are posed and researched, with the aim to facilitate understanding of the importance of the topic, where it originates and how it could develop in the future. Consequently, this thesis researches and discusses the following questions:

- What are the advantages for right holders, Artists and Composers claimed on behalf of blockchain technology by ‘Music visionnaire’?
- Could a blockchain-embedded copyright system really allow better protection of authorship and copyright ownership, as well as lead to ‘fair-trade’ in music and fairer remuneration for Artists?
- How does blockchain technology influence the value chain in the music industry between Performing Artists and Composers on one side, and record labels, Producers and CMOs on the other? In the current framework of the online music industry, is it really feasible to cut out the ‘middle men’ intermediaries?
- Are smart contract embedded on a blockchain the apical and final development of this technology? What are the advantages and the main challenges of using smart contract for sale and purchase or licensing of online music?

Hypotheses are made on the possibilities that blockchain technology could be employed to affect copyright’s role in society as well as to influence mass produced licensor/licensee relationships and shape a new more direct relationship between Artists and listeners.

1.4 **METHODOLOGY AND MATERIAL**

To allow verification and testing of the findings of this thesis by other scholars, here follows an accurate description of the philosophical underpinning and methodology used for writing this thesis. Afterward, the legal resources on which the analysis is
Based are listed.

During the research and writing process of this thesis, a legal dogmatic method is used, together with a law and technology approach and the use of empirical cases and economical findings. The legal dogmatic method as a guiding principle allows providing answers to the research questions mentioned in the previous paragraph, by introducing a highly technical topic and studying how it interacts with present legislation and the real-life framework of the music industry. Also, the legal dogmatic method is paired with the legal and scientific practice of legal scholarship, in order to approach the topic at hand through analytical analysis, discussing on how to tailor the law to changing developments in the society. The method is experimental and based on the state of technology at the time of writing. Reliance should be placed on the results keeping in mind that a development of new technology or the introduction of new legislation could interfere with the results.

An overall qualitative approach, rather than quantitative, is preferred due to the novelty of the topic at hand and the many explorative papers that now overcrowd the academic forum with all kinds of theories on the problems that blockchain technology might solve in the future.

Moreover, an introductory chapter on technical aspects of blockchain is included to allow for better understanding of how this new technology works and what it can do. This introductory Chapter 2 helps studying the new paradigm that originates from the use of blockchain technology for protection of copyright in the music industry. At the end, three Annexes are added containing schemes and technical graphs that accompany the initial descriptions and that explain the interactions between technical and legal aspects.

Regarding the sources, a great deal of academic papers and research articles are taken into consideration, while few monographs have been consulted. This, due to the novelty of the topic researched and the lack of specific legislations and case laws on the matter at hand, more specifically of its application in the online music industry. Most of the sources are quite recent and based on future hypothetical application of blockchain-based systems for protection and further development of copyright. Therefore most academic and legal researches on the issue at hand are hypothetical, therefore allowing for speculations on the possible outcomes of application of blockchain technology in real life, but always by keeping in mind its judicious and efficient applications and legal limits.
Furthermore, the thesis analyses concrete examples of uses of blockchain technology in the copyright environment. This allows critically discussing possible, concrete application of blockchain technology and evaluating its risk against its advantages.

Finally, it is necessary to identify the legal framework of reference for the research and analysis that follows, in order to examine better the relationship between blockchain technology and copyright in the online music industry. The most relevant international and European Union (“EU”) sources are:

- Berne Convention;
- TRIPs Agreement;
- WIPO Copyright Treaty;
- WIPO Performances and Phonograms Treaty;
- Rome Convention;
- InfoSoc Directive;
- CMOs Directive;

1.5 LIMITATIONS

Due to the ubiquitous impact that blockchain could have in the copyright environment, a large amount of secondary legal aspects need to be left out of this analysis in order to first and foremost focus on the main applications of the blockchain technology in the online music industry.

Since the research of this thesis refers to the online music industry, and due to the lack of territoriality and sovereignty of internet, this thesis has no limitation with regard to any specific country. The research is developed at an EU supranational level.

First, even if blockchain technology invites to cross border applications, aspects related to private international law – such as jurisdiction and applicable law – are not discussed in this thesis as their application is still hypothetical and it can only be speculated on how the legislator might decide to legislate on their application in the blockchain realm in the future.

Second, although discussing a very technical topic, this thesis omits to study the connection between blockchain and other technological protective measures such as those provided under Arts. 11 - 12 WCT and Arts. 18 – 19 WPPT.
Furthermore, with reference to Chapter 5 on ‘smart contracts’, substantial unresolved issues are only mentioned for acknowledgement but not discussed in depth. Those issues involve, for instance, lack of consensus on how code as contract fits into the traditional concepts of contract law; how to identify pseudonymous parties in the blockchain; and, how to deal with lack of remedial measures in case of breach of smart contract as well as lack of legal instruments to resolve jurisdictional conflicts. Neither privacy nor data protection issues are discussed.

1.6 Structure of the Work

Initially, Chapter 2 introduces the reader to the technical characteristics of how blockchain technology works. The definition of the various aspects of the technology and the explanation of what it can or cannot do allow the writer to bring readers with different technical background to the same level of knowledge, consequently facilitating them in having a better understanding of the following chapters where technical and legal aspects interfere with each other.

Following, the thesis is developed in three macro areas, each related to a different legal aspect, that respectively evaluates how blockchain technology could:

i) solve the existing challenges for recognition of ownership and for fair remuneration of Artists through technological innovation;

ii) lead to automation of licensing of Works and payment of royalties, interfering with the value chain in the music industry by upsetting the powers of record labels, Producers, CMOs causing ‘disintermediation’ between authors and listeners (i.e. removing the need for the ‘middle men’ intermediaries); and;

iii) impact the licensing of Works of music in the digital environment through so-called ‘smart contracts’, bringing licensing up to speed with the new technological challenges.

The first section (Chapter 3) analyses how blockchain could lead to better recognition of authorship and creatorship, leading to a ‘fair trade’ between Artists and listeners. This could bring also the empowerment of payment system for Artists and Composers, as well as directly between Artists and listeners through considerable reduction and transparency of transactions’ costs. Furthermore, it is brought forth the
advantage of higher control of right holders of the licensing terms on their Works of music, in case of direct connection between Artists and listeners. Moreover, many practical cases are analysed for each thematic and it is explained how they intend to solve the technological challenges that would arise.

The second section (Chapter 4) discusses how blockchain could affect record labels, Producers and CMOs and upset their powers in the value chain by introducing disintermediation between Artists and listeners, i.e. eliminating the need for intermediation of record labels, Producers or CMOs as ‘middle men’ between Artists and their listeners (‘Disintermediation’). Different issues are analysed in this section through discussions of concrete examples of partnership between CMOs and their prototypes of shared blockchain-enabled system to manage authoritative music copyright information using blockchain technology. In the end, it is taken into consideration whether it is likely to reach complete Disintermediation soon.

The third and last section (Chapter 5) introduces an overview of expected uses of blockchain technology and blockchain smart contracts to support legal enforcement through code, as well as to introduce efficient and transparent administration of copyrights and neighbouring rights. Further, the possibility to develop smart contracts is investigated in depth to evaluate the possibility to: i) enable automatic execution of the agreement; ii) reduce the risk of non-compliance; iii) facilitate licensing, through global licensing standards embedded in the software; and iv) facilitate frictionless, near-instant micropayments. This section then analyses the difficulties to implement smart contracts to reach a critical mass for future development as well as to deal with the massive amount of coordination required between non-chain and off-chain contracts to minimize the risk of conflict with off-chain traditional contracts (‘De-synchronization’). Finally, substantial unresolved issues limiting the applicability of smart contracts, and consequently a smooth application of blockchain in the music industry, are discussed.

In the concluding Chapter 6, application of blockchain technology in the music industry and positive and negative contributions of blockchain are debated. Particular weight is given to consideration that blockchain could be a positive and fruitful technology for the future of copyright, discussing the concrete legal difficulties that will need to be overcome in the near future in order to enable efficient revamping of the old hierarchic framework of the music industry, and adapt copyright’s legal paradigm to blockchain technology.
CHAPTER 2

Technical characteristics of blockchain technology

2.1 TECHNICAL PRIMER OF BLOCKCHAIN

Technology and law have always been closely connected. The way technology interferes with users’ daily lives – simplifying mechanical changes and allowing for automation of daily functions – has always been of deep interest from a legal point of view. Reciprocal developments between law and technology, caused by reaction and adaption of one to the changes of the other, call for a change in the paradox of the law. The latter is required to develop in order to keep up with the technological changes. At the same time, these technological changes require in some way to be ‘authorized’ by the law, to be legalized in order to be ‘normalized’ into our own lives. An instance of these changes is the advent of internet in the second half of 1990s, where the law had to develop new paradoxes in order to legislate and ‘legalize’ all legal effects happening in the online environment, originating from the digitalization of traditional legal schemes\(^\text{11}\).

The same change is happening nowadays with blockchain technology, defined by Don and Alex Prescott as “the second era of internet”\(^\text{12}\). Some scholars even suggest that blockchain technology could be “the most important IT invention of our age”\(^\text{13}\); or even that it is “at the same level as the World Wide Web in terms of importance”\(^\text{14}\).


\(^{13}\) J. NAUGHTON, Is Blockchain the Most Important IT Invention of Our Age?, The Guardian, June 23, 2016.

\(^{14}\) W. MOUGAYAR, The business blockchain: promise, practice and application of the next internet
In fact, it was over three decades ago that the scholar Langdon Winner conceptualized the term of ‘politics of technology’, highlighting that technological design choices become part of the wider framework for public order\textsuperscript{15}. Technology’s ability to be used as a mean of expressing normative objectives and constraints is well known. Just as law, computer code is strongly shaped by the objectives and intentions of its creators. What distinguishes both mechanisms, however, is that computer code, unlike law is enforced \textit{ex ante}. This meaning that, save for the technologically skilled, those exposed to it have no other option but compliance\textsuperscript{16}.

Hereinafter, technical aspects of blockchain technology are briefly explained in such a way that should allow a reader without technical background to understand the complex concepts of this technology.

\section*{2.1.1 DISTRIBUTED LEDGERS TECHNOLOGY AND BLOCKCHAIN}

This paragraph introduces the instrument of distributed ledgers technology ("DLT") and its more commonly known version i.e. ‘blockchain technology’\textsuperscript{17}.

The first time someone wrote about blockchain was in 2008. Author Satoshi Nakamoto – a pseudonymous mastermind behind the theory of bitcoin cryptocurrency – discussed in his famous White Paper\textsuperscript{18} for the first time the possibility to create a new technical infrastructure for cash payments. This method would allow for a more secure, traceable and transparent payments as a by-product of the fact that all transactions were saved on various computer and were verifiable by the future owner of the transferred coins in a reliable and secure way\textsuperscript{19}.

Rather than being a completely novel technology, some scholars better define

\begin{footnotesize}
\begin{enumerate}
\item M. Finck, V. Moscon, \textit{op. cit.}, pp. 99–100.
\item It is to be highlighted that under a technical point of view there can be nuances between a blockchain and distributed ledgers technology. Nevertheless in this thesis they are used as synonyms for the sake of simplicity and in accordance with conventional usage.
\item S. Nakamoto, \textit{Bitcoin: A Peer-to-Peer Electronic Cash System}, Bitcoin.org, 2008. It is to be notice, although, that the term ‘blockchain’ does not explicitly figure in the paper.
\item Ibid, p. 3. Nakamoto explains that “an electronic coin consisted in a chain of digital signatures, through which each owner would transfers the coin to the next by digitally signing a hash of the previous transaction and the public key of the next owner and adding these to the end of the coin. A payee can verify the signatures to verify the chain of ownership”. In 2009, Nakamoto released Bitcoin, the first open source software with a peer-to-peer design, based on a complex algorithm and secured by cryptography.
\end{enumerate}
\end{footnotesize}
blockchain as being an inventive combination of existing mechanisms\textsuperscript{20}. In fact, it can be argued that nearly all of its technical components originated in academic research from the 1980s and 1990s.

In simple words: blockchain technology serves as a common asset registry to record and track transactions, either by directly storing data or linking to data. This innovative DLT design creates a trustworthy and transparent database that relies on consensus among multiple users of the blockchain for assessing the legitimacy or illegitimacy of a certain transaction. Each user participates in verifying, in advance, what is entered onto the blockchain. This consensus mechanism is a main characteristic of the blockchain process in which the majority of the chain validators come to agreement on the state of each ledger.

In simpler words: “it is a set of rules and procedures that allows maintaining coherent set of facts between multiple participating nodes”\textsuperscript{21}. It is believed that blockchain technology utilises two core technologies to create a “persistent, tamper-evident record of transactions between parties, whose identity has been authenticated”\textsuperscript{22}.

In essence, a blockchain can be defined as an open DLT that contain a shared and synchronized digital database, it is maintained by an algorithm and it is stored on multiple computers (each technically called ‘nod’ of the chain) such that each nod stores a complete copy of the database\textsuperscript{23}. Records can be written on the chain by using


\textsuperscript{21} T. SWANSON, Consensus-as-a-service: a brief report on the emergence of permissioned, distributed ledger systems, Of Numbers.com, April 6, 2015.


\textsuperscript{23} Blockchain is a DLT with a distinct structure. Decentralization assures data integrity and security because the network must reach a consensus to add new data and over the data already stored. In fact, a blockchain has essentially an append-only structure that only allows data to be added to, but not removed from, a continuously growing list of records. Moreover, adding transactions with time-stamp creates an immutable history which can’t be modified in the future, therefore making immutability verifiable by every peer of the DLT.

On the contrary, it is to be noticed that a database is an organized collection of data, organized into rows, columns and tables, and indexed to make it easier to find relevant information. It has administrators with centralized control (which instead it is only a possibility in DLT) that provide users with the ability to access/read/write/delete records. In fact, the main difference is that data can be manipulated as it gets updated, expanded and deleted as new information is added. Also, databases don’t need to keep history of previous records and ownership of digital records.
consensus (i.e. transaction verification and transaction auditability) of all participants who are identified as ‘peers’. Furthermore there is no longer any client-server hierarchy and peers connect by knowing the IP address of any other node on the network.

The blockchain contains four different key components: i) each single ledger, ii) the hash of all transactions contained in the block (its ‘fingerprint’), iii) a time-stamp, and iv) a hash of the previous block (which allows to create the sequential chain of blocks and so on)\textsuperscript{24}.

![Diagram of blockchain components](image)

Figure 2: Components and interactions of the elements of a DLT.

Its main features are:

- **Transparency**: all the data on blockchain is public to the peers that have access to the blockchain, it cannot be arbitrarily tempered with and easily auditable;
- **Redundancy**: every node of the blockchain solution holds a copy of the data, thus it cannot be easily taken offline due to a system malfunction or malicious actions of third parties;
- **Immutability**: changing records on blockchain is prohibitively difficult and requires consensus provided in accordance with the protocol (e.g., by the majority or all of blockchain peers). Although it is important to understand that

\textsuperscript{24} A. M. ANTONOPoulos, *Mastering bitcoin*, O’Reilly Media Inc. (Farnham), 2017.
even in blockchain there is no such thing as perfect immutability. Thus, integrity of records is ensured by intrinsic properties of the underlying code rather than from the identities of system operators;

- **Disintermediation**: the removal of the ‘middle men’ intermediaries decreases transaction costs and risks associated with presence of such intermediaries. It does not mean, however, that a new kind of intermediaries won’t be created as a result of deeper implementation of blockchain technology in the social fabric, depending in which environment the blockchain is developed;

- **Decentralization**: the main advantages of decentralization are fault tolerance, attack resistance, and collusion resistance at the expense of other participants. There are three separate axes of centralization/decentralization: i) architectural (de)centralization considers how many physical computers is a system made up of; ii) political (de)centralization considers how many individuals or organizations ultimately control the computers that the system is made up of; and iii) logical (de)centralization considers if the interface and data structures that the system presents and maintains look more like a single monolithic object or an amorphous swarm. (One simple heuristic check is: if you cut the system in half, including both providers and users, both halves shall continue to fully operate as independent units)\(^{25}\).

The technology gets its name from the fact that multiple transactions are ordered as blocks (“Ledgers”), which are added to the existing chain of blocks. The Ledger contains different data grouped together (Paragraph 2.1.2 below) and, upon reaching a certain size is chained to the existing Ledgers through a hashing process\(^ {26}\). In particular, the hash pointers (“Hash”) link each block of transactions (i.e. the Ledgers) together, in order to make impossible to tamper with transaction data in past blocks, since that would cause the break of the links between the blocks. Also, in certain type of blockchain it is also possible to utilize public key infrastructure to authenticate the identity of the user associated with each transactions\(^ {27}\). This infrastructure utilises

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\(^{26}\) 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.

\(^{27}\) For further explanation on the topic of public key infrastructure see: MICROSOFT, *Public Key*
cryptography to generate a pair of matching keys – consisting of a public and a private key – that are used to sign a data item and to validate whether a digital signature is correct and has not been tampered with\textsuperscript{28}. An example of this mechanism is shown in the figure below:

![Diagram of transaction verification within blockchain](image)

Figure 3: First scheme of transaction verification within blockchain, through cryptographic signatures, provided from Nakamoto in his White Paper.

A shared blockchain can be used by different entities to standardize and link data and enable credible accounting of digital events\textsuperscript{29}. Of foremost important, in fact, it is the characteristic that all future transactions are verified on a peer-to-peer network and validated by the multiple computers that host the blockchain, without any single party having the ability to change unilaterally any Ledger entries later on. In other words, from the perspective of information, the real innovation of blockchain technology is that it ensures the integrity of the Ledger. For this reason it has been defined multiple times as “near un-hackable”\textsuperscript{30}, because to change any of the information on a Ledger or even


\textsuperscript{28} Data encrypted with the public key can only be decrypted using the private key and vice versa. This proves the data was encrypted by, and therefore came from, the holder of the private key.


on a previous block, would mean to have to change that specific block as well as all of
the proceeding blocks (and theirs Ledgers) going back the entire history of that
blockchain. This simultaneously on all existing copies of the chain and in all nods.

Finally, it needs to be pointed out that the blockchain technology allows
guaranteeing that the transaction was recorded only once, instead it doesn’t guarantee
that the person making the transaction was the rightful owner of the cryptographic key
that signed the transaction. This is why Werbach points out that “the essence of
blockchain’s revolutionary potential lies in its capacity to provide a distributed yet
(only) provably accurate record”31.

2.1.1.1 STRUCTURE OF A BLOCKCHAIN: PERMISSIONLESS OR PERMISSIONED

Blockchain is not is one unique technology, on the contrary of the traditional
belief of most. Instead, it must be noted that, despite general commonalities, blockchain
technology varies widely in its technical and governance configurations. Therefore,
blockchain is better thought of as a class of technologies32.

To give the necessary information in the present context, this author focuses only
on the description of the main difference, i.e. between ‘public and permissionless’
blockchain, and ‘private and permissioned’ blockchain.

The first type is an open and anonymous network, where anyone can join without
requiring prior authorization. For instance, users can obtain a copy of the Ledgers
(technically becoming a node of the blockchain), can contribute to the process of adding
new Ledgers as miners and can help administer the blockchain. Consequently, due to its
open-source software, anyone can download the entire blockchain and view each
previous transaction and data transferred. In order to ensure the consistency of the many
copies present on each computer and to ward off attackers, this type of structure relies
on intensive consensus protocols. They offer strong data integrity and high resilience,
since it is much harder to tamper with large numbers of distributed copies. All
transactions are public, which ensures transparency but minimizes privacy33. Moreover,

32 M. FINCK, V. MOSCON, op. cit., p. 100.
33 P.V. VALKENBURGH, What is “Open Source” and Why Is It Important for Cryptocurrency and Open Blockchain Projects?, Coin Centre, October 17, 2017.
the need to support thousands of small nodes, and run proof of work, limits transactions output and increases costs of maintenance.\footnote{J. Bacon, J.D. Michels, C. Millard & J. Singh, \textit{op. cit.}}

The second type of blockchain is defined private and permissioned since it blockchain relies on privately written software and requires prior approval for anyone to participate in the network. This approval is granted by an already authorized user or by a third party authority (i.e. a gatekeeper). The latter could be a single party or a consortium or a third party authority appointed by the company owning the blockchain.

In fact, private and permissioned blockchain are usually created internally to fit the needs of a specific company. This type of blockchain better protects the privacy of transactions and of users but penalizes the ‘independency’ of the blockchain because of the constant necessity to have a gatekeeper to grant access to the blockchain and supervise all transactions. Type of structure is often built on the aforementioned public key infrastructure that establishes users’ identities and allows to data encryption, which provides digital signatures, with private keys.\footnote{It might also be fairly safe to assume that, for the reason that are described in the following chapters, given the inherent characteristics of transparency in permissionless networks, the large corporate players in the music industry are more likely to be attracted to permissioned blockchain; instead Artist and Composers would probably be more willing to push for the adoption of a permissionless blockchain.}

To briefly summarize, Swanson describes the difference between the two structures as follow:

“A permissioned system is one in which identity for users is whitelisted (or blacklisted) through some type of legal entity identifier procedure; it is the common method of managing identity in traditional finance. In contrast, a permissionless system is one in which identity of participants is either pseudonymous or even anonymous. Bitcoin was originally designed with permissionless parameters”.\footnote{T. Swanson, \textit{op. cit.}}

2.1.2 Tokens as Data

As mentioned already in the previous Paragraph 2.1.1, the blockchain consists of various elements. Of particular interest for the development of this thesis is the concept of token.
A token (“Token”) can be defined as raw data that represent different forms of digital assets, agreed to be transacted on the blockchain. For instance, in the copyright environment, a Token could represent a protected work, data files, songs, photos, videos, etc. It could as well embed documents of various content such as intangible properties, rights, personal data, certificates, legal transaction and contractual information (see further Chapter 5), including licensing terms (i.e. right management information) and remuneration terms (i.e. cryptocurrency). Data represented in the Token can have a value either purely on-chain (for instance, digital songs sold online), or be the avatar of a real-life asset, such as a good (e.g. CD or DVD), a service (e.g. a voucher for an online music service) or an entitlement (e.g. a legal right, a license to use a song or the lyrics of it etc.).

Although it doesn’t fall within the scope of research of this thesis, it should be mentioned that information stored in the Tokens – therefore in the blockchain – could be protected as data in a DLT, depending on the technical design of the platform’s desired functionality. Also, this thesis does not explore the legal value of Token and how their transacting relate to real-life assets or on-chain assets (i.e. digital Tokens which exist only by virtue of the blockchain), but it should be mentioned that is uncertain if digital Tokens on DLT applications qualify as property under the applicable law.

37 M. FINCK, V. MOSCON, op. cit., p. 91.
38 J. BACON, J.D. MICHELS, C. MILLARD & J. SINGH, op. cit., p. 96. These authors believe that the information stored on a specific blockchain could be protected by copyright under Art. 3 (1) of EU’s Directive on the legal protection of databases (Directive 96/9/CE of the European Parliament and of the Council of March 1996 on the legal protection of databases, Official Journal L 77, 27.3.1996, p. 20–28 – the Database Directive). In fact, Art. 3 (1) Database Directive provides for EU member states to guarantee copyright protection for databases, which “by reason of the selection or arrangement” of contents “constitute the author’s own intellectual creation.” In other word, as quoted by important scholars and Bacon: “To attract copyright protection, the author must have expressed his creative ability in an original manner by making free and creative choices in setting up the database”.

By contrast, the database will lack the required originality, if the setting up was dictated by technical considerations (See Case C–604/10, Football Dataco v. Yahoo! UK Ltd, ECLI:EU:C:2012:115).
40 In their paper authors Low and Teo discuss whether the token represented (i.e. cryptocurrencies) should be considered property and what rights the law should afford them. The user interested in deepening the knowledge of said topic can refer to: F.K. LOW & G.S. TEO, Bitcoins and other cryptocurrencies as property?, Law, Innovation & Technology, Singapore Management University School of Law, Research Paper No. 21/2017, 2017, p. 235.
2.1.3 SMART INTELLECTUAL PROPERTY RIGHTS AND SMART CONTRACTS

As suggested above, blockchain technology could provide new mechanisms for the management of IPR, which could even substitute current paradigms of law. In particular, there is a new wave of technological transmutation on the horizon that could have a lasting influence on copyright law: smart contracts. Their development has been predicted to being able to “make(s) much of the promise of block chain technology a reality”\textsuperscript{41}.

Following this explanation about smart contracts and their technical features, this thesis will engage with the interplay between legal prose and machines, which is often written from a computer science perspective (see further Chapter 5).

2.1.3.1 SMART INTELLECTUAL PROPERTY RIGHTS

An important notion to establish before proceeding any further is the concept of ‘smart intellectual property rights’ (“sIPR”): IPR that exists on and are transacted through a blockchain. These rights are a completely new kind of concept, with wide implications for property law\textsuperscript{42}. The potential to use blockchain technology for the management of sIPR is vast. For instance, by recording sIPR in a DLT rather than a traditional database it could be effectively possible to turn them into “smart IP rights”, allowing for the creation of a blockchain-enabled recording of immutable records of events in the life of a registered sIPR. For example, it could allow establishment of a time-stamp when the work came into existence, who owns the IPRs and to whom it has been licensed or assigned, and so on, resolving the practicalities of collecting, storing and providing such evidence. The collection of these data on a DLT would enable right holders of a given sIPR to be asserted on the blockchain, securing their rights by means of a cryptographic key and by a self-enforced code. Consequently, sIPR could also become the objective of licensing agreement executed on the blockchain, through a smart contract.


\textsuperscript{42} M. SWAN, Blockchain: Blueprint for a New Economy, O’Reilly (Beijing, Cambridge, Farnham, Köln, Sebastopol, Tokyo), 2015, p. 15.
2.1.3.2 SMART CONTRACTS IN THE BLOCKCHAIN REALM

One of the first to theorize the concept of a contract that was created, executed and maintained online was Nick Szabo: indeed he conceived the term ‘smart contract’ back in 1994, to denote “a computerised transaction protocol that executes the terms of a contract” 43. He envisaged that in the future it could be possible to develop computer software, resembling contractual clauses, which would be able to satisfy common contractual conditions and therefore make more difficult for one party to unilaterally terminate an agreement.

He was not far from what would be developed about a decade later.

In the blockchain context44, a smart contract is a computer program, implemented on top of the chain, which automatically processes its inputs regarding trade relationships when certain conditions are triggered by a transaction submission provided by the users or extracted from the environment45. This computer program is consistently executed by a network of computers without the need for an intermediary, making this automated execution the main value of smart contracts. As second-layer applications, they are resilient to tampering, which makes them appealing in many scenarios including the transfer of copyright protected Works and copyrights46.

To better understand, let us consider the example of the purchase of an IPR licence on a blockchain. Cuccuru describes it as follow: “Party A creates a smart contract to which the information/licence X is permanently attached, programming that X is to be released upon certain conditions (e.g. for a certain consideration Y), and launches it into a blockchain. Whenever party B wishes to obtain the information/licence, he transfers consideration Y to the protocol. Automatically, the

43 N. SZABO, Smart contracts: building blocks for digital markets, King’s College London, 1996.
44 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.
45 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, White Paper, Blockchain Research Network, 2013, p. 13.
smart contract algorithm releases X to party B and delivers Y to party A, eliminating delays and room for non-compliance: once the obligation is fulfilled on the one side (Y), the computer protocol autonomously performs the other side of the agreement (X): it is an all-or-nothing trade.\textsuperscript{47} See graphic representation in the figure below:

![Diagram of smart contract algorithm](image)

Figure 4: The image above is a visual flow chart that shows applied business logic to smart contracts. Source: by Jo Lang and R3 CEV, in T. Swanson, Consensus-as-a-service: a brief report on the emergence of permissioned, distributed ledger systems, 2015.

This second-layer application on the blockchain has access to all data contained in the Tokens, and consequently in the blockchain. All users of the chain can be aware of the rights represented in each smart contract and they can all interact with each other and moderate their behaviour consequently. The fundamental characteristic is that a third processor does not really exist in smart contracts, but it is the computer program itself which carries out the operations.

### 2.2 TECHNICAL CONCLUSION

In synthesis, blockchain has been presented by some as a “revolution in how to keep track of rights”.\textsuperscript{48} It may enable, through Tokens, the transparent, secure and


\textsuperscript{48} 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
tamper-free tracking of certain digital assets and could be used as evidence of authorship and provenance of each work or right contained in the Tokens.

In an intent to summarize the technical aspects:

- Hash functions can be used to generate Hash trackers that link each blocks of the transactions together in a chain. Hash trackers guarantee the integrity of the data within each block, as well as the order of the blocks, thereby creating a tamper-evident data structure. At the same time, they create a unique fingerprint of each work or right in the block: this allows recording of ownership as well as a time-stamp of the existence, at a given time, of the work or rights (without revealing its actual content).  

- Tokens can encode all kind of information, including the work, the terms of use of protected material and contractual information for licensing and use.

- A private cryptographic key can be used to establish an individual’s identity through a digital signature. Blockchain combines private keys and Hash functions to create a long-term, tamper-evident record of transactions between parties, each with verified identity.

In conclusion, knowing how the technology works permits the reader to subsequently follow the interaction between law and blockchain technology that are develop in the next chapters.


CHAPTER 3

Functional perspective of blockchain technology from the point of view of copyright holders, Artists and Composers

3.1 LEGAL BACKGROUND FOR COPYRIGHT PROTECTION IN THE MUSIC INDUSTRY

Since the advent of the Berne Convention in 1886, today in 177 countries of the world\(^{52}\) the copyright owner of a Work of music\(^{53}\) enjoys a series of exclusive moral and economical rights over the border of all these countries. These exclusive rights arise instantly when a Work of music is created, without costs and without the need to be registered or recognized by any kind of authorities. In particular, three basic principles govern the Berne Convention: i) works of citizens of countries of the Berne union must be given identical protections in the country where protection is sought as the national of that country enjoy (‘principle of national treatment’); ii) protection of works must not be conditional upon compliance with any formality (‘principle of automatic protection’); and iii) the works obtain protection independently from the protection they could obtain in their country of origin (‘principle of independence of protection’)\(^{54}\). For instance, some of the rights granted by Berne Convention are the right to sell the Work of music and the economic rights attached to it, or to license its use, distribution or exploitation to third parties in exchange for economic compensation.

Thus, under the Berne Convention an Artist gets 177 different national copyright

\(^{52}\) Data available at WIPO official website at the time of the writing. For Berne Convention contracting parties see: <https://www.wipo.int/treaties/en/ShowResults.jsp?treaty_id=15>.

\(^{53}\) Under Art. 2 (1) 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 provision for exclusive rights in respect of works of music.

\(^{54}\) Respectively Art. 3, Art. 5 (3), Art. 5 (2) Berne Convention. The substantive provisions of the so called ‘Paris Act’ of the Berne Convention (Articles 1 to 21) have been incorporated into the TRIPs Agreement (Art. 9) and WCT (Art. 1).
rights and they all sum up into a “bundle” of national right fragments. The term ‘right
fragment’ has been used to illustrate this ‘fragmentation’ of copyrights at international
level.\textsuperscript{55} In other words: each right in the copyright bundle can be owned and exploited
separately 177 times in each national territory of each member of Berne Convention.

It gets worse still.

The music industry controls and exploits various kinds of copyrights. The
complexity of music copyright lies in the multi-layering of rights embodied in a single
track and correspondingly, possible multiple right holders and licensees. It is important
to understand that any Work of music contains not one but two copyrights: one for
underlying lyrics and music composition and one for the sound recording itself. The
first one is created by Composers and lyricists and monetised by music Producers; the
latter instead is created by the Performing Artist and usually is monetised by the record
label.\textsuperscript{56}

For musical compositions, the primary rights of Composers are performance
rights and mechanical rights. The set of rights called ‘mechanical rights’ are a
combination of the right to copy or reproduce and the right to distribute (and their
definition is used in the music industry by convention). Instead, the right to perform
them in public refers to the preforming on a recording as well as before a live
audience.\textsuperscript{57} Performing Artists also have exclusive rights to copy, distribute, and
perform their recordings, but the licensing and royalties schemes for Performing Artists
are different from those for Composers.

In addition to copying, distribution, and performance, other rights are specific to
types of digital music services are licensed for digital sound recordings, such as paid
permanent download, conditional download (e.g. time-bounded or device-tethered),
paid subscription stream, or ad-supported stream.

When an Artist records compositions, a record label typically owns the copyrights
to the sound recordings. The label manages licenses for reproduction and distribution of
the sound recordings, for other purposes, such as remixes and the use of recordings

\textsuperscript{55} As defined by M. SFAFFER VAN HIOWELING, \textit{Author autonomy and atomism in copyright law}, Virginia

\textsuperscript{56} BERKLEE ICE Project, \textit{op. cit.}

\textsuperscript{57} C. COOK, \textit{Dissecting the digital dollar part one: how streaming services are licensed and the
along with video (analogous to sync licenses for compositions), as well as taking care of
the logistics of distributing them to digital service providers and manufacturing physical
products (such as CDs and LPs).

Thanks to this legal framework and the different layers of copyrights exploitation,
music production has thus been turned into a lucrative business for right holders. In
the 20th century the market progressively overcame public funding and patronage as the
main sponsor for artistic production. This paradigm was definitively altered in the 21st
century due to the advent of new streaming technologies and the rise of online music
distribution.

The latter disrupted the music ecosystem to the extent that scholars question
whether the current copyright system is still adequate to provide incentives to artistic
production given the difficulty of rights administration and enforcement of copyright in
the digital world. Digitalisation and Disintermediation may also have exacerbated the
differences between different groups of Artists and parties in the value chain.

Recently, many Artists, Composers and Performing 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
the rigidity of the industry, unable to adapt to the arrivals of new technologies in the 21st
century. 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.”

The same was acknowledged by Silver, who believes that the music industry is
one of the first industrial sectors to have been heavily disrupted by the arrival of internet

58 P. DE FILIPPI, Blockchain-based crowdfunding: what impact on artistic production and art
59 Some statistics around the turn of the century are well explained by Shapiro in: C. SHAPIRO, H. R.
60 M. HVID, S. JACQUES, S. IZQUIERDO SANCHES, op. cit., p. 21.
61 J. SILVER, op. cit., p. 21.
62 Interview carried out by ‘11 IS LOUDER THAN 10’, 2016.
Artists, record labels, Producers and major music institutions are searching for solutions to long-withstanding problems such as:

i) the lack of unique and complete (national or international) databases, with data scattered all over various databases, doesn’t facilitate to identify the legitimate right holders of authorship and creatorship rights over a Work, making it almost extremely difficult to track rights ownership and ensure all parties involved in the creation process are acknowledged fully;

ii) currently there is an increasingly fragmented record music market in favour of few who retain most of the commercial power and economic profit, against many Artists that have difficulties in managing their Works and obtaining financial comeback for their work. This is paired with high marketing costs for Artists, which can’t afford to compete with the big names in the music industry and therefore are forced to agree on disadvantaging contractual provisions and to give up most of the control over terms of use of their works;

iii) Another issue is absolute lack or non-existent data on the exploitation of the Work of music, by whom, for how long and for which uses. To this follows the lack of transparency in the conferment of royalties or questionable trails of royalties tracking back to the Artist after an extremely long amount of time, prevents the correct payment of royalties to Artists.

Because of all the aforementioned problems, there is an emerging sense that the overall music industry model needs reform. Despite the failures of previous attempts\textsuperscript{64} to create a singular, comprehensive, and authoritative database of the ownership and control of musical Works around the world, there remains a fairly wide consensus in the music industry that a better system of rights ownership information management is crucial to the development of digital music industry, such as a global database system.

Blockchain technology seems to open a new horizon toward digital transformation of this industry, raising the hope of those that demand reform in favour of a more extensive protection of copyright owners, Artists and musicians’ rights (see the

\textsuperscript{63} J. Silver, \textit{op. cit.}

\textsuperscript{64} See for instance the Global Database Repertoire Working Group (GRD WG), started by EU Commissioner Neelie Kroes in September 2008 that crashed in 2014.
solutions offered in Paragraph 3.2.1, 3.2.2 and 3.2.3 below).

It should be kept in mind that blockchain technology doesn’t change the legal fundamentals that pertain to the protection of copyright and related rights, for the use and exploitation of a Work. Instead, it introduces a new modality through which the aforementioned rights can be protected. A new way to deal with those legal factors and to protect authorship, copyrights, neighbouring rights and, more in general, the music usage and licensing in the internet era.

3.2 ‘Music Visionnaire’ and the advantages claimed on behalf of blockchain technology

Thanks to its intrinsic technical characteristics, blockchain and other DLT are presently advertised as the solution to the problems that the music industry is currently facing. In fact, blockchain could primarily allow for tracking of existence and worldwide protection of Works of music. This could help determine authorship and provide evidence of creatorship of recorded music, while keeping track of various Works’ licensing or transferring of rights. Moreover, blockchain technology’s potential use could lead to an easier method for Artists to determine the terms of use of their music and set their own pricing, together with more accessible digital rights management. Furthermore, for Performing Artists this technology could facilitate the licensing of their Work of music through metadata in a cost-effective way, introducing near-instant payments methods for streaming, downloads and various use, whether online or offline. Finally, blockchain could interfere with broader themes of the music industry such as matters of transparency in payment of royalties to Artists from record labels, Producers and CMOs and the issue of eliminating the need for mediation of these intermediaries between Artists and their listeners. All these are possible solutions that blockchain could bring to the problems of the music industry mentioned in Paragraph 3.1, point i) to iii) above.

Hereafter this author introduces and discusses the three main advances that blockchain technology could bring to the digital reformation of the music industry.

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65 B. Clark, op. cit.
3.2.1 RECOGNITION OF AUTHORSHIP AND CREATORSHIP TO ARTISTS, PERFORMING ARTISTS AND COMPOSERS: THE EXAMPLES OF UJO MUSIC AND OPEN MUSIC INITIATIVE

Some scholars claim that blockchain technology is bringing a new digital revolution to the music industry, in order to oppose major record labels, Producers and CMOs to strengthen their control over music production and consumption\(^66\). Since most of the time, at least in the public eyes, the rights of the Artists, Performing Artists and Composers’ are not recognized or acknowledged outside the music industry environment, they are often exposed to contractual and economical power that the intermediaries such as record labels, Producers and CMOs can enforce over them. The problems, that Artists and Performing Artists alike have to face, originate mainly from the fact that there is no comprehensive database of music copyright ownership. There are several independent databases, but none features every track in existence nor is connected with each other in a complementary function\(^67\) (see problem i) in Paragraph 3.1 above).

This is where blockchain technology can alter the existing framework. Since it envisions immutable DLT owned by no single entity, blockchain could enable content creators to register ownership of their Works of music without the need of record labels or Producers. As Fairfield defined it, blockchain technology could be “a revolution in how to keep track of rights”\(^68\). In fact, blockchain provides the ability to digitise and securely store information of practically any IP asset, increasing visibility and availability of information about copyright ownership and allowing users to identify and track right holders of a Work\(^69\), solving most of the issues mentioned in Paragraph 3.1 above. For instance, in terms of recorded music, authorship of a Work of music could be confirmed by means of a unique ID (empowered in the Hash of the blockchain), in order to contain information that properly acknowledge the Performing Artists, Composers or

\(^{66}\) See inter alia, D. ARDITTI, Itake-over: the recording industry in the digital era, Rownman & Littlefield (London), 2015.

\(^{67}\) 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.


various right holders. Such information can be provided by means of ‘trusted time-stamping’, a term coined by author Melanie Swan\textsuperscript{70}. To better explain the concept she stated, “people can use the [blockchain] web-based service to hash things such as art or software to prove authorship of the works”.\textsuperscript{71}

This technology could also go as far as becoming both a database that could be protected by law\textsuperscript{72} (where to store music copyright information via a cryptographic digital fingerprint), and a network (to keep all information up-to-date and accessible by all users).

Lately, this possible use of blockchain had been attracting also the interest of many companies. One of the first companies to develop a prototype of a comprehensive database in the music industry is the platform Ujo Music, founded by Phil Barry and based on the Ethereum blockchain\textsuperscript{73}. Ujo Music aims to determine ownership of creative Works, using a unique ID Hash to enable Artists to manage their identities and music and make instantly recognisable information on songs, Artists, musicians, Composers and all other right holders involved in the music production. The language of Ujo Music’s website reiterates the vision to which it aspires:

“Ujo is a new shared infrastructure for the creative industries that returns more value to content creators and their customers. Our open platform uses blockchain technology to create a transparent and decentralised database of rights and rights owners and automates royalties’ payments using smart contracts and cryptocurrency. We hope that it will be the foundation upon which a new more transparent, more efficient and more profitable music ecosystem can be built.”\textsuperscript{74}

\textsuperscript{70} According to the Regulation No. 910/2014/EU on electronic identification and trust services for electronic transactions in the internal market, adopted on July 23, 2014, time stamping is one of the electronic trust services, which is considered to be key enabler for secure cross-border electronic transactions and a central building block of the Digital Single Market.

\textsuperscript{71} M. Swan, op. cit., 2015.

\textsuperscript{72} See explanation in Note 23 above.

\textsuperscript{73} Ethereum is a decentralized blockchain-based platform, founded in 2014 by Vitalik Buterin. The platform runs smart contracts and allows for “move(ment) of value around and represent(ation of) the ownership of property”, as stated in their website <https://www.ethereum.org/>.

\textsuperscript{74} It is stated on their website that “Ujo Music is an Ethereum based, ConsenSys backed music software services company for the modern economic landscape of music” <https://www.chainstep.com/portfolio-item/uko-music/?lang=en>. 
Beside the aforementioned example, many other record labels and Producers started to realize the potentialities of blockchain to keep track of music and related data, and they are investing funds to study its further applications\textsuperscript{75}. This had led some\textsuperscript{76} to suggest that blockchain technology could be used to create a single, universal database of music copyright.

Following the same idea, and worth mentioning for its extensive success, a new major blockchain-based project is being developed with the aim to create a universal copyrights registry. It is called the ‘Open Music Initiative’ (‘OMI’), launched by Berklee College of Music’s Institute for Creative Entrepreneurship\textsuperscript{77}. This project is a non-profit initiative founded and supported by leading academic institutions\textsuperscript{78}, music and media industry organizations\textsuperscript{79}, creators, technologists, entrepreneurs and policy experts who claim to love and value music and therefore are advocating for a change in the way copyright is recognized. According to the OMI’s website, they have created, not a database or a standard, but instead an “open-source protocol for the uniform identification of music right holders and creators” to dramatically simplify the way that music creators and rights owners are identified and compensated\textsuperscript{80}.

This initiative has received an enormous success as well as the huge support of many important names in the music industry. This is mainly due to the fact that OMI is not controlled by any authority but it is open to any user to contribute with information

\textsuperscript{75} There are other companies, beside Ujo Music, that are based on blockchain and are trying out this technology as a possible solution to various problems in the music industry. Some of the music industry projects include: Bittunes, the first one to be launched in 2013, Mycelia, launched Imogen Heap in 2015; Dot Blockchain Media Inc., launched by Benji Rogers, together with Blokur, Blokur source of global music publishing data using blockchain technology and machine learning, or others like Resonate, Stem, and Aurovine (which is launching in spring 2019). Many of them are discussed in the following paragraphs.

\textsuperscript{76} D.A. WALLACH, \textit{op. cit.} Also, Pledge Music’s CEO, Benji Rogers, pushed for using blockchain to create a giant database of recorded music. He helped developing the Global Rights Database, containing rights that would help solve issues of ownership, payments and transparency of music. However, the fate of the database reflected the scale of the enormous task. The database collapsed in 2014.

\textsuperscript{77} \url{http://openmusic.org}.

\textsuperscript{78} Such as Berklee College of Music, MIT Connection Science and Internet Trust Consortium and MIT Sloan School of Management and Connection Science, all with legal seat in Boston, USA.

\textsuperscript{79} Over 180 companies have joined OMI to date, such as Universal Music Group, Sony Music Entertainment, Warner Music Group, Vevo, Spotify, Netflix, YouTube, Pandora, SoundCloud, Viacom, SiriusXM, Société des Auteurs, Compositeurs et éditeurs de Musique (SACEM), Red Bull Media House, Middlesex University UK and many others (see here for full OMI’s members list \url{http://openmusic.org/members}).

\textsuperscript{80} \url{http://open-music.org/about}. 
about the copyrights of any song, music sheets, lyrics, or the Performing Artist or Composer as well as of any performance done of the Work of music itself. Moreover, its architecture comprises core functional blocks and APIs that allow developers and stakeholders to build their own systems and tools that are OMI compliant. OMI is still at its infancy but looks very promising in ensuring ownership accuracy and addressing the fragmentation in the way copyright across the music industry is recorded.\(^{*}\)

A similar attempt 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”\(^{82}\). Founded by Benji Rogers in 2015 but slowly taking life throughout the years until its first employment in 2017,\(^{83}\) the DOT Blockchain Music Project is a public benefit corporation which is creating 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 blockchain denoting music rights transactions. This allows the company to offer 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. Its architecture uses

\[\text{Figure 5: The image shows the layers of communication between data and parties in the blockchain.} \]
\[\text{Source: Dot Blockchain Media Inc.’s website.}\]

\(^{81}\) Especially since at the time of the writing it seems that OMI is the only blockchain base initiative that is able to face the need to more transparency and to ensure authorship’s right accuracy. This is also discusses by O’Dair in: M. O’Dair, *How blockchain could help musicians make a living from music*. The conversation, July 7, 2016.

\(^{82}\) As stated on their website: <http://dotblockchainmedia.com/main/#about-section>.

\(^{83}\) The first Dot Blockchain Media registered song (by independent Artist Stolar) to be successfully delivered into the digital supply chain was released only in October 2017, two years after the incorporation of the company.
The value of this project is recognizable in the partnership signed in 2017 between Dot Blockchain Media Inc. and four partners related to the Canadian collecting society SOCAN (i.e. Society of Composers, Authors and Music Publishers of Canada): the CMO itself with its MediaNet subsidiary, its Downtown Music subsidiary’s Songtrust and its digital distributors CD Baby and FUGA\(^{84}\). The four partners provide technical and financial resources to Dot Blockchain Media Inc. to achieve its goal of music rights transparency\(^{85}\).

Although the idea of creating a modernized rights management solution for media creators and businesses, leveraging the power of DLT, this music start up still requires to grow acknowledgement in the music industry and obtain more follow from Artists, Producers and record labels before we can really see its full potential developed and having a real impact in the value chain of music.

In light of the changes happening in the music industry, it is possible to affirm that a new generation of Artists and musicians is rising and demands more transparency in the recognition and protection of its rights. The law already protects it and their copyrights in abstracto\(^{86}\), giving them exclusive rights toward their Works. But the vagueness of how the music industry deals with those rights and the uncertainty of the person that owns them give reason for this new generation of Artists to demand a change in the way the music industry works inside. Following the mentioned dissatisfaction of many – due to streaming threatening sales and live shows becoming ever more crucial for the Artist survival – these projects base on blockchain technology appears to be the better hope to bring about “sustainable business models for Artists, entrepreneurs and music businesses alike”\(^{87}\).

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


86 Indeed copyright law is territorial in nature but copyright 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 WCT; Arts. 2 to 5 InfoSoc Directive as well as single national copyright laws.

87 J. SILVER, op. cit.
3.2.2 **Creation of ‘fair trade’ in the music ecosystem and direct management of copyright works. The dream of Imogen Heap**

After global internet access has been brought to most of the developed countries in the world\textsuperscript{88} and unlimited streaming and downloading platforms (whether lawful or not) have become popular and easily accessible by most, it has also become more difficult for Performing Artists to make a living in the music industry, at least from recorded music. In fact, the traditional value chain revolving around the sale of physical recordings (like vinyl records, CDs, and DVDs) has been broken: the diminution of CD sales, the shift towards buying single tracks online rather than the whole albums, the increase of illegal downloads and the low payments of royalties from legal streaming platforms\textsuperscript{89}, have all played a role in the fall of the music industry in the 21\textsuperscript{st} century.

Thanks to potential benefit of blockchain technology, some distinguished figures in the music industry have suggested that blockchain could bring about a ‘fair trade’\textsuperscript{90} in the music industry, solving the issue of creating a fair and sustainable music market for empowerment of Artists (see problems ii) mentioned in Paragraph 3.1 above). In fact, as explained above, this technology allows creation of a networked database of music’s copyright information, with more transparency on authorship rights and faster payment of royalties. This could indeed offer Artists and Composers a greater share of value.

The first attempt to empower a fair, sustainable and vibrant music industry, involving all 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 and Ethereum. The experiment in itself was not

\textsuperscript{88} MINIWATTS MARKETING GROUP, *Internet World Stats*, 2019.

\textsuperscript{89} See research conducted in: E. HOLLOWOOD, M. QUICK, S. TAMESEVIC, *Spotify, Apple-music, Tidal-music, streaming services and royalties rates compared*, Information Is Beautiful. To fight the inappropriate and disproportionate payment of royalties to the right holders, the new DMS Directive has introduced new responsibilities and liabilities for ‘online content-sharing service provider’, those platforms which store and give access to a large amount of copyright-protected content with the purpose of obtaining profit therefrom, such as online audio and video streaming services (Art. 17 DSM Directive).

\textsuperscript{90} The notion that blockchain technology can give us ‘fair’ or ‘fair trade’ music has been proposed by Imogen Heap and Benji Rogers, as well as Stem, a start-up exploring the potential of blockchain technology for tracking revenue streams from digital service providers; Aurovine, a new 2019 platform for listening to and sharing music via the blockchain; and the music streaming platform Resonate.
a success for Heap from an economical point of view\textsuperscript{91}; nevertheless it was a wake-up call for many, who started realizing the real potential of blockchain and how the music industry might take advantage of the technological capabilities that the blockchain 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 – player within blockchain-based projects: Mycelia\textsuperscript{92}. The project, named after a thread of underground fungus that grows for miles, was developed together with the support of Ujo Music in an attempt to automate the background disbursement of royalties to the respective parties through the creation of music related metadata, in order to ensure all parties involved are paid and acknowledged fully. This automation was developed by ConsenSys, a subsidiary of Ethereum, with the idea in the future to further employ the use of smart contracts for ‘smarter’ payments.

The entire ‘music eco-system’\textsuperscript{93} of Mycelia proposes a database of Works of music containing all data relating, for instance, to lyrics and photographs as well as giving full credits to Performing Artists, Composers, Producers and so on. The ‘ecosystem of data’ around each Work of music would make it easier to locate the owners of copyrights to obtain a legal license to use the Work. Moreover, Mycelia aims to “connect the dots with all those involved in this shift from our current outdated music industry models, exploring new technological solutions to enliven and positively impact the music ecosystem”\textsuperscript{94}. As Heap strongly believes, “blockchain is the catalyst for change in the industry. It’s a new piece of technology, in the same way MP3 was. It’s a step in the right direction”\textsuperscript{95}.

At the time of writing, Mycelia is not a specific set of technological solutions although it may become one. For Silver\textsuperscript{96}, Mycelia is a fascinating set of aspirations and

\textsuperscript{91} 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.

\textsuperscript{92} <http://myceliaformusic.org>.

\textsuperscript{93} As defined by J. BARTLETT, \textit{Imogen Heap: Saviour of the Music Industry?}, The Guardian, September 6, 2015.

\textsuperscript{94} As described on Mycelia’s website: <http://myceliaformusic.org/#about>.

\textsuperscript{95} See Mycelia For Music’s blog at: <http://myceliaformusic.org/2016/05/14/imogen-heap-decentralising-the-music-industry-with-blockchain/>.

\textsuperscript{96} J. SILVER, \textit{op. cit.}
desires for how a new blockchain enabled architecture might connect music and data and what services the blockchain might offer in the foreseeable future.

On the other side of this revolutionary medal of ‘fair trade’ music, it is the aim of many to facilitate Artists in licensing their Works, through easier access to metadata databases of said Works. Following what was described in Paragraph 3.2 supra, metadata regarding the authorship of a Work of music would help become more popular what is currently a complex and convoluted process for those wishing to license a Work directly to the listeners. Making it easier to locate the owners of a Work of recorded music and to negotiate or obtain a license to use the Work is a major issue. Mycelia, as well as the previously mentioned Ujo Music, hopes to overcome it by using blockchain technology, combining the aforementioned characteristic of transactions’ transparency with the innovation of smart contracts (see Chapter 5 below), creating a system that would enable listeners to obtain more easily a license for the use of the music for various purposes, ideally directly from the Artist itself.

3.2.3 GIVING ARTISTS INCREASED CONTROL OVER TERMS OF USE AND ENSURING AN EASIER PAYMENT SYSTEM TO ARTISTS

Two consequences can be derived directly from the aforementioned advantages of using blockchain in the music industry: i) if authorship is recognized and protected, the Artist can have more control over the term of use of his/her Work of music; ii) if the identification of the person that owns the economical right over the Work is made easier, it is also easier to ensure a faster and more correct payment of royalties.

With regard to the first aspect, it is possible to envisage Artists using blockchain technology to break the hold of the record labels or Producers’ forced licensing system and instead have a more important say over the licence of their Works, at prices of their own choosing, ideally to single listeners all across the world. Moreover, this independency of Artists from the stronghold of record labels would allow for them to be more economically independent, solving the problem mentioned in Paragraph 3.1, point ii) above. Some scholars theorize the possibility for fully automated monitoring of Artists throughout their careers, via smart contracts. This could lead to ‘Artist accelerators’ along the lines of technology start-ups, opening up the music industry to

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97 As defined by O’ Dair in: M. O’DAIR, Music on the blockchain. Blockchain for creative industries,
new sources of capital, seeking businesses for founding or venture capital\textsuperscript{98}. This model could go as far as having a significant effect on Artists’ income to the extent that modern blockchain technology could enable listeners and fans to engage more directly with their favourite Artists. For instance, there is a new trend in the online music industry\textsuperscript{99}, which is the growth of fan-funding and direct sales sites for independent musicians via crowdfunding campaigns. This way listeners can send micro-tips or micro-donations to these Artists whose Works they appreciate the most (with Artists issuing their own shares or Tokens on the blockchain and ‘drafting’ smart contracts to ask for pledge contributions directly from their listeners)\textsuperscript{100}.

The possibility for Artists to have a direct connection with their listeners is still hindered by technical limitations and legal hurdles, which would need to be approached and solved as blockchain technology evolves. Nevertheless in the eye of this author it is an idea worth pursuing in order to be made technically and legally viable.

The second and most important issue is the lack of transparency in the value chain for recorded music\textsuperscript{101}. Payment of royalties, for both the sound recording and the underlying words and music, is often slow, taking months or even years to reach the right holders. In a culture of confidentiality and non-disclosure agreements on specific 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\textsuperscript{102}. Worse, significant funds are often paid to the wrong party, while large

\textsuperscript{98} Ibid, p. 14. O’Dair goes as far as speculating that “The opportunity to ‘hot house’ a group of emerging Artists, offering access to resources, mentoring, facilities and networking in exchange for a small stake in their future sound recording income might become a viable business model for portfolio investors”.

\textsuperscript{99} See for instance Bandcamp (<https://bandcamp.com/fair_trade_music_policy>) which helps independent artists sell their own music online or Patreon (<https://www.patreon.com/>) that allows artists to develop a direct relationship with their fans and generate revenue from their creative work.

\textsuperscript{100} Even though the technology is still very experimental and not entirely mature, several of these platforms are already up and running. See e.g. Swarm (<https://www.swarm.fund/>), Crypt Start (<http://www.cryptstart.com/>), and Agency 2.0 (<https://www.agency20.com/>), to name a few.

\textsuperscript{101} It is difficult to fairly pay creative work in a digital world where it is easy to share and distribute copies online at the click of a mouse, in a matter of few minutes. For example, music streaming sites and right holders struggle to agree on compensation for trillions of song streams, This has led to many legal battles in courts (such as various billion lawsuits brought forth against Spotify in 2017/18 for alleged lack of licensing rights to stream thousands of songs on its platform).

\textsuperscript{102} 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, \textit{op. cit.}
amount of royalties end up in a ‘black box’ in case where the rightful owner of the rights was not accurately identified. This is mostly due to the fact that the mechanism by which royalties are calculated and paid is often opaque and due to lack of a unique international database in the music industry that could unequivocally determine the rights’ ownership.

Blockchain technology has the potential to change this situation in various ways, solving the problem mentioned in Paragraph 3.1, point iii) above. First, payment of royalties could be split almost instantly according to agreed percentages and paid directly to Artists using smart contracts and cryptocurrencies; secondly, blockchain technology allows for lower transaction costs, making micropayments more feasible (given the small size of most payments to Artists in the digital streaming era).

Most significantly, this new way of identifying the right holder, tracking the usage of the Work online, calculating the exact amount of royalties due, making the payment in a matter of second, would finally help the music industry evolving and creating different, more fair and equal positions for each players in the value chain of music.

3.3 Blockchain innovations to implement the DSM Directive

The need for a proper legal framework for protection of Artists and other copyright holders has sprung from rapid technological developments that transformed the way Works of music are created, produced, distributed and exploited online. Artists have struggled to protect their digital contents, often finding their Works appropriated and republished without their permission across the web – over user-upload content platforms – often free of charge or subject to a comparatively low remuneration.

The EU institutions have recently addressed this issue within the framework of the DSM Directive. In order to achieve a well-functioning and fair marketplace for copyright, the EU legislator has introduced four main provisions that will improve protection of Artists on: i) the use of protected Works by online content-sharing service providers (“SP”) storing and giving access to user-uploaded content (Article 17); ii) Artists’ appropriate and proportionate remuneration (Article 18); iii) the transparency obligations for up-to-date, relevant and comprehensive information over the exploitation

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103 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 ICE Project, op. cit.
of the works (Article 19); as well as iv) the use of a mechanisms for contract adjustment of economical remuneration (Article 20).

Without entering into the merits of each provision, which have been object of many debates during the three years of discussion of the Proposal draft\textsuperscript{104}, it is suitable to briefly introduce the content of the provisions and their innovative nature:

i) \textit{Article 17 - use of protected content by SPs:} out of the many provisions this article is easily the most controversial. It addresses the perceived ‘value gap’: i.e. the misalignment between the volume of creative content accessed globally by users through online SP, that obtain unreasonable value from just enabling sharing of content, and the revenue that these accesses generate for the right holders\textsuperscript{105}. Under Article 17, by allowing its users to upload copyright-protected works, SPs perform an act of communication or an act of making available to the public for the purposes of the DSM Directive. Hence, they shall obtain an authorisation from the right holders to escape liability for copyright infringement\textsuperscript{106}. This is the key obligation enshrined in the new DSM Directive.

Where no authorisation has been granted to the SP, it shall be assessed whether the latter has made its best efforts in accordance with high industry standards of professional diligence to avoid the availability of unauthorised Works online. Account should be taken of the best industry practices and the effectiveness of the steps taken in light of all relevant factors, under the principle of proportionality\textsuperscript{107, 108}.

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\textsuperscript{104} Proposal for a Directive of the EU Parliament and of the Council on copyright in the Digital Single Market, COM/2016/0593 final - 2016/0280 (COD). The draft of the Proposal has been the subject of considerable discussion and lobbying by different parties within the artistic world. 104 organisations and entities have made their thoughts be known to the EU Commission. (<http://www.lawditmusic.co.uk/>).

\textsuperscript{105} As defined by C. ANGELOPOULOS, \textit{The ‘value gap’ and the new proposal for a directive on copyright in the DSM}, Centre for Intellectual Property and Information Law (CIPIL), University of Cambridge, 2019.

\textsuperscript{106} Authorization shall not only cover SP but also legalise the upload of Works by end users not acting on a commercial basis, within the scope of Article 3 InfoSoc Directive.

\textsuperscript{107} The principle of proportionality is a standard yet to be defined with sufficient clarity. In the absence of CJEU case law, domestic case law on filters available may serve as guidance.

\textsuperscript{108} Under Art. 17 (6) DSM Directive, the specific liability regime (and its criteria) is applicable only partially to start-up companies and newly emerging SP, with less than three years of services, an annual turnover below EUR 10 million and the average number of monthly unique visitors in the Union not exceeding 5 million.
Thus, this provision requires SP to utilize content recognition technologies\(^{109}\), so-called ‘upload filters’, as a back-up defence where best efforts to obtain authorisation have failed. The aim is to give rightholders the ability to determine whether, and under which conditions, their Works are used, with the final goal of obtaining appropriate remuneration for such uses over the SP platforms.

ii) **Article 18 - principle of appropriate and proportionate remuneration:** the DSM Directive provides that the remuneration of Artists should be appropriate and proportionate to the actual or potential economic value of the licensed or transferred rights, taking into account the Artist’s contribution to the overall work and all other circumstances of the case such as market practices or the actual exploitation of the work.\(^{110}\)

Thus, this provision requires the implementation of different mechanisms that would allow to supervise the use of each Work and determine easily who uses the Work, for which use as well as a database containing the correct information on the right holders so that the remuneration can be allocated in time. The mechanism shall also provide application of these principles and guarantee their fulfilment universally, taking into account the principle of contractual freedom and a fair balance of rights and interests.

iii) **Article 19 - transparency obligation:** as Artists tend to be in the weaker contractual position when they grant licences or transfer their rights, they need clear information to assess the actual economic value of their rights, compared to the remuneration received for their licence or transfer. Unfortunately, they often face a lack of transparency. Therefore, the sharing of adequate and accurate information by their contractual counterparts is important for achieving high level of transparency and balance in the system governing the remuneration of Artists\(^{111}\).

Under this provision, Artists shall receive on a regular basis – at least once a year – up to date, relevant and comprehensive information on the exploitation of their works and performances from third parties to whom they have licensed

\(^{109}\) The requirements in place for those filters are subject to proportionality and depend on technical availability, related cost and on the type and size of SP and their related audiences (Recital 66 DSM Directive).

\(^{110}\) Recital 73 DSM Directive.

\(^{111}\) Recital 75 DSM Directive.
or transferred their rights. The information shall cover all relevant revenues generated worldwide and be provided in a manner that is comprehensible, i.e. it should allow the effective assessment of the economic value of the rights in question.

Thus, following the requirements stated in the previous point ii), this provision requires to identify a technological instrument that would allow for easy, automated, immediate tracking of the use of Works and automatic calculation the amount of revenue originated for each right holder. This data should be adequate and accurate and should be accessible by both SP and right holders equally.

iv) **Article 20 - contract adjustment mechanism:** certain contracts for the exploitation of rights harmonised at EU level are of long duration, offering few opportunities for Artists to renegotiate them with their contractual counterparts in the event that the economic value of the rights turns out to be significantly higher than initially estimated and therefore the remuneration originally agreed clearly turns out to be disproportionately low compared to all relevant revenues derived from the subsequent exploitation of the work or fixation of the performance. Accordingly, in the absence of an applicable collective bargaining agreement providing for a mechanism comparable to the one set out here, a remuneration adjustment mechanism should be provided. The assessment of proportionality should take account of all relevant revenues, the specific circumstances of each case, including the contribution of the Artist, as well as the different sectors.

Thus, adding to all previous requirements stated in point i) to iii), this provision requires a mechanism for Artists to claim additional, appropriate and fair remuneration for the exploitation of their rights from the party with whom they entered into a contract. In order to do so, contractual adjustment mechanism should be put in place to estimate the real value of the rights, to calculate the correct retribution, and redistributing the fair revenues between right holders and their counterparties, eventually automatically.

In light of the above, it cannot be denied that the revision of copyright law is a commendable effort by the EU Parliament to prevent artistic theft and increase the

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112 Recital 78 DSM Directive.
protection of Artists and their IPR\textsuperscript{113}. Nevertheless, some complain about a critical factor hindering the Directive from achieving worldwide success: the absence of a mechanism to monitor each original Work and track its use through verified transactions, avoiding right holders to losing control over their creative Works shared online\textsuperscript{114}.

In this perspective, blockchain technology may play an important role to ensure the protection of copyright and could indeed be the solution for tracking rights online, satisfying all requirements stated in the provisions i) to iv) above. As already explained in Chapter 2 above and in previous Paragraph 3.2.1/2/3, blockchain offers options for easy, automated, immediate traceability of any digital IP asset, by tagging them with a unique cryptographic Hash, which allows tracking of uses of the Works and under which conditions. Furthermore, a blockchain-based network creates a tamper-free, immutable, transparent database of IPR, containing the correct information on the right holders and the Works, as well as the licensing or transferring contractual obligations. Clarity and transparency in information leads to easier identification, thus higher remuneration for such uses given to the correct right holders. Moreover, by using the instrument of smart contracts (see Chapter 5 below), blockchain could introduce contractual adjustment mechanism that would estimate the real value of the rights, calculate the amount of revenue for each right holder depending on the instruction stored on the code by the parties and automatically redistributing fair revenues between right holders and their counterparties. Most important, blockchain’s payment mechanism would lead to frictionless remuneration, allocated in a short time.

Relevance of blockchain in the modern era is noted even by the EU Commission, which has recognized blockchain-based technologies as having significant potential for

\textsuperscript{113} Ex multis, the General Manager of GESAC (a representative of 32 largest authors’ societies based in 27 EU countries, Iceland, Norway and Switzerland) says that the Directive is: “a major achievement for European creators and their future in the digital environment. It is also a strong and encouraging message from the EU institutions, showing that they will not give in to the aggressive and irresponsible behaviour undertaken by the tech giants to intimidate politicians and to manipulate public opinion with scaremongering, astroturfing and misinformation spread on their own platforms.” She adds: “The new Copyright Directive is a win-win policy achievement. It ensures fair payment for creators, provides broader protection for consumers, favours start-ups and brings about a level playing field for small businesses”.\textsuperscript{114} <http://authorsocieties.eu/mediaroom/339/33/A-major-achievement-for-Europe-GESAC-welcomes-the-final-adoption-of-the-Copyright-Directive>.

\textsuperscript{114} G. OLIVI, S. MASSALONGO, Italy: protecting digital content with the blockchain, Dentons Blog, April 22, 2019.
the purposes of achieving the Digital Single Market\textsuperscript{115}.

In conclusion, blockchain technology is shaping up to be transformational for copyright holders trying to protect their copyrights online under the DSM Directive. Developments in blockchain technology are currently moving fast, with concrete applications being developed and many implications explored also from a legal perspective. At the same time, it will be another couple years before the DSM Directive takes effect across the EU member states\textsuperscript{116}. Only time will tell, after the application of the DSM Directive, what will be the real and effective advantages brought to Artists by this new legislation. It may well be that by the time the legislation is effective across EU, the online world has embraced the use of blockchain to protect copyrights.

\subsection*{3.4 CONCLUSIVE REMARKS: PROBLEMATIC APPLICATIONS TO OBTAIN THESE ADVANTAGES}

Albeit the advantages mentioned above, there are still some technical and legal questions that need to be solved before blockchain could gain popularity as a bridge between Artists and listeners.

First, the question of who would enter the data is a key factor, as is the question of how the data would be verified in absence of a central authority. In this case, it might be necessary to evaluate the creation of a permissioned blockchain in order to at least verify the identity of the users allowed to enter the data.

Second, blockchain can guarantee the origin and time-stamp the existence of a Work of music. Nevertheless, it can’t itself prevent copying of the Work. In order to do so, something akin to DRM would be required, although it is unclear whether a cryptographic Hash stored on the blockchain would achieve the same result as a DRM. In addition, there are further logistical questions, since even a minimal edit of the Work (such as a minute alteration in tempo or length) would create a different Hash, identifying differently the variation of the Work, with the risk of exponential


\footnote{The DSM Directive entered into force on June 7, 2019. From this date, EU member states have two years to implement this Directive into their own laws. So, this new regime is unlikely to apply before May 2021.}
duplications in Works and in data.

Third, there is the problem of cryptocurrencies implementations and validation on the market that needs to be solved. Also, it would be preferable to establish a unique payment system without multiplications of cryptocurrencies for each DLT.

Fourth, to be considered is the capacity limit of the system to support bigger and more numerous transactions if blockchain evolves in a popular method of music sharing and licensing.

Anticipating what will be discussed more in depth in the following Chapter 4, there are, finally, many barriers that uphold the reach of a complete Disintermediation. The ideal of upsetting the entire status quo of the value chain system and deprive the ‘middle men’ of its power takes time, especially since it needs mainly acceptance by the general public as well as a valid substitutive technological method and legal paradigm, which would need to be tried out and perfected in time.
CHAPTER 4

Functional perspective of blockchain technology from the point of view of record labels and CMOs

4.1 THE MUSIC INDUSTRY’S FRAMEWORK IN THE 21ST CENTURY: A BRIEF OUTLINE

Prior to illustrating the friction caused by old royalties reporting and collecting methods for digital uses of music, and prior to discussing how blockchain technology might influence these aspects of the music industry, it is valuable to describe how the music industry works nowadays and what are the relationships between the parties involved in the value chain (for further analysis see Annex A).

Today, the music industries are worth globally an estimated US$45 billion, of which the record industry – those aspects associated with recorded music – is responsible for approximately US$19.1 billion of revenues. In 2018, the global recorded music market grew by 9.7% since the previous year. It is the fourth consecutive year of global growth and the highest rate of growth since 1997117. In particular, this growth was predominantly driven by a 32.9% rise in paid streaming that now accounts for 37.0% of total revenue118.

Thus, it can be affirmed that the recorded music made a shift to a model based on ‘access’ rather than ‘ownership’119 and this has brought new significant challenges to the industry. By necessity, Artists and musicians are entrepreneurs. Their job is to create music and their income originates from the appreciation of the listeners for their Work, which is reflected by listening to the Work of music, buying a copy online, purchasing a

117 IPFI Global Music Report – State of the industry 2019. IFPI is the organisation that promotes the interests of the international recording industry worldwide.
118 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%).
119 M. O’Dair, Music on the blockchain. Blockchain for creative industries, op. cit.
CD in a store etc. Sometimes Artists are able to match their passion with a serious career, taking on complicated tasks such as manufacture and distribution of the Work of music or activities like marketing, press and radio sponsoring and so on. Inexplicably, though, most of the time it seems that Artists are in constant wait of fair financial returns for their efforts. In order to have the chance to achieve commercial success and make a name for themselves, most turn toward intermediaries such as record labels, Producers, CMOs and streaming platforms for support and sponsorship. Nevertheless, while these relationships between Artists and intermediaries often are presented as an investment in the Artists’ talent, with the intermediaries providing funds to support the Artists, in reality they are more akin to a loan, rather than an equity stake. Due to the unbalanced bargain powers, Artists are forced to sign economically disadvantageous contracts with the hope, in the future, to obtain commercial success that would guarantee a fair return for their efforts.

120 M. O’Dair, The networked record industry – How blockchain technology could transform the consumption and monetization of recorded music, op. cit.

121 In so-called ‘360-degree’ deals, intermediaries expand their economic rights on Artists’ success to include a portion of revenue from multiple channels (e.g. live performance, merchandise, etc.). Furthermore, the money paid for these rights to the Artist, along with the costs of other services provided by the intermediaries (e.g., distribution, marketing, even mechanical royalties, etc.) can be treated as a recoupable account. This is deducted from the Artists’ percentage of income, until the intermediary has recouped the entire amount given up front.

122 Cook analysed how much revenue each party of the value chain receive for every $1 of royalties collected. He stated that every record deal is different but usually artists receive a minority cut of income – commonly 15-20% – and usually only after the record label’s initial and ongoing costs have been paid. C. Cook, op. cit., p. 15.

123 Furthermore, with regard to the economic disadvantaged provision for royalties, Schwartz analysed in his article a royalties’ statement sheet. The statement shows a particular song that was streamed 162,525 times on Spotify. Total royalties reported for those streams are US$11.46. Out it, the songwriter receives 50% of the royalties, which amount to US$5.73 to the songwriter. In other terms: US$0.000035 per stream. To put that into perspective, for a songwriter, to earn a middle class living from a song of about US$35,000 per year, he would have to see his song streamed one billion times. See: E. Schwartz, Coda: fair trade music: letting the light shine in, in S. Frankel, D. Gervais, The evolution and equilibrium of copyright in the digital age, Cambridge Intellectual Property and Information Law, Cambridge University Press (Cambridge), 2014, p. 314.
Recorded music revenue is spread across an array of channels. In the digital market, for instance, Artists’ Works are available on a number of different streaming platforms and download stores\(^{124}\). As a result, commercial and economic relationships that exist between Artists, record labels, Producers and CMOs have multiplied and evolved in time, becoming more digital and long-distance rather than physical and in close contact. By cause of this infinite multiplication, the knowledge about revenue earned by Artists from their compositions, performances, and recordings remains obscured.

A study of Boston’s Berklee School of Music – Institute for Creative Entrepreneurship shows\(^{125}\) 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. It is, in fact, unclear why and on what terms record labels

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\(^{124}\) Such as, for instance, paid interactive models, on-demand models, advertising-supported models or subscription-based models.

\(^{125}\) The report tries to exemplify payments from streaming services and describes the relationship between the parties: “First, for ‘table stakes,’ the label receives upfront payments, or advances, from the streaming service to acquire licenses to the label’s catalogue. Second, the label sometimes charges catalogue service payments. Third, not only does the label set the price for the service, it sometimes also receives an equity stake in the streaming company itself and becomes a minority owner. And finally, after all of these terms have been negotiated, the label sets a streaming rate”\(^ {\text{BERKLEE ICE Project, op. cit.}}\).
are entitled to hold such disproportionately high amounts of revenue, creating such a discrepancy between the Artists’ and record labels’ revenues. The same happens for revenue of royalties from CMOs in most countries.

Aiming for clarity, it is possible to summarise the critical points that create disparities in the music industry within four categories:

i) There is a severe lack of transparency on revenue data. It follows that it is all but straightforward to obtain access to real-time, in-depth, and comprehensible information on royalties about Artists’ sales or plays on various online platforms. In many instances, payments of royalties fail to reach the respective right holders, or when they do, the documents only provide the amount credited but don’t show the details of the payment flows, such as who’s paying who and for what.\footnote{126}

ii) As discussed in Chapter 3 above, the lack of unique, complete, open-access, intra-national or inter-national databases, with data scattered all over various databases, makes it rather difficult to identify all relevant and legitimate right holders, whether they are affiliated with any collective societies and which territory they have licensed, further complicating already convoluted rights tracking and preventing the correct payment of royalties.

iii) Without standardized reports from intermediaries and digital services, explaining where royalties come from and how they are calculated, payment information is disjointed, inaccurate, and incomplete. Consequently, Artists are at loss to understand their royalties’ statement analysis sheets. If even the right holder itself is not able to discern its revenues, it shows how complex payments on a single Work of music can be.\footnote{127} Unfortunately, these long, error-riddled reports will continue to exist until music companies invest in more robust and standardized digital royalties reporting systems.

\footnote{126}{In most other cases, today’s royalties’ statements still arrive in a manager’s office in a hefty stack of papers. The data is either too scattered or complicated to be useful or lacks relevant details and useful presentation. And that’s often because Producers or labels themselves don’t have the information correctly and quickly.}

\footnote{127}{Initiatives like Digital Data Exchange (DDEX) have attempted to establish some sort of standards for digital supply-chain communication, developing XML messaging standards for communications regarding electronic releases, digital sales, and music licensing, among others. Unfortunately, the committees are not always able to reach agreements quickly enough to keep pace with technological development. See the list of standards available from the DDEX Knowledge Base website.}
iv) Time is another major issue. It can take months or years for royalties to finally reach right holders. When rights authorship and ownership information is either unavailable or faulty, the process for payment of royalties becomes dramatically slower due to bureaucratic administrative verifications.

For these reasons, many Performing 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. Heap, in her drive toward fairness in the music industry, goes as far as stating that “only blockchain-enabled ready-for-business music registry could lead to a whole new dimension for music creatives to drive business toward themselves and their work”.

Hereinafter, this author discusses how the old framework within the music industry doesn’t fit anymore in the digital age, clashing with the digital economy and causing a major lack of reliable data and a decrease in remuneration for the majority of Artists. It follows the development of an analytical framework in which blockchain is hypothesized as likely to change the way these two quite different categories of protagonist of the music industry (Artists and Composers v. record labels, Producers and CMOs) would interact in a future, reformed, Artist-oriented scenario.

4.2 REDUCING THE NEED FOR THE ‘MIDDLE MEN’

Perhaps the most radical and controversial aspect of how blockchain technology could affect the music industry relates to its potential for creating a direct link between Artists and listeners, eliminating the need for intermediation of 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

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


130 M. O’DAIR, Music on the blockchain. Blockchain for creative industries, op. cit.
important regulatory actors in our society: the middle-men”\textsuperscript{131}.

Although this issue is discussed more in depth in the following Paragraphs 4.2.1 and 4.2.2, it is worth mentioning that this could be a much-cited advantage that blockchain could bring to the music industry and which is also present in its fair trade potential initiatives.

With such a Disintermediation, Artists could (more) easily sell their Work of music to listeners worldwide, bypassing country-based currencies, payment networks, gateways and distribution platforms\textsuperscript{132}. This would lead to direct and automated payments not only to the Artist but also to all other professional 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.

On the blockchain platform, all these could easily be defined as right holders. Moreover, listeners could place requests on the blockchain and, through smart contracts, could obtain instant access to the requested Work while directing funds (possibly via cryptocurrencies) directly to the right holders, with the platform simultaneously distributing the respective percentage of royalties to each right holder. This is for instance the aim of Heap, who describes her intention through the Mycelia project as “trying to take away the power from top down and give power, or at least a steering, to theArtist to help shape their own future”.

\section*{4.2.1 Blockchain Technology for Transparent and Equal Relationships between Artists, Record Labels and Producers}

Music industry practices have not always kept pace with the many possibilities of digital technologies, as technology moves in cycles throughout the years while the music industry tends to stand still. By recalling the aforementioned problems that create disparities in the music industry (Paragraph 4.1, points i) to iv) above), it could be affirmed that the lack of equality and transparency in the relationship between Artists and record labels or Producers does not fit anymore in the digital age. Even more so

\textsuperscript{131} A. WRIGHT, P. DE FILIPPI, Decentralized blockchain technology and the rise of lex cryptographia, SSRN Electronic Journal, 2015, p. 6.

\textsuperscript{132} In the copyright domain, Disintermediation would affect incumbents at every level: (i) publishers and music labels, (ii) CMOs, and (iii) online platforms, including those that host user-uploaded content.
when it comes to how the lack of reliable economic data on the retribution of the majority of Artists clashes with the digital economy and proves how the old framework within the music industry doesn’t fit anymore to the fast exchange of information of the digital era.

In the past, the music industry framework was built on a value chain composed of different parties having a ‘hierarchical’ position. Artists were dependent from record labels and Producers to promote, sponsor and market their Works to the public, and at the same time they were dependent from CMOs to collect royalties for the use of their Work of music by the public. Unfortunately, throughout the years these intermediaries began to exercise their powers to obtain personal economical gain (having the bargaining power) instead of protecting the Artists (which were and still are the weak party in the contractual relationship) and enforcing their rights for more guarantees.

Today, Artists claim more transparency in the management of their rights and more say in the commercial and economic aspects related to the use of their Works. In order to do so, some have suggested the implementation of blockchain technology. This is considered to be able to reset and equilibrate again the powers inside the value chain by removing the enormous power of such intermediaries. 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’.

The reduction in the number of intermediaries could be made a reality by blockchain, by automating most of the processes between Artists and listeners. This would lead to fewer intermediaries capturing economic gain in the value chain, in such a manner that more would be left for the actual creators of music. This result is presented in terms of Disintermediation: providing a new horizon of opportunities for filmmakers, musicians, Artists, Composers and other content creators. In fact, those who see Artists empowered by recent technological developments are correct, in that it has never been easier to record and disseminate music without a record label. However,

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133 S. NAKAMOTO, op. cit., p. 1.

due to the new extreme simplicity in producing and marketing music, competition is colossal, with the tangible risk that most Artists will remain stuck in what Anderson calls ‘the long tail’.

An area of the music framework that is ripe for new reinvigorating changes is the royalties reporting, which has been trapped in outdated practices (see problems mentioned in Paragraph 4.1, points i) and iii) above). As Phil Barry, founder of Ujo Music, suggests in an interview:

“approximately 12.7% of royalties that currently disappear on the operating costs of a performing rights society could, through the adoption of blockchain technology, be made available to Artists and record labels”

Amendments have recently been made possible by a number of blockchain-based companies that offer to Artists the possibility to enter into contacts directly with their listeners and obtain simultaneous payment of royalties over their Work. At the costs of the ‘risk’ of being left out of the major gains from the music market, some Artists have attempted to withdraw their Works from CMOs, record labels and streaming platforms in an effort to directly negotiate better rates on the open market.

One example is the service offered from the UK-imported and self-funded company Bittunes, 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 support exclusively Artists that are not part of any major label and, at the same time, offers to its users ownership of cryptocurrency as an incentive to buy Works from its Artists.

Similar to the previous, PeerTracks is a newly incorporated start up worth mentioning thanks to its ideal of pursuing a blockchain-enabled super-distribution model for streaming. In simpler words: PeerTracks claims to be the first streaming


136 J. SILVER, op. cit., p. 25.


138 <http://bittunes.co.uk/>.

139 <https://www.peertracks.com/>.
application utilizing the SOUNDAC blockchain platform\textsuperscript{140} for simultaneous automated payments of royalties to Artists, immediately at the moment the Work is streamed by users of the platform. Moreover, it is subscription free and allows the users to collect currency (called ‘XDS’ token) when listening, which can then be redeemed against fan club activities (e.g. meet-and-greets or signed merchandise). To this author this ideal is pure, but only time will tell if this financial investment will become popular enough between users to established a change in the world of online streaming and payments of royalties.

Another relevant example of company aiming toward Disintermediation is Kobalt. Founded by the Swede Willard Ahdritz in 2000, its mission was making the music industry more fair and rewarding for creators. Ahdritz wanted to give Artists, Composers, musicians, record labels and Producers the freedom and transparency they needed to build their careers\textsuperscript{141}. Today, Kobalt represents more than 40% of the top 100 songs and albums in the U.S. and U.K and allows Artists and Composers to keep 100% of their rights over their Works. When interviewed by Forbes, Ahdritz affirmed that the company represents his idea of “a publishing company that needs to be centralized, run on the same professional-grade technology as DSPs, and have relationship databases to link songs with products. But most importantly, [with] moral leadership and transparency”\textsuperscript{142}. Thanks to the new technology-based approach to collections of royalties, creators and Producers using Kobalt enjoy quicker payments, and, on average, obtain remunerations of 30-40% more revue from royalties compared to other online companies, as stated on their website (and this would help solve the problem mentioned in Paragraph 4.1, points iv) above). The success obtained and the length that Kobalt is willing to go to is proved by their collaboration with the music collection society American Music Rights Association.

In conclusion, as mentioned in Paragraph 3.2.1 above, without well-catalogued rights-ownership information databases, Artists would need to negotiate many more

\textsuperscript{140} As stated on their website: “The SOUNDAC database is open, transparent and constantly in-sync. There are no gatekeepers. SOUNDAC is not proprietary. It is an ownerless, automated, globally distributed, Peer-to-Peer network. Businesses worldwide, from streaming platforms to music retail websites, will know exactly which copyright holders to pay (in real time!) by using the open data contained within SOUNDAC”.

\textsuperscript{141} <https://www.kobaltmusic.com/>.

\textsuperscript{142} Interview of Willard Ahdritz by Danny Ross for Forbes.
licenses and would not necessarily know what each license covers, leading to higher costs and increased risk of infringement liability and errors in conferment of royalties. Open access projects like Berklee’s OMI have managed to gather almost every major party under the music industry to explain why blockchain is at least worth exploring and engaging with. Nevertheless, at present this technology is still perceived by some in the music industry as a threat, due to the potential for Disintermediation that distributed ledgers could bring about143. As such, its introduction is likely to be resisted by many incumbents and parties involved in the value chain.

What happens to the record labels and Producers if blockchain is introduced in the industry? The opinions are discordant. Silver sees as representing new business models based on the equity trading system and transparency in tracking use of Works, offered by blockchain technology. He thus suggests that projects like PeerTracks and Bittunes will have to struggle to achieve critical mass due to their fundamental weakness of being separated from the major label system in the present music industry (although they celebrate this as a sign of their independence)144.

Instead, Disintermediation supporter Heap believes these intermediaries could still benefit from the changes that blockchain can bring to the framework of the industry, if they adopt and embrace change. In a recent article she co-wrote, she claimed:

“As with all new technology, blockchain creates a shift in skill sets and opens up new opportunities. [...] There is an ever-greater need for curation and marketing. Record companies could better help music lovers to sift through the hundreds of millions of hours of music and, along with the Producers and existing collection societies, verify that the data are indeed correct. At some stage, Artists will invariably need to work with these and other parties.”145

4.2.2 IMPACTS OF BLOCKCHAIN ON CMOs

CMOs face the same type of challenges that record labels and Producers also face due to Disintermediation via blockchain. Whereas every Artist has his/her own deal

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143 BERKLEE ICE Project, op. cit.
144 J. SILVER, op. cit., p. 30-32.
145 I. HEAP, D. & A. TAPSCOTT, Blockchain could be music’s next disruption, December 6, 2017.
with a record label, the deal with collecting societies is the same. The main problem is that Artists and Producers must go through hundreds of CMOs from all over the world to collect royalties for a Work of music and this takes often years. That is assuming that the technology used by CMOs records all of the uses of the Work. As this is the era of global digitalization, most music consumption and distribution happens online, but right holders still have to rely on archaic collection methods that prolong timing for payments and confuse the verification of the correctness of data (see problems mentioned in Paragraph 4.1, points i) to iv) above). The method used by the CMOs to go through the process of negotiating, collecting and distributing royalties accurately is increasingly challenging, as digital services release increasingly high quantities of data.

Therefore, at present, there is a breakthrough under way in digital royalties tracking and collection and CMOs are pressured to reduce overheads, become more competitive with each other and more transparent toward Artists. In Europe, the recent DSM Directive is specifically targeting CMOs to encourage them: i) to become more efficient together across numerous territories, in order to offer flexible licensing schemes in the digital age; and ii) to reach a higher level of transparency in the calculation made to determine the amount of revenue in their royalties statement analysis sheets.\textsuperscript{146}

In order to achieve these goals, some\textsuperscript{147} see blockchain as taking up the functions of CMOs and rendering their services almost completely unnecessary by implementing the use of smart contracts to collect payments and distribute royalties in (almost) real-time, thanks to pre-agreed contractual rules put in place between CMOs and right holders and imputed in the code. By eliminating the need for trusted third-party intermediaries to guarantee the validity of transactions, blockchain has the potential to radically alter the existing distribution royalties and consequently alter the value chain inside the music industry. In a future and highly technologically-dependent world, blockchain may even show its most significant transformational change by representing

\textsuperscript{146} Respectively, for instance, Recital 3 and 46 and Arts. 16 – 18 – 20 DSM Directive. In particular Recital 3 states: “\textit{In order to achieve a well-functioning and fair marketplace for copyright, there should also be rules on rights in publications, on the use of works or other subject matter by online service providers storing and giving access to user-uploaded content, on the transparency of authors’ and performers’ contracts, on authors’ and performers’ remuneration, as well as a mechanism for the revocation of rights that authors and performers have transferred on an exclusive basis}”.

\textsuperscript{147} M. O’Dair, \textit{The networked record industry – How blockchain technology could transform the consumption and monetization of recorded music}, op. cit.
a reliable, trustworthy and effective technology that will replace completely the then absent legal institutions. This scenario is just an extreme hypothesis and anyone who thinks that all of this is achievable in the near future is clearly dreaming of utopia. This author agrees however with other scholars when they state that blockchain potential advantages and strategic motivations are surely intriguing.

Pushed by this wave of old challenges and new technological changes, some CMOs have recognized their need to step up with their role in the music industry, improve their functioning and accountability, embrace new technologies and establish new collaborations with other parties involved in the value chain to fill the gaps caused by a non-transparent and unbalanced market.

Guidance and directions came from the CMO Directive, which aimed to provide a response to the extensive fragmentation of national rules on the matter of collective right management but also remedies for certain pathologies of CMOs. These can be summarized in: i) insufficient checks and balances on the functioning of collecting societies; ii) right holders not always able to exercise their rights, notably because of poor governance and transparency standards applied by CMOs; iii) poor financial management since royalties collected on behalf of rightholders accumulate, pending distribution, with little oversight and poor handling; iv) the licensing of rights for the online use of musical Works is often difficult, cumbersome and costly for commercial users. Problems with the functioning of CMOs lead to inefficiencies in the exploitation of copyright and related rights across the internal market, to the detriment of the members of CMO, rightholders and users.

Notwithstanding the legal clarification that the CMO Directive has brought, after its implementation in 2016, considerable uncertainty remains as regards the application of the acquis and the ability of CMOs to properly provide their services for online management of Works of music.

In fact, at present, many CMOs do not have the ability to quickly and accurately identify Works and Work shares licensed; to organise fully electronic data exchange.

148 J. SILVER, op. cit., p. 61.
150 Recital 5 CMO Directive.
with online music SP pertaining to online usages of rights in musical Works which they represent; subsequently to process user reports and related invoicing as well as to achieve a complete distribution of amounts due.\textsuperscript{152} The administrations of Works of music requires extensive data processing capabilities and the ability to keep information up to date, as the scale of reported uses of music is considerable (see Paragraph 4.1 above). Without adequate automated processes, it would just not be economically viable and, with the traditional collection methods, many transactions get lost or, even when recognized, the cost of collection for those Works may be extremely difficult to recover anyway.

Modern advances in digital tracking and royalties collection through blockchain technology could assist CMOs in their daily activities, enabling them to correctly and automatically track usages of Works, generate fair compensation to Artists for uses of their Works online, fully capturing royalties in a cost-effective manner through fingerprinting of Works and allowing for fast and frictionless payment of royalties, solving most of the problems listed in points i) to iv) of Paragraph 4.1 above.

For instance, the ideal of bettering its services moves Polaris Nordic – a North European alliance of three collective societies\textsuperscript{153}. It desires to overcome complex local IT systems by developing a joint back-end system for music reporting and distribution of the revenues collected by various organisations. As stated on their website, Polaris Nordic seeks to adapt collective rights management and licensing processes in the digital era as well as reaching the European Commission’s objectives on the digital single market and copyright, as stated primarily in the DSM Directive\textsuperscript{154}. In order to achieve the aforementioned goals, Polaris Nordic partnered with the blockchain-based


\textsuperscript{153} Polaris Nordic is an alliance of the three Nordic copyright collection societies Koda (Denmark), TEOSTO (Finland) and Tono (Norway). Together they are among the world’s most efficient collecting societies representing more than 97,000 local and millions of foreign Composers, lyricists, arrangers and music Producers. <https://www.polarisnordic.org/>.

\textsuperscript{154} Namely the modernisation of certain aspects of the EU copyright framework to take account of technological developments and new channels of distribution of protected content in the internal market. Recital 2 in the preamble to the DSM Directive states: “\textit{The directives that have been adopted in the area of copyright and related rights contribute to the functioning of the internal market, provide for a high level of protection for right holders, facilitate the clearance of rights, and create a framework in which the exploitation of works and other protected subject matter can take place. That harmonised legal framework contributes to the proper functioning of the internal market, and stimulates innovation, creativity, investment and production of new content, also in the digital environment, in order to avoid the fragmentation of the internal market}”.

company Revelator in 2018\(^\text{155}\). The latter completed the first copyright application programming interface ("API")\(^\text{156}\) for Polaris Nordic, providing the foundational framework for upgrading any CMO’s data management system on Works of music\(^\text{157}\). Only time will tell if this API will really bring a change in the method of collection of royalties but this author believes that the current preparatory works and requirements are already a good step in the right direction and that this could be a very plausible solution for revamping the relationship between CMOs and Artists.

Another important example of CMOs using blockchain to improve the collection of royalties is the project currently implemented by PRS for Music, ASCAP and SACEM\(^\text{158}\) which aims at improving data accuracy for right holders\(^\text{159}\). Their ultimate goal is to conceive a global registry holding rights management information about copyright and neighbouring rights.

During a presentation at a blockchain symposium in 2017\(^\text{160}\), Xavier Cosaz – Project Director at SACEM – explained that the project between different CMOs is intended to create a concrete proof of concept on the use of blockchain for a shared system to manage authoritative music copyright information and improve data accuracy for rights holders.\(^\text{161}\) This would allow for the development of potential benefits into

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\(^{155}\) Revelator was founded in 2012 by music industry veteran Bruno Guez and is now a leading provider of data services for today’s digital business. Its cloud-based digital asset platform addresses the challenges of aggregating, processing, reporting and analysing large volumes of data, and solves the problems of transparency in royalties’ distributions to copyright owners and creators with easy-to-use web and mobile applications <https://revelator.com/>.

\(^{156}\) The goal of API is to provide the much called for transparency and efficiency, as well as demystify rights ownership, by providing developers and enterprises with tools to access and manage digital assets, including copyrights.

\(^{157}\) As states in an press article in their website <https://revelator.com/case/3159/polaris>.

\(^{158}\) PRS for Music Limited is the UK’s leading collection society, bringing together two collection societies: the Mechanical-Copyright Protection Society (MCPS) and the Performing Right Society (PRS). Formed in 1997 from the merging of MCPS with PRS, in 2009 changed its name in the current one. ASCAP, i.e. American Society of Composers, Authors, and Publishers, is an American non-profit performance-rights organization. SACEM, i.e. Société des Auteurs, Compositeurs et Editeurs de Musique, is the French CMO.


\(^{160}\) ‘Blockchain and Copyright Symposium’, organized by the Institute for Information Law (IViR) of the University of Amsterdam, on July 5, 2017.

\(^{161}\) This system would consist of a decentralized database of metadata on musical works with real-time update and tracking capabilities. More technically, it would manage the links between two existing music recordings standard codes, the ISRC (International Standard Recording Code) and the ISWC (International Standard Work Code).
real benefits of blockchain and smart contracts as described in the following chapters.

Furthermore, PRS for Music developed another similar project – called ‘ICE’ – in collaboration and partnership with STIM and GEMA\(^{162}\) which has resulted in the development of the world’s first integrated blockchain licensing and processing hub.\(^{163}\)

In the recent year, these CMOs partnered also with IBM and are now using the Hyperledger Fabric blockchain platform to solve the problem of scalability of data inherent to the difficulties arising when managing a library of a thousand Works and around 100,000 links. The project is currently entering its second phase, which will test a real life situation, extending the library to millions of Works.\(^{164}\)

Some have raised criticism concerning those projects arguing that they originate from specific marketing strategies and foster new forms of intermediation, instead of empowering the real potential of blockchain technology in favour of better payments for their Artists.\(^{165}\) Notwithstanding, these platforms still constitute a new form of possible profit from intermediaries to Artists and only time will determine what economic impact such solutions will eventually have.

Furthermore, the music collection society American Music Rights Association ("AMRA") has struck a deal with YouTube that enables centralized collection of its Artists’ royalties for videos streamed by the online streaming company anywhere in the world. A similar deal was struck in 2015 with Apple Music for global royalties’ collections around Apple streaming service. Tomas Ericsson, CEO of AMRA, is very optimistic on the advances that this deal would bring to Artists and goes as far as stating that "with AMRA’s global digital collection capability, Artists and writers are bound to collect 50% more royalties than what they collect today"\(^{166}\).

\(^{162}\) STIM, i.e. Svenska Tonsättarens Internationella Musikbyrå (Swedish Performing Rights Society), is a Swedish collecting society for songwriters, composers and music publisher, founded in 1923.

\(^{163}\) GEMA, i.e. Gesellschaft für musikalische Aufführungs- und mechanische Vervielfältigungsrechte (Society for musical performing and mechanical reproduction rights), is a government-mandated collecting society and performance rights organization based in Germany.


\(^{165}\) See the arguments of Matteo Fedeli, Director of Music Division at SIAE (the Italian CMO – i.e. Società Italiana Autori ed Editori) as reported by the press. <https://www.dday.it/redazione/28573/dirittodautore-soundreef-blockchain-siae>.

\(^{166}\) This is possible by using a technology invented by the company Kobalt, which allows identifies the song featured in the video played on YouTube. When the videos are played, the Artist owning the rights to the song is also identified, permitting the royalties to be accrued automatically, by updating a
Finally, one last example is worth mentioning. Core Rights, founded in Nashville (TN), is an American company that handles pure B2B blockchain-licensed music transactions and aims to building a marketplace for licensing of music by venues, such as bars, restaurants, and retail stores. Its new product, Music Licensing Exchange is an integrated, direct licensing digital marketplace that serves business owners, rights holders and music suppliers alike. Core Rights uses embedded identifiers to enable linking transactions with music files subjects of the transactions, so that each company pays performance royalties only for the specific music they play on their audio systems.

The relevance of the work carried on by Core Rights is amplified by the recent collaboration signed with two Canadian collective societies: SOCAN (who collects royalties for compositions’ rights) and Re:Sound (who collects royalties for sound recordings rights). The project aims to build the first implementation of blockchain royalties’ collection marketplace in Canada.

In the light of the recent discussions, while the innovators of the music industry point optimistically to blockchain mechanisms (as a very real and easy solution to a complex problem – for instance allowing data to be incrementally authorised and validated as and when new content is created, bringing the peace of mind that Artists are getting paid their fair share), this reasoning is at the same time too simplistic and underestimates the work done by CMOs. They administer and govern a large volume of back catalogues that generates the vast majority of the royalties. First of all, they are uniquely responsible to identify a Performing Artist’s details, eligibility, and status for collecting in a particular territory, often even by manually researching solutions (such as trying to ascertain with certainty whether a particular musician played on a particular track, recorded in some by-gone era). Then, there is the question of tracking down previously unrecognised contributors when data are lacking: only a manual and human effort could allow this type of work. Moreover, they manage claims of contributors who

dashboard in an app that an Artist, Composer or Producer can see from any mobile device.

SOCAN, i.e. Society of Composers, Authors and Music Publishers of Canada, is a Canadian performance rights organization that represents the rights songwriters, composers and music publishers. Re:Sound is a Canadian not-for-profit music licensing company dedicated to obtaining fair compensation for artists and record companies for their performance rights.

For instance the comment of Nelson Granados, Executive Director of the Institute for entertainment, media, sports, and culture at Pepperdine Graziadio Business School. See: N.GRANADOS, A breakthrough in music streaming royalties payments is underway, October 25, 2015.
make claims over certain Work of music or parts of a Work and, last but not least, have the power to decide over dispute resolution lawsuits.

Mark Douglas, British PPL’s Chief Technology Officer, is sceptic about blockchain implementation. In an interview, he highlights the challenges of CMOs and affirms that he is not sure that the blockchain would solve those sorts of issues\(^{170}\). From his perspective the challenge is less about how to improve the way CMOs currently distribute, but more about how to render more accurately what they distribute/to whom.

Moreover, given the role that the DMS Directive still recognizes to CMOs, for instance their main role in collective licensing, protecting cultural heritage or in achieving fair and appropriate compensations for Artists\(^{171}\), it is clear that the legislator doesn’t share this revolutionary idea of eliminating the role of CMOs.

Furthermore, the actual technical status of blockchain doesn’t seem to allow it to substitute CMOs, yet. Nevertheless, these innovative ideas give hope that music businesses, record labels, Producers and CMOs will become more efficient, the more digital they (and their listeners) become. One such step might be to become a good deal more active in their exploration of the capabilities of blockchain to increase their efficiency in data gathering, identity validation and in transaction handling\(^{172}\).

4.3 CONCLUDING REMARKS: COMPLETE DISINTERMEDIATION IS UNLIKELY AT THE MOMENT

New technologies can be applied to radically simplify the way music right holders are identified and compensated, resulting in sustainable business models for Artists, entrepreneurs and music businesses alike. The question is whether the new technological resources entering into the music industry will be well received by intermediaries and CMOs, or will they be opposed by slowing things down for as long as possible in order to each keep their role (and power) in the value chain of the industry\(^{173}\). The process of Disintermediation that blockchain could enable is likely to be resisted by those same intermediaries that might feel that their positions of control

\(^{170}\) Mark Douglas and Peter Letham are interviewed by J. Silver on January 15, 2016.

\(^{171}\) Respectively Art. 12, Art. 8 and Art. 16 DSM Directive.

\(^{172}\) J. Silver, op. cit., p.49.

\(^{173}\) J. Silver, op. cit., p. 51.
are threatened to be taken away within the old ‘hierarchic’ framework. Transparency throughout the value chain may be in the interest of Artists, but intermediaries might benefit more from the opacity of data currently provided to Artists, as already mentioned in Paragraph 4.2.1 above. Major record labels and collecting societies are careful not to allow their corporate policy positions to be undermined by the adoption of new technologies.

Yet, blockchain offers at least the potential for transforming the music industry, such as challenging the economic models and bringing about a more equal and fair place for all parties involved, not just record labels, Producer and CMOs; and not just Performing Artist and Composers. Blockchain is an exciting challenge for Heap, but, as she states: “it will only become a reality for those who wish to interact with music if its solutions are better and simpler than those that currently exist”.

There seems to be opportunities in blockchain technology that current CMOs and major labels or Producers indeed could and should explore. The benefits are likely to bring more incremental return on investment when implementing an efficient system via blockchain to create royalties tracking, gathering and distribution system. For that reason alone, in the interests of serving their members as effectively as possible, these intermediaries in the music space ought to look into the incremental value of investing in new blockchain systems. Although, as Silver maintains, whether these intermediaries could ever step outside their old roles and venture into a grander form of openness and public transparency is perhaps more doubtful.

In conclusion, a shift toward a peer-to-peer digital networked record industry might not be welcomed by all as not everyone will benefit from it. Even after the hypothetical adoption of blockchain, the complexity of the current system will take some time to unravel and rebuilt. The system first needs to achieve a high level of trust within the different parties involved in the value chain (nowadays lacking) in order to accept to cooperate and make the contribution of blockchain really valuable.

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175 I. HEAP, op. cit.
176 J. SILVER, op. cit., p. 55.
CHAPTER 5

Smart contracts as apical development of blockchain technology for the licensing of Works of music

5.1 SMART CONTRACTS FOR LICENSING OF MUSIC

In the previous chapters, this Author presented the positive wave of changes – in favour of Artists, record labels and CMOs – that blockchain could bring to revamp the music industry, in parallel with the difficulties that still need to be overcome for a full and successful usage of this technology. In the following paragraphs, the concept of smart contracts and their value in implementing in concrete the blockchain technology in the reality of the music value chain are analysed.

In technical words, smart contracts are algorithmic account holders on the blockchain. In easier words, such an algorithm constitutes what is now commonly referred to as an ‘executable software’ i.e.: “a computer program that both expresses the contents of a contractual agreement and operates the implementation of that content, on the basis of triggers provided by the users or extracted from the environment”\textsuperscript{177}. This is possible thanks to smart contracts’ ability to enable nodes in the chain to interact with the data stored and act autonomously if predetermined conditions are met (see Paragraph 2.1.3.2 above).

In spite of their name, the term ‘smart contracts’ is often confused with the concept of traditional legal contracts, but these terms are not interchangeable. Smart contracts are not legally binding contracts in a technical meaning. As better explained by Cuccuru, a smart contract is a computer code running as second level application on a blockchain and containing a set of rules agreed on by the interacting parties.\textsuperscript{178} Upon the satisfaction of these pre-defined rules, the agreement contained in the smart contract


\textsuperscript{178} P. CUCCURU, op. cit.
is automatically verified and enforced through the code of the blockchain. Thus, it can be said that they are an ‘instrument’ for the automatic execution of certain digitally-processed agreements, but not really agreements in themselves.

Because smart contracts can be relied upon to automate transactions typically governed by contract law (such as, for instance, on-chain assets transfers or licensing), they are useful tools for on-chain relationships and introduce higher efficiency in terms of cost, speed and security.¹⁷⁹

5.2 POSITIVE ASPECT OF IMPLEMENTING SMART CONTRACTS

A fully developed and networked record industry could use smart contracts, embedded on blockchain, for the sale or licensing of sIPR to: i) enable automatic execution of the agreement; ii) reduce the risk of non-compliance; iii) facilitate licensing, through global licensing standards embedded in the software; and iv) facilitate frictionless, near-instant micropayments.

5.2.1 THE BENEFIT OF AUTOMATED EXECUTION

The main value of smart contracts is their automated execution of contractual obligations, which performance is hard-wired (i.e. translated) into the code. Thus, the intervention of one of the parties or of an intermediary triggering contractual execution is replaced by the software’s automated execution. Given the interoperability and interdependence of blockchain and smart contract and since smart contracts execute automatically, they cannot be halted¹⁸⁰ nor controlled by one single party of the chain.¹⁸¹ This enables the execution of transactions in any situations devoid of human or institutional trust, it lowers the transaction costs and reduces the risk of counterparty’s infringement and interpretative uncertainty.¹⁸²

¹⁷⁹ Wright and De Filippi suggest that smart contracts are “one of the first truly disruptive technological advancements to the practice of law since the invention of the printing press”. See: A. WRIGHT, P. DE FILIPPI, op. cit. p. 10.

¹⁸⁰ Unless this option is specifically built into the code. See M. FINCK, V. MOSCON, op. cit.

¹⁸¹ As stated in their discussion by De Filippi and Wright. See: P. DE FILIPPI, A. WRIGHT, Blockchain and the law, Harvard University Press (Cambridge), 2018, p. 29.

¹⁸² The rigour of computer code indeed impedes conflicting readings, and execution, of the same term, thus avoiding disputes grounded on the opposite interpretations of the words used. For an overview of the advantages of smart contracts, see M. GIANCASPRO, Is a ‘smart contract’ really a smart idea? Insights
Furthermore, as second-layer applications embedded on blockchain they benefit from the same tamperproof nature of the underlying blockchain infrastructure, which anchors their automated execution.

Finally, 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.

Through these characteristics, smart contracts promise to trigger efficiency gains particularly attractive in commercial settings, including in relation to copyright protected materials.

5.2.2 REDUCTION OF RISK OF NON-COMPLIANCE

Consequence of the previous characteristic of automatic execution is the further advantage of blockchain being able to ideally reduce the risk of non-compliance thanks to the formalization of relationships into blockchain’s code. Once the protocol (i.e. the smart contract) is launched into the blockchain, it becomes 'independent' from the will of the parties, following nothing but its instructions and self-enforcing the conditions therein encoded. This leaves no room for voluntary breaches of the agreement. Indeed, the effectiveness of the relationships therein formalized directly derives from the code the instructions are embedded in.183

The advantages of automation can, therefore, be appreciated on a structural level thanks to the degree of 'prescriptiveness' embedded in the code184. Indeed, trust in the counterparties' spontaneous performance is highly minimized should a network of computers be empowered to fulfil the terms of the contractual relationships.

In summary, the blockchain technology could allow the music industry to capture

\[\text{References}\]


183 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 generally speaking, market forces and social norms). See: L. LESSING, Code: and other laws of cyberspace, Basic Books (U.S.A.), 1999.

184 Traditional contracts are basically assisted, in their execution, by legal binding-ness. As such, they are naturally subjected to a certain degree of uncertainty as regards their final outcomes: parties can voluntarily disregard their promises, law can be breached and courts or arbitral tribunals orders may demand to modify, invalidate or enforce the obligations assumed. The same outcome could be reached by smart contracts’ code embedded in the blockchain.
greater upside. De Leon and Gupta believe that smart contracts could involve provisions that have varying options depending on the greater market traction of a specific Work: for instance in this case the royalties’ rate or end user pricing could automatically be adjusted by the smart contract the more success the Work obtains. This is undoubtedly good news for aspiring Artists who often agree to disadvantageous contractual terms in order to get higher exposure from Publishers and record labels.

5.2.3 **Creation of Global Licensing Standards for Easier Licensing of Works of Music**

The above has led to expectations that smart contracts may be used to reliably automate a large volume of transactions in the copyright domain, modelled after simple ‘if-then’ rules. Consequently, scholars believe that automated licensing via smart contract has the potential of playing a role in standardizing licensing terms and conditions for protection of copyright Works across uses and different jurisdictions. Following the example of Creative Commons licenses employed at a global scale, DLT-based smart contract technology could be used to generate custom smart contracts that contain 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 – allowing to obtain augmented transparency, reducing ‘multi-jurisdictional’ barriers to using traditional contracts and further lowering the number of intermediaries between the rights holders and their audience.

De Leon and Gupta go as far as stating that it is highly likely that standard smart contracts would become *de rigueur*, which would obviate the need for an Artist to

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187 In 2001 a group of US Internet legal and intellectual property 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’. To this end, the first licences were introduced in December 2002. 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/>.

develop the negotiation skills or hire a skilled negotiator in dealing with different intermediaries and differentiated licensing terms, in each different jurisdiction where the Work is used or licensed.189

5.2.4 FACILITATING FAST, FRICTIONLESS ROYALTIES PAYMENTS

Finally, smart contracts could allow the collection and distribution of rights in almost real time according to pre-agreed rules put in place by right holders to control who has access to their Works and under which conditions. To illustrate, smart contract would allow music royalties to be administered almost instantaneously as soon as a Work is e.g. used, downloaded or streamed. These instantaneous micropayments could trigger more efficient remuneration models for the benefit of both users and right holders, improving fast cash-flow for Artists.

This highlights that blockchain technology could enable a more disintermediated and fair era of copyright management in the music industry. In fact, rather than passing through intermediaries, royalties could be distributed automatically between rights holders, according to ‘splits’ agreed in the smart contract ‘agreement’.190

In conclusion, Artists could be paid much quicker than with the present value chain framework, which has inordinate delays in payments to Artists. Although blockchain is unlikely to change the ludicrous fact that Artists are paid last in the value chain, the time for Artists to get paid would likely decline drastically, alleviating some of their woes.191

5.3 MAIN CHALLENGES TO IMPLEMENTATION OF SMART CONTRACTS

Besides advantages, smart contract have also 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 decentralized architecture they are included in. These concerns regard: i) the difficulty to reach a critical mass for future development; ii) the rigidity of the code and the system that doesn’t allow for easy adapting of the code to a singular peculiar situation but refers to a general standard for a

190 M. O’DAIR, Music on the blockchain. Blockchain for creative industries, op. cit., p. 11.
191 I. DE LEÓN, R. GUPTA, op. cit., p. 25.
multitude of cases; iii) the massive amount of coordination required between non-chain and off-chain; iv) fluctuation of cryptocurrencies that are yet to be recognized as an international currency in most stock exchanges.¹⁹²

### 5.3.1 DIFFICULTIES IN REACHING CRITICAL MASS FOR FUTURE DEVELOPMENTS

In the field of copyright law, mainstream adoption is one of the first challenges in the implementation of blockchain technology. In order to unleash its full potential and reach a sufficiently high level of development, the theorized blockchain-based copyright management system needs to be used by a significant number of right holders and cover a significant amount of copyright Works in the music industry. As the number of users increases, the system will become even more valuable and able to attract a wider user base. However, it is not yet clear what the threshold of a sufficient number of users is in order to begin to disrupt the existing status quo in the industry.

### 5.3.2 RIGIDITY BY CODE AND RIGIDITY BY DECENTRALIZATION

A further partially related issue is that of rigidity of the code embedded in the blockchain¹⁹³. Contractual parties are sometimes willing to provide a certain level of flexibility and vagueness in their contractual terms, for different reasons. Smart contracts, on the contrary, structurally limit parties' discretion, as the code need unequivocal and pre-defined propositions to follow instructions given and process them automatically¹⁹⁴.

On the other side of the coin, rigidity to use only well-defined terms is a severe requirement in case of blockchain. Fully decentralized blockchain allows complete freedom to enter and participate in the processing of the transactions. For all to run smoothly, it cannot be allowed vagueness and discretion that some contractual relationships may require and this may lead to an oppressive prescriptiveness of the instructions uploaded in the smart contracts code.

¹⁹² Due to their primordial state, any review of these specific issues shall wait for their actual implementation long-term.


¹⁹⁴ Code lines are not able to render 'grey areas'; everything is either 1 or 0. See P. CUCCURU, op. cit.
5.3.3 REQUIRING MASSIVE AMOUNT OF COORDINATION TO AVOID RISK OF DE-SYNCHRONIZATION

Using blockchain technology for copyright licensing requires a massive amount of coordination both on-chain, and between on-chain and off-chain transactions. In order to prevent potential conflicts (i.e. De-synchronization), the reality as represented on a blockchain and the reality as represented through non-blockchain contracts and traditional institutions must remain synchronous.\textsuperscript{195} Coordination of strictly on-chain uses of Works can be to an extent automated via smart contracts. For instance, blockchain cannot solve conflicts in cases where non-exclusive licensee’s right might conflict with the rights of an exclusive licensee in a given territory. The same would happen if an Artist retains all titles to a Work worldwide and conflicts emerge between smart contracts and ‘normal’ or traditional licenses that allow for exceptions and limitations provided for by the law. It is argued by some authors that these conflicts could be avoided either if such out-of-chain transaction would not possible or, more realistically, by ensuring that conflict resolution is supervised and administered by off-chain institutions.\textsuperscript{196}

Finally, De-synchronization of a blockchain can happen if off-chain transactions are not properly recorded on a DLT. Since blockchain technology is an append-only DLT, information can only be changed in extraordinary circumstances.\textsuperscript{197} This raises issues, such as where information relevant to copyright Works is entered incorrectly, maliciously or mistakenly; when unwanted transactions have been automatically executed; or a party lacks legal capacity or it decides to default on its obligations. Also modifications, such as those mandated by law or court decisions, cannot easily be accommodated. Unless technical and governance processes capable of remedying this fact are provided, this remains a severe limitation of the resulting system.\textsuperscript{198}

\textsuperscript{195} 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 DLT. See: A. I. SAVELYEV, \textit{op. cit.}, p. 3 – 8.
\textsuperscript{196} B. Bodò, D. Gervais, P.J. Quintais, \textit{op. cit.}, p. 12.
\textsuperscript{197} A. I. SAVELYEV, \textit{op. cit.}, p. 14–16.
\textsuperscript{198} It is accordingly unclear how copyright information that was entered incorrectly (whether intentionally or mistakenly) could be altered. For further comments see: K. ITO, M. O’DAIR, \textit{op. cit.}, p. 3-8.
5.3.4 **FLUCTUATION OF CRYPTOCURRENCIES**

Finally, some scholars see a structural weakness in the use of cryptocurrencies to support the infrastructure for payment of royalties on the chain. It must be noted that a severe limitation exists in the form of the value fluctuations that at present characterize these economic systems. The lack of stability of cryptocurrencies indeed currently makes them unappealing for use in payments of royalties for Works of music.\(^{199}\) While innovations could solve this scepticism, for the time being this remains a difficult prospect for the future to implement on a larger scale.\(^{200}\)

5.4 **UNRESOLVED LEGAL ISSUES RELATED TO SMART CONTRACTS (AND TRANSVERSELY TO BLOCKCHAIN IN GENERAL)**

Yet, despite the promises of utilizing blockchain technology, there remain substantial unresolved issues limiting the applicability of smart contracts, and consequently a smooth application of blockchain in the music industry. Among others, open questions include:

i) the legal systems lack a consensus on how code as contract fits into the traditional concepts of contract law;

ii) there are currently no solutions on the identification of the pseudonymous parties in blockchain-based smart contracts;

iii) it has yet to be determined how to coordinate the provisions of a-territorial smart contracts that restricts the use of the Work in a way that conflicts with exceptions or limitations to the use, established in each users’ country;

iv) it has yet to be determined what are the remedial measures for the breach of smart contracts;

v) it has yet to be determined how to deal with the possibility of conflicting claims on the same Work. Blockchain technology may be excellent at safeguarding the validity and provenance of information already in the chain, but cannot check the validity of the information inputted into the system.

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\(^{199}\) Ibid.

\(^{200}\) In blockchain, the registration (proxy for copyrighting) of the artist’s work on the DLT registry goes together with the possibility to monetize the licensing of the work. However, there is the consideration that registration on the blockchain may create a formality that Berne forbids in exercising exclusive rights under copyright. See Art. 5 (2) Berne Convention.
Therefore, a solution must be implemented to ensure that only truthful, valid, verified information gets into the blockchain;

vi) following, it is unclear how dispute resolution takes place. More broadly, at the moment the system lacks appropriate dispute-settlement instruments to handle conflicting claims, to address choice of applicable law and to resolve jurisdictional conflicts – all crucial questions for a markedly territorial right, like copyright.

Since the detailed analysis of all these contract law related issues is beyond the scope of this thesis, the applicability of smart contracts in the copyright domain has been analysed under the optimistic assumption that such issues might be resolvable in the future, if blockchain technology becomes widely applied.

Nevertheless, it remains to be seen to what extent standardized smart contracts, that transcend national and jurisdictional borders and that run on a global DLT network, might be an ideal fit for the online cross-border licensing logics of the music industry, which show little respect of, or interest in the nationally issued statutory and compulsory licenses.\textsuperscript{201} 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 automated copyright licenses on the blockchain\textsuperscript{202}.

5.5 CONCLUSIVE REMARKS: REQUIRING A MORE MEASURED APPROACH TO SMART CONTRACTS

The theoretical, normative and cautious discussion developed in the previous paragraphs 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

\textsuperscript{201} For our purposes these two terms can be seen as synonyms. See: J.P. QUINTAIS, Copyright in the age of online access: alternative compensation systems in EU law, Kluwer Law International, 2017, p. 85–138.

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”\textsuperscript{203}.

Notwithstanding the serious legal and policy issues surrounding smart contracts, this author believes that blockchain-embedded contracts – once standardized, thus capturing all legal eventualities – can dynamically respond to multiple situations, become useful for the prevention and enforcement of copyright infringement and eventually create superior compensation for Artists. On the other hand, some scholars are more pessimistic in their view and believe that as long as cheaper and less complicated alternatives – such as simple peer-to-peer file sharing protocols – remain widely accessible, there is little reason to expect blockchain applications to address enforcement in a meaningful way.\textsuperscript{204}

In conclusion, this author hopes to have set a level of expectations for development of smart contracts and blockchain to a somewhat realistic level. In fact, only time and higher numbers of application of this technology will show if the promises are met for improving copyright based practices and reducing frictions within the current framework of the value chain, as well as for improving the legal architecture of copyright protection in the music industry.

\textsuperscript{203} P.J. QUINTAIS, B. BODÒ, L. GROENEVELD, \textit{op. cit.}
\textsuperscript{204} I. DE LEÓN, R. GUPTA, \textit{op. cit.}, p. 29.
CHAPTER 6

Conclusions

6.1 CONCLUSIVE REMARKS ON BLOCKCHAIN CHALLENGES TO THE MUSIC INDUSTRY

The advent of the internet and the development of digital technologies – such as blockchain – have created profound disruptions in the music industry while opening the way toward new opportunities for Artists, Performing Artists and Composers alike. They are now better equipped and more empowered to reach broader global audiences, without the need to be supported by intermediaries in order to do so. At the same time, listeners have better and easier access to online digital Works of music than ever before.

Through the development of this thesis, hypothetical and real-life cases of application of blockchain technology have been studied in order to determine whether this technology could indeed affect how copyright protection is implemented in society as well as influence the online music industry. Blockchain technology, though in its infancy, holds the potential to alter the entire music value chain drastically. By introducing a new legal paradigm for the protection of Works of music, the advantages of blockchain technology are many and undeniable. Particularly in terms of storing music copyright data, achieving fast and frictionless payments of royalties and transparency through the value chain, creating and executing more flexible contracts between and among members of the value chain, blockchain technology does seem potentially transformative.

Although it must be borne in mind that given the diversity of possible blockchain platform designs, no one-size-fits all legal analysis is possible, blockchain is likely to bring to Artists the following benefits:

- better protection of authorship and copyright ownership, by creating a comprehensive database with information about right holders, Works, licensing terms, history about transfer of rights, etc.;
- lead to ‘fair-trade’ in music and fairer remuneration for Performing Artists and
Composers which will have direct access to the management of their Works of music, consequently being able to have a say on the terms of licensing and use of said Works;

- radically simplify the way music right holders are identified and compensated, resulting in sustainable business models for Artists, Composers and music businesses alike (such as record labels, Producers and CMOs).
- implementing an efficient system via blockchain to create royalties tracking, gathering and distribution system; simplifying tracking of the use of each Work and the calculations of royalties;
- smart contracts, embedded on blockchain, would allow the full development and networking of the record industry for easier sale or licensing of sIPR. Following it would be possible to: i) enable automatic execution of the agreement; ii) reduce the risk of non-compliance; iii) facilitate licensing, through global licensing standards embedded in the software; and iv) facilitate frictionless, near-instant micropayments.

It's still too early to say how blockchain-based music platforms and projects discussed in the previous chapters will perform, since most are very new in the music industry and have yet to be widely recognized and implemented. Blockchain is probably not a panacea to all the problems plaguing the music industry (see Paragraphs 4.3 and 5.3 above). 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 old, outdated ‘hierarchie’ framework. This would give every Artist, from amateur singers to platinum record selling superstars, the chance to offer their Works to the world; have more say in deciding how and to whom the Works are licensed; have their copyrights effectively protected and be fairly compensated for their Work, consequently being able to make a living out of creating music.

6.2 IMPLEMENTATION CHALLENGES

Albeit the described advantages blockchain technology could bring to the music industry, there are still some technical and legal questions to be solved before this technology could be accepted by all parties of the value chain and the public as a valid substitutive technological method and legal paradigm.
Blockchain technology application in the music industry still must overcome a number of challenges (see Paragraph 5.4 above). It needs to be tried-out and perfected in time until it reaches a point where the technological advances will equal a complete and extensive protection of copyright, without the possibility to circumvent technological blocking measures or to take advantage of technological limits, in order to obtain free access to the use and licensing of copyright protected Works.

Furthermore, another problem still exists of many key stakeholders in the music industry are too hesitant to accept these new technological developments, afraid to see their status quo upset in the value chain. The process of Disintermediation that blockchain could enable is likely to be resisted by those same intermediaries that keep pushing against the technological changes to preserve an incredibly lucrative (for them), non-transparent, standard-lacking, pre-digital music industry. On the other hand, depriving the intermediaries of their power takes time. As discussed, the current framework of the music industry doesn’t make feasible to completely cut out these ‘middle men’ in the near future. In fact, many of their activities and responsibilities cannot so easily be replaced by automatic computerized actions of blockchain technology and smart contracts.

According to research and advisory US company Gartner Inc., blockchain is not (yet) mature. Blockchain is not a distributed database replacement: blockchain complements distributed database technology with appropriate information partitioning between the two. Thus, the state of blockchain technology today is not suited for a high-volume of low value transactions; in the near term, the technology remains better suited to a low-volume of high value transactions.

Therefore, only a partial implementation of blockchain technology in the music industry has been realized, creating a mismatched ecosystem in which different parties have different advantages and compensation, meanwhile other lack the proper digital infrastructure to support them.

In conclusion, not all might welcome a shift toward a peer-to-peer digital

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networked record industry, as not everyone will benefit from it. Even after the hypothetical adoption of blockchain, the complexity of the current system will take some time to unravel and be rebuilt, and for a new legal paradigm to be instituted. The music framework first needs to achieve a high level of trust within the different parties involved in the value chain, nowadays lacking, in order for them to accept to cooperate and make the contribution of blockchain really valuable instrument. Subsequently, blockchain application needs to be tried-out and perfected over time until it achieves a degree of development, scalability, reliability and market adoption where all parties are equally represented, enabled and protected in the music industry.

6.3 FUTURE DEVELOPMENTS OF BLOCKCHAIN IN THE MUSIC INDUSTRY

As an old Latin saying states “not all that glitter is gold”. Although the idea of revolutionising the music industry using blockchain technology is a great and tempting opportunity for getting rid of old mechanisms that no more correspond to how the music environment has developed, this author believes that there are still major complications that have to be overcome before the success of this change. It takes time to adapt the legal paradigm to a new social and technological situation, and it takes even more time for the law to accept the technological changes, study them and their effects to the real life and find a way to legislated them. In addition, it needs to be taken into consideration that many must support the change before it actualizes.

In the case of blockchain, it is hard, at least in 2019, to detect high levels of enthusiasm that would in the short-term lead to legal recognition and protection of copyright by blockchain-related technological innovations. In fact, savvy of the stigma and challenges brought by the catastrophic impacts of the earliest digital networks in the form of the anarchic application of the technology novelties\textsuperscript{207}, 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 on the music industry— if not well moderated, adapted and controlled – disrupting once more the value chain and the industry’s inner

\textsuperscript{207} Exemplified by free streaming/download platforms such as Napster, Gnutella, Grokster, Limewire, as well as to the early 2000s types of BitTorrent networks such as Kick Ass Torrents or the infamous Pirate Bay, that allowed users to access and download copyright protected works in violation of copyright legislations.
equilibrium.

Should blockchain technology reach its full market potential in the forthcoming years and be followed by a shift to a blockchain networked record industry, this may have a significant, transformative impact on copyright in the digital music industry environment as well as for other creative industries entirely.
The music industry value chain starts with Artist and Performing Artists, who create and perform the Works of music. It is important to distinguish the two types of Artists – Artist and Performing Artists – as their copyrights and other related rights are different. Nevertheless, from a competition perspective they are the ultimate rights holders in the music industry value chain: they own the copyrights and moral rights to a Work and their negotiating capacity is very much alike. Although Artist and Performing Artists routinely assign – and therefore give up – the economic copyrights over Works they created to Publishers and record labels, they will likely retain certain contractual rights in relation to those Works, such as moral rights.

As a negotiating group, on average, Artist and Performing Artists are highly dispersed and therefore they lack the bargaining power to negotiate the terms and conditions of their licensing agreements with their counterparties in the industry, most likely Publishers and record labels.

Each group in the value chain brings unique capabilities to make the industry Work. The money paid by the listeners flows back through the value chain (in a pretty, and often delayed, and convoluted manner, as explained in Chapters 3 and 4 above) to provide the financial return needed by each member of the chain to make the music industry economically viable.

The following figures show some of the most “typical” of the many different content and money flows in digital music.

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208 Authors are songwriters, composers, lyricists, and arrangers. They create works and their rights are protected by copyright (droit d’auteur), which is for the duration of the author’s life plus 50 to 70 years. Performers are singers and people who play musical instruments. They create fixed performances, also known as recordings. Their rights are related rights (or neighbouring rights). Their copyright protection is mostly 50 to 70 years from the first release to the public. I. De LEÓN, R. GUPTA, op. cit.

209 Ibid. Therefore, Artist and Performing Artists position is weak and often the royalties revenue that they received from their licensing agreements, particularly for unknown artists, tends to be meagre.
Figure 7: It depicts the flows for musical compositions, involving songwriters and publishers, from most types of DSPs (with differing royalties’ amounts for different service types). Source: B. ROSENBLATT, Watermarking Technology and Blockchains in the Music Industry, Digimarc, 2017.

Figure 8: It shows the flows for sound recordings, involving recording Artists and labels, from digital music download services such as iTunes and Amazon. Source: B. ROSENBLATT, Watermarking Technology and Blockchains in the Music Industry, Digimarc, 2017.
Figure 9: It shows the flows for sound recordings from interactive streaming DSPs such as Apple Music, Spotify, and TIDAL. Source: B. ROSENBLATT, *Watermarking Technology and Blockchains in the Music Industry*, Digimarc, 2017.

Figure 10: It shows the flows for non-interactive (radio-like) music streaming services. Source: B. ROSENBLATT, *Watermarking Technology and Blockchains in the Music Industry*, Digimarc, 2017.
B.1 Artchain Marketplace Platform: what is does

In the practical case of Artchain Marketplace Platform, the actors of the system exchange digital properties. The Works are marketed in a permissioned blockchain with Hyperledger fabric (i.e. a distributed operating system for permissioned blockchain). In this marketplace, each transaction is represented by a smart contract in the Hyperledger blockchain. This guarantees the process to run smoother thanks to the absence of a human intermediary or a central body, which is one of the main characteristic of DLTs. On the other side, payment are automatized and made in cryptocurrency Ether, on the Ethereum blockchain. In this Ethereum platform, IP addresses of the buyer, seller and oracle\textsuperscript{210} are visible to the platform’s users, so that each party is represented.

Consequently, as the functioning of the marketplace is given to the Hyperledger blockchain and the monetary management at the Ethereum blockchain, there is the need of a connection between these two blockchain that will make the all system a so-called ‘multichain’. The Decentralized-Application (so-called ‘Dapp’) is the access window to the multichain between Hyperledger and Ethereum.

B.2 Artchain Marketplace Platform: how it works

Here it is described the general diagram of how the Artchain Marketplace Platform (hereinafter ‘Marketplace’) works:

1. An Artist (i.e. the seller) sings up in the Marketplace, entering name, surname and personal Ethereum address, which will be used to receive payments. A user

\textsuperscript{210} The oracle is a third party moderator of the transaction, responsible for the creation of the smart-contracts and the release of the funds.
profile is created on the Hyperledger blockchain (hereinafter ‘blockchain’), visible to other users on the Artchain platform.

2. The Artist uploads to the platform the digital Work to sell (this will produce an MD5 Hash of the Work that will represent the Work in the blockchain). Then he/she will insert the name of the Work and the price at which he/she wants to sell it. The Work is instantiated on the blockchain and it is now visible to all potentials buyers.

3. A private collector/auction house/gallery (i.e. the buyer) signs up in the marketplace, entering the same data required in point 1 above. The user profile of the buyer is now active on blockchain and is visible to the entire system.

4. The buyer has at his/her disposal a dashboard with which he can navigate among the Works available for sale and where he will be able to make offers to buy them.

5. The buyer chooses the Work he/she wants to buy and proceeds with the creation of an offer (i.e. a ‘bid’), entering the price in Ether that he/she is willing to pay for the Work. The marketplace communicates to the oracle the intention of the buyer.

6. Therefore the oracle:
   a. creates a draft of a smart-contract that would bound together the addresses of the seller and of the buyer;
   b. employs the contract on the Ethereum blockchain and initializes it within the addresses in question, then returns to the Dapp the unique address of the contract just created;
   c. the Dapp creates a payment request to the created contract of the amount of the bid.

7. The buyer signs the transaction using the wallet browser (i.e. ‘Metamask’) which is propagated on the Ethereum network. Now the amount lies on the smart contract and is no longer under the direct control of the buyer. The app waits for the confirmation of the transaction, then sends the request of the bid to the buyer, (which now includes the contract address) on the blockchain.

8. The bid is now visible in the buyer’s dashboard ready to be sent automatically to the seller.

9. The buyer proceeds by sending the bid to the seller, the Dapp creates a transaction draft for transfer of ownership of Work to the seller and makes the offer visible in the seller’s dashboard.

10. The seller sees the bid in his/her dashboard with the amount bid by the buyer.
11. The seller chooses to sell the Work and accepts the bid.
12. The seller no longer sees the Work in his/her dashboard and, instead, sees the balance of his/her Ethereum portfolio updated with the amount of the price of the Work sold.
13. The buyer sees the Work in his/her dashboard and sees the balance of his/her Ethereum portfolio deducted of the amount of the price paid for purchasing the Work.
14. End.

(Images from each of the previous steps are shown in Annex C below).
ANNEX C

Examples from the Artchain Marketplace Platform

C.1 WHAT ARTCHAIN MARKETPLACE PLATFORM LOOKS LIKE

The following images are screenshots taken from the real-case multichain of Artchain Marketplace Platform, to show how the platform operates in concreto.

They show step by step the process of how a smart contract operates for the sale and purchase of a Work of art on a blockchain. The contract is executed between a “basic” Artists (not renowned) and a private collector.

The example follows the description of the process as provided in Annex B, Paragraph B.2 above. These are the names used in the example:

- Name of the Artists: Mario Rossi, ID code 001;
- Name of the Buyer: Luca Bianchi, ID code 002;
- Name of the Work: Girasoli;
- Name of the Gallery: Pinacoteca di Brera
- Cost of the Work: ETH 1 (ETH is the code for Ethereum cryptocurrency).
Figure 12: Homepage panel of the Artchain Marketplace Platform, as seen by Artist and buyer. It shows the name of the Work, the code of the owner (001 = Mario Rossi), the price of the Work (ETH 1 = 1 Ether cryptocurrency) and the Hash of the Work. Also it shows all the info about the Artist and the different buyers present in the blockchain such as the gallery (named e.g. Pinacoteca di Brera), the private collector (e.g. Luca Bianchi) and the Auction house.
Figure 13: it shows the form to create a user profile used by the artist (named e.g. Mario Rossi). It request entering name, surname and personal Ethereum address, which will be used to receive payments. The profile is created on the Hyperledger blockchain, visible to other users on the Artchain platform.
Figure 14: it shows the form to upload the digital Work (named e.g. Girasoli) to sell on the blockchain. This will produce an MD5 Hash of the Work that will represent the Work in the blockchain. The Artist can insert the name of the Work and the price at which he/she wants to sell it. The Work is instantiated on the blockchain and it is then visible to all potentials buyers.
Figure 15: it shows the form to create a user profile used by a private buyer (named e.g. Luca Bianchi). It request entering name, surname and personal Ethereum address, which will be used to receive payments. The profile is created on the Hyperledger blockchain, visible to other users on the Artchain platform.
Figure 16: Screenshot of the homepage that the artist Mario Rossi sees in the marketplace. It shows the name of the Work, the code of the owner (001 = Mario Rossi), the price of the Work (ETH 1 = 1 Ether cryptocurrency) and the Hash of the Work. Also in the second part of the screen the artist sees his name, ETH address and the balance of cryptocurrency in his portfolio (ETH 0 so far, as the Work has not been sold yet).

Figure 17: Screenshot of the homepage of the buyer Luca Bianchi. It shows the name of the Work, the code of the owner (001 = Mario Rossi), the price of the Work (ETH 1 = 1 Ether cryptocurrency) and the Hash of the Work, together with a clickable button “Buy Opera”. Also in the second part of the screen the buyer sees his name, ETH address and the balance of cryptocurrency in his portfolio (ETH 1.42)
Figure 18: Screenshot of the homepage that the artist Mario Rossi after the sale and purchase smart contract has been executed by the blockchain.
It shows the artist ID and name, his ETH address and the balance of cryptocurrency in his portfolio (ETH 1, since he received the price of ETH 1 for the sale of the Work).
The artist also has a clickable button “New Opera” to upload a new opera to sell.

Figure 19: Screenshot of the homepage of the buyer Luca Bianchi after the sale and purchase smart contract has been executed by the blockchain.
It shows the name of the Work, the code of the new owner (now 002 = Luca Bianchi), the price of the Work (ETH 1 = 1 Ether cryptocurrency) and the Hash of the Work.
Also in the second part of the screen the buyer sees his ID and name, his ETH address and the new balance of cryptocurrency in his portfolio (ETH 0.42 since he paid ETH 1 to buy the Work)
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