MUSIC COPYRIGHT MANAGEMENT ON BLOCKCHAIN:

ADVANTAGES AND CHALLENGES

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ABSTRACT

The emergence of music blockchain-based platforms is revolutionizing the online music landscape. These platforms are hoped to enable right-holders to transact directly with end-users without the need for the middlemen, namely collective management organizations and commercial users. It is expected that blockchain could help to solve the historic problems, which are associated with the dominant position of such intermediaries in the right management system. However, blockchain still attracts much debate on its practical constraints. In this research, the benefits and drawbacks of blockchain application in the management of copyright and related rights in music online are investigated. On that note, this research can help to elevate the understanding of the true promise of blockchain application in the music industry.

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INTRODUCTION

"Who runs the world?" are the lyrics of a well-known Beyoncé song that chime with some of the areas of this world; namely where does power reside? Currently, power is placed in the hands of a few. For centuries, entities such as banks, distributors and agents have been entrusted to manage the ebbs and flows of the economy. Consequently, they have become the most important actors in our society – the "middlemen". Notwithstanding, when these middlemen do not act as expected, trust in the system collapses.

In the context of music online, collective management

organizations (CMOs) are often entrusted by owners of copyright and related rights[1] to monetize and enforce rights on behalf of right-holders before commercial and individual users. However, the music community is suffering from issues, such as inaccurate copyright data, a lack of transparency and delayed payments.[2] Such problems are blamed on the current bureaucratic right management system which relies on the central role of CMOs.[3] Therefore, faith in the current centralized order has evaporated.

The issues caused by the existence of intermediary layers in music online are best exemplified by the conflicts and disputes between CMOs and commercial users. The most notable case in Europe is GEMA[4] (a CMO based in Germany) v. YouTube[5] where a number of music videos on YouTube were blocked in Germany before the parties amicably settled the case.[6] Similarly, there seem to be conflicts between PRS for Music[7] (the United Kingdom's CMO) and YouTube whenever it comes to the renewal of licensing deals between the parties—resulting in the blocking of thousands of music videos to individual users in the United Kingdom.[8]

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1 Copyright and related rights comprise two kinds of protected rights: (i) moral rights which are aimed at entitling authors and creators to preserve and protect their work; and (ii) economic rights which are aimed at entitling right-holders to monetize their work. While economic rights are transferrable, many countries prohibit the transfer of moral rights. WORLD INTELLECTUAL PROPERTY ORGANIZATION, *UNDERSTANDING COPYRIGHT AND RELATED RIGHTS* 9 (2d ed. 2016).

2 Zonghui Li & Wenting Cheng, *Practices of Collective Management of Copyright on Musical Works and Related Rights on Audio-Video Products in China*, 8 INT'L J. OF INTELL. PROP. MGMT., 78 (2015).

3 *Id.*

4 GEMA is the abbreviation name of Gesellschaft für musikalische Aufführungs- und mechanische Vervielfältigungsrechte, which means Society for Musical Performing and Mechanical Reproduction Rights.

5 OLG München, Urteil v. 28.01.2016 – 29 U 2798/15.

6 Nils Rauer, *Germany: YouTube and GEMA Reach a Licensing Agreement on Music Videos* LIMEGREEN IP NEWS (Nov. 4, 2016), https://www.limegreenipnews.com/2016/11/germany-youtube-and-gema-reach-a-licensing-agreement-on-music-videos/#page=1.

7 PRS for Music is the operational alliance between Performing Right Society (PRS) and Mechanical-Copyright Protection Society (MCPS).

8 Alexandra Topping, *YouTube and PRS Make Peace as Musicians Protest about Plans to Punish File Sharers*, THE GUARDIAN (Sep. 02, 2009), https://www.theguardian.com/technology/2009/sep/03/youtube-prs-deal-file-

Meanwhile, the emergence of blockchain technology has breathed life into the notion of restoring power back to the individual. Blockchain technology has started electrifying the music industry by the establishment of blockchain-based platforms for online music licensing, such as Ujo, Peertracks, Dot Blockchain, Mycelia and others. These platforms are expected to offer right-holders greater control over the management of their online rights[9] by creating a new decentralized marketplace for right-holders to directly enter into transactions with individual users. Much has been said and written about blockchain, though much of the discussion about this technology's potential seems to have been exaggerated. Hence, the community is awash with ill-informed and inaccurate commentaries. Therefore, this research aims at enhancing the understanding of the music community about blockchain. It evaluates blockchain's significant opportunities and challenges in management of online rights.

This research is divided into four Parts. In the first Part, the concept of management of copyright and related rights is presented. The second Part highlights four long-complained issues of the current CMO-led right management system. The third Part is dedicated to technical concepts of blockchain technology and practical perspectives on its advantages and disadvantages in solving the existential problems of the current right management landscape. Finally, this research is concluded by the evaluation of the pros and cons of blockchain application

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sharing; Chris Cooke, *The Love/Hate Relationship Continues as PRS Renews its Deal with YouTube,* COMPLETE MUSIC UPDATE, (Jan. 15, 2016), https://completemusicupdate.com/article/the-lovehate-relationships-continues-as-prs-renews-its-deal-with-youtube/.

9 Under most copyright laws, the "traditional" protected rights of economic rights include the rights of authors or creators to authorize or prohibit: (i) reproducing the work in different forms, such as recorded or printed forms; (ii) distributing copies of the work; (iii) performing the work in the public; (iv) broadcasting or other public communication of the work; (v) translating the work; and (vi) adapting the work, such as turning a novel into a play. Meanwhile, the economic rights in digital market only comprises: (i) reproducing the work in the form of intangible copies; (ii) communicating to the public, which includes webcasting, radio and simulcasting or near-on-demand services; and (iii) making available the work, which includes on-demand and other interactive services (in this research, these rights are collectively referred to as "online rights"). 2001 O.J. (L 167) 16; 2005 O.J. (L 276) 55; WIPO: World Intellectual Property Organization, *Understanding Copyright and Related Rights* 9 (2016).

in music online.

1 Introduction to management of copyright and related rights in recorded music

Traditionally, copyright and related rights are administered in the individual management form whereby authors and creators directly exercise their rights or mandate the management of rights to another person on an individual basis, such as agencies, publishers or record labels, who then grant licenses to users for the exploitation of musical pieces.[10] Over time, individual management form became impractical and commercially ineffective for rightholders.[11] Collective management form therefore appeared in the nineteenth century, in which copyright and related rights of more than one rightholder (such as authors, performers, producers and publishers) are aggregated to specialized management organizations, such as CMOs.[12] The functions of these organizations are to collectively license works, monitor the use of works, collect revenue on behalf of and distribute revenue to rightholders.[13] The works whose right management have been assigned to these organizations constitute their repertoire.[14]

To understand the position of these organizations in the online music market, it is essential to draw a full picture of the music value chain landscape. Basically, in every recorded music, there are two compositions of copyright and related rights, namely the composition (musical works) and the recording itself (sound recordings).[15] As a common practice, with respect to the musical

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10 Romana Matanovac Vuckovic, *Remunerations for Authors and Other Creators in Collective Management of Copyright and Related Rights* 66 ZBORNIK PFZ 35, 38 (2016).

11 WORLD INTELLECTUAL PROPERTY ORGANIZATION, *WORKING DOCUMENT: WIPO GOOD PRACTICE TOOLKIT FOR* CMOS (THE TOOLKIT) 3 (Oct. 31, 2018), https://www.wipo.int/publications/en/details.jsp?id=4358.

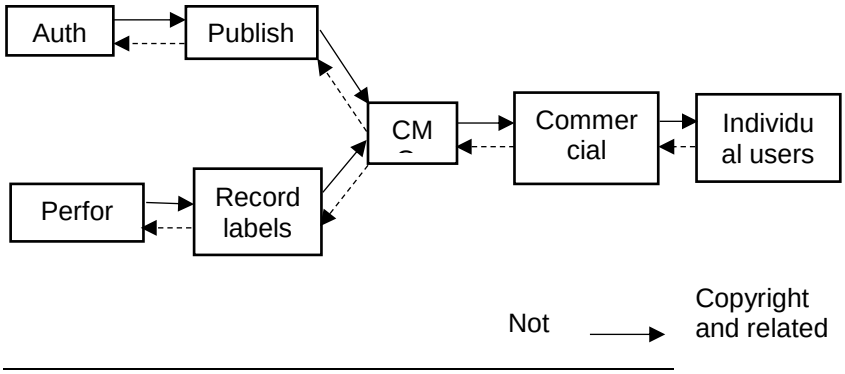
12 Mihaly Fiscor, *COLLECTIVE MANAGEMENT OF COPYRIGHT AND RELATED RIGHTS* 19 (2002).

13 Simone Schroff & John Street, *The Politics of the Digital Single Market: Culture vs. Competition vs. Copyright*, 21 INFO., COMM. & SOC'Y 1306–07 (2018).

14 Reto M. Hilty & Sylvie Nérisson, *Collective Copyright Management and Digitization: The European Experience,* MAX PLANCK INST. FOR INTELLECTUAL PROP. AND COMPETITION L. RESEARCH PAPER SERIES 2 (2013)

15 U.S. COPYRIGHT OFFICE, COPYRIGHT REGISTRATION OF MUSICAL COMPOS

works, authors often enter into publishing agreements with publishers, in which publishers are entitled to monetize the musical compositions.[16] With respect to the sound recordings, performers normally engage record labels to release their pieces of recorded music.[17] If these rightholders mandate a CMO to administrate rights in their works, such CMO grants licenses for exploitation of these works and receive payment on behalf of rightholders from commercial users, such as Spotify or YouTube.[18] These commercial users then provide a range of recorded songs on their online music platforms to individual consumers. Subsequently, CMO makes the distribution of royalties to rightholders after the deduction of operating expenses and other authorized deductions.[19] Accordingly, there are at least three layers in the music value chain, namely: (i) publishers and record labels; (ii) CMOs; and (iii) commercial users; through which payments are processed before being transferred to authors and performers. The overview of the music value chain as described above is summarized in the figure below:



ITIONS AND SOUND RECORDINGS (2012), https://www.co /circ 56a.pdf (last updated Mar. 2019).

16 SOCAN, *The* Toolbox, SOCAN, https://www.socan.com/wp-content/uploads /2017/05/socan-publishing-101-en.pdf (last visited Apr. 29, 2019).

17 Allen Bargfrede, MUSIC LAW IN THE DIGITAL AGE: COPYRIGHT ESSENTIALS FOR TODAY'S MUSIC BUSINESS 64 (2d ed. 2017).

18 Robert Hooijer & J. Joel Baloyi, WORLD INTELLECTUAL PROPERTY ORGANIZATION, COLLECTIVE MANAGEMENT ORGANIZATIONS – TOOL KIT: MUSICAL WORKS AND AUDIO-VISUAL WORKS 54, 163 (2016).

19 Romana Matanovac Vuckovic, *Remunerations for Authors and Other Creators in Collective Management of Copyright and Related Rights* 66 ZHORNIK PFZ 39 (2016).

It is observed that collective right management has offered substantial benefits but also entailed a number of issues and disputes among different stakeholders. This issue deserves a separate examination, which is set out in Part 2 of this research.

2 Problems facing music right management in digital environment

2.1 Difficulties in trans-border exploitation of online rights due to repertoire fragmentation

Currently, under the law of many countries, such as European legislation,[20] right-holders are entitled to withdraw rights or any category of rights or any type of works from a CMO for the purposes of licensing on a pan-European basis, regardless of territorial barriers. Such cross-border licensing can be undertaken by right-holders themselves or a re-assigned CMO or any other entity who is capable of granting pan-European licenses for exploitation of rights in digital format.[21] This regulation acknowledges the freedom of right-holders in right management, and thus, is in their best interest.

However, such provisions give rise to certain practical problems. The fact that right-holders are free to opt out leads to CMOs' unstable repertoires.[22] In addition, as right-holders place the administration of their online rights in CMOs of different countries, local CMOs are no longer able to manage a complete national repertoire of musical works. Meanwhile, pan-European CMOs, despite the ability to assemble the works which are scattered all over the European Community, cannot hold a

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20 *See* 2014 O.J. (L 84) 74, 83 (discussing collective management of copyright and related rights and multi-territorial licensing of rights in musical works for online use in the internal market).

21 *Id.*

22 Daniel Gervais, COLLECTIVE MANAGEMENT OF COPYRIGHT AND RELATED RIGHTS 171 (3d ed., 2015).

comprehensive repertoire of all existing works.[23] Consequently, commercial users have to obtain a number of licenses which are necessary for their online music services from different CMOs.[24] To do this, commercial users have to bear high search costs to find the CMOs which manage the rights of works they wish to obtain licenses.

Based on the above discussion, it can be seen that the disintegration of repertoire among different CMOs is created to a certain extent due to the assignment and withdrawal of rights by right-holders. This situation causes difficulties to commercial users in obtaining necessary licenses for exploitation of rights. If commercial users are unable to properly procure licenses for their online music services, the trading of unauthorized musical pieces by these commercial users is considered copyright infringement.[25] Accordingly, relevant stakeholders, such as CMOs or right-holders, may seek orders from the courts to block access to such infringing online contents if the parties cannot reach an agreement on compensation. Ultimately, individual users are unable to enjoy their favorite pieces of music. In some cases, individual users even try to unlawfully get access to the works which are not available online in their country. This situation also adversely affects right-holders' entitlement to rewards for their creations. In sum, the inherent obstacles among the intermediaries in relation to obtaining licenses for online music consumption appear to be eventually detrimental to both right-holders and individual users.

2.2 Lack of authentic copyright database

In every song, there may be the contribution of a number of songwriters, performers, musicians, publishers and producers.[26]

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23 Emanuela Arezzo, *Competition and Intellectual Property Protection in the Market for the Provision of Multi-Territorial Licensing of Online Rights in Musical Works – Lights and Shadows of the New European Directive* 2014/26/EU 46 IIC - INTERNATIONAL REVIEW OF INTELLECTUAL PROPERTY AND COMPETITION LAW, 549 (2015).

24 *Id.* at 550.

25 Claire Broadley, *The Definitive Guide to Copyright: What Are the Rules of Copyright?*, WHO IS HOSTING THIS?, https://www.whoishostingthis.com/resources/copyright-guide/ (last updated May 7, 2019).

26 Sebastian Felix Schwemer, *Emerging Models for Cross-Border Online Licensing*, USER-GENERATED LAW: RE-CONSTRUCTING INTELLECTUAL PROPERTY

Thus, it is difficult to identify all relevant rights-holders. In fact, CMOs and commercial users often have to pay for services to track right-holders of numerous musical pieces.[27] In order to tackle this problem, there are several attempts to incorporate copyright information into repertoires. For instance, the International Standard Musical Work Code and the International Standard Recording Code were introduced to embed copyright information in musical works and sound recordings respectively.[28] According to these standards, music files are encoded with digital fingerprints which help to identify relevant composers, lyricists and performers.[29]

Notwithstanding, a significant amount of royalties still go to wrong parties because right-holders are not correctly recognized. At the heart of the problem is the lack of interoperability between the International Standard Musical Work Code and the International Standard Recording[30] because there is no authoritative source for pairing compositions and the associated recordings.[31] In addition, these systems are still incapable of complete information, such as details of musicians and sub-publishers.[32] Moreover, these digital fingerprinting technologies do not have any verification mechanism for copyright and related rights.[33] As a result, anyone can allege the rights by uploading and claiming the ownership over the works in the system.[34]

LAW IN A KNOWLEDGE SOCIETY 6 (2016).

27 Jeremy Silver, *Blockchain or the Chaingang? Challenges, Opportunities and Hype: The Music Industry and Blockchain Technologies*, CREATE 40 (May 2016).

28 Louis Matteo, *Two Sides of the Same Coin: ISRC and ISWC*, HYPEBOT, https://www.hypebot.com/hypebot/2015/08/two-sides-of-the-same-coin-isrc-and-iswc-draft-1.html (last visited Apr. 29, 2019).

29 *Id.*

30 *Fair Music: Transparency and Payment Flows in the Music Industry*, RETHINK MUSIC 3 (2015) https://static1.squarespace.com/static/552c0535e4b0afcbed88dc53/t/55d0da1ae4b06bd4bea8c86c/1439750682446/rethink_music_fairness_transparency_final.pdf (herineafter Rethink Music).

31 Bill Rosenblatt, *Watermarking Technology and Blockchain in the Music Industry* DIGIMARC (2018).

32 Silver, *supra* note 27.

33 *Id.*

34 Anjanette H. Raymond, *Heavyweight Bots in the Clouds: The Wrong Incentives and Poorly Crafted Balances that Lead to the Blocking of Information Online*, 11 Nw. J. Tech. & Intell. Prop. (2013).

Meanwhile, the approach of creating a global proprietary database has been attempted.[35] The salient examples are the International Music Joint Venture started in 1998 between the CMOs in the Netherlands, the United Kingdom and the United States; the International Music Registry launched by the World Intellectual Organization in 2011; and the Global Database Repertoire Working Group initiated by EU Commissioner Neelie Kroes in 2008.[36] However, none of these contributions have materialized. Consequently, the situation remains unchanged. Among various barriers, the main reason for such failure was blamed on the dispute over the right to control the database.[37] Notably, Silver opines that the centralized solutions for a joint project may result in mistrust and destroy the project due to the shift of power.[38]

Currently, there are masses of databases which may contain errors or inconsistent information. Within Europe, there are more than thirty CMOs and IMEs,[39] whose databases are neither comprehensive nor connected to each other.[40] Furthermore, the assignment of copyright and related rights, which may be made quite often, results in the change of rightholders multiple times. As a result, it is difficult for all stakeholders to be updated with such changes.[41] Accordingly, some CMOs cannot provide commercial users with accurate copyright information[42] or even cannot identify what repertoire they represent.[43]

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35 Rosenblatt, *supra* note 31.

36 *Id.*

37 *Id.*

38 Silver, *supra* note 27.

39 Richard Hooper and Ros Lynch, INTELLECTUAL PROPERTY OFFICE, *Copyright Works - Streamlining Copyright Licensing for the Digital Age,* (Jul. 2012).

40 Marcus O'Dair, *Music on the Blockchain: Blockchain for Creative Industries Research Cluster* (Middlesex University Jul. 2016).

41 Giuseppe Mazziotti, *New Licensing Models for Online Music Services in the European Union: From Collective to Customized Management*, 34 COLOMBIA J. OF L. & THE ARTS 795 (2011).

42 *Id.*

43 *Id.*; Monica Horten, THE CENTER FOR DEMOCRACY AND TECHNOLOGY, *The Looming Cloud of Uncertainty for Internet Intermediaries* 6 (2016).

2.3 Delayed and unfair payment

The distribution of royalties may normally take up to several years for rightholders to receive their income.[44] The main reason for such delay is the involvement of a number of intermediaries, in which each entity has its own policy, differently-structured database and accounting system.[45] Especially, in the case of multi-territorial licensing where rightholders can be located in different countries, the payment process may have to be compliant with various domestic legal formalities, such as national auditing rules and withholding tax.[46] Accordingly, each stakeholder may involve collection agencies to gather and transfer royalties, which incurs additional fees for collection services.[47] Since money has to make its way through a number of intermediary layers before reaching rightholders' accounts, rightholders are only given a poor level of payment. Besides, many criticize that the advent of centralized music streaming models has choked creators.[48] For instance, it is reported that in order for the first penny to be paid to authors or performers, there must be at least 120 streams on Spotify.[49] Moreover, unknown authors and performers, who do not have the equality of bargaining power in negotiating licensing terms and conditions with major distributors, usually receive a meagre amount of

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44 Marcus O'Dair and Zuleika Beaven, *The Networked Record Industry: How Blockchain Technology Could Transform the Record Industry*, 26 STRATEGIC CHANGE 472 (2017).

45 Rethink Music, *supra* note 30, at 20.

46 Rethink Music, supra note 30, at 20; Marcus O'Dair, *The Networked Record Industry: How Blockchain Technology Could Transform the Consumption and Monetisation of Recorded Music* 16 (2016); Alexandra Savelyev, *Copyright in the Blockchain Era: Promises and Challenges,* 34 Computer L. & Security Rev. 553 (2018).

47 Rethink Music, *supra* note 30, at 20.

48 Bokang Jia et al., *Opus – Decentralized Music Distribution Using Interplanetary File Systems (IPFS) On The Ethereum Blockchain* 5 (Opus Foundation, V 0.8.3 2016).

49 Alexandra Savelyev, *Copyright in the Blockchain Era: Promises and Challenges,* 34 Computer Law & Security Review (2018), p. 553; *See also* Ryo Takahashi, *How Can Creative Industries Benefit from Blockchain?,* WORLD ECONOMIC FORUM (Jul. 18, 2017), https://www.weforum.org/agenda/2017/07/how-can-creative-industries-benefit-from-blockchain/.

money.[50] Even in the case where the negotiations are led by CMOs, rightholders have also expressed their discontent with CMOs for failing to help rightholders to be fairly remunerated.[51]

2.4 Lack of data transparency

CMOs have long been addressed criticism for the lack of transparency in their operations.[52] Right holders scarcely receive the information they need or comprehensive annual reports. This is partly due to the engagement of middlemen with different payment systems and reporting standards. Besides, the operation of those intermediaries is not supported by technology which is capable of processing a vast amount of information.[53] Hence, each party usually provides generic data in unstandardized formats.[54]

In addition, a lot of information may be kept in the dark under the non-disclosure agreements between publishers, record labels, CMOs and service providers.[55] Most companies consider information as valuable property and thus are not willing to share it. Accordingly, right-holders are usually oblivious to how their rights are managed or how their royalties are processed.

3 Blockchain technology: problem solver?

3.1 Overview of blockchain technology

Blockchain is simply a database of transactions recorded across

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50 Ignacio De Leon and Ravi Gupta, *The Impact of Digital Innovation and Blockchain on the Music Industry* 4-5*, (*Inter-American Development Bank, Nov. 2017).

51 Schwemer, *supra* note 26, at 9.

52 CLÁUDIO LUCENA, COLLECTIVE RIGHTS AND DIGITAL CONTENT: THE LEGAL FRAMEWORK FOR COMPETITION, TRANSPARENCY AND MULTI-TERRITORIAL LICENSING OF THE NEW EUROPEAN DIRECTIVE ON COLLECTIVE RIGHTS MANAGE MENT 2 (2015).

53 Bruno Guez, *Creating Transparency in the Music Industry*, HYPEBOT.COM, https://www.hypebot.com/hypebot/2015/08/transparency-in-the-music-industry.html (last visited May 21, 2019).

54 CHRIS COOKE, DISSECTING THE DIGITAL DOLLAR — PART ONE: HOW STREAMING SERVICES ARE LICENSED AND THE CHALLENGES ARTISTS NOW FACE 12–13 (2015).

55 *Id.* at 12–13.

a network of computers.[56] Blockchain has a decentralized database structure, which means that it does not depend on one single server to verify and monitor data.[57] Instead, some or all computers (also known as nodes) are directly connected to each other and maintain copies of the database.[58]

Blockchain consists of every transaction which was ever made, and therefore, is considered as a ledger.[59] When a participant wants to add a transaction to such ledger, the data is encrypted and verified by other participating computers.[60] The way to undertake this validation process depends on whether blockchain is: (i) a permission less platform, which allows anyone to add and validate transactions; or (ii) a permissioned platform, in which transaction entry and validation are only available to pre-registered participants.[61] Regarding the accessibility, blockchain can be either: (i) public, in which anyone can read and add transactions; or (ii) private, which is limited to a closed group of participants. In practice, most permission less blockchains provide public access, while most permissioned blockchains are only accessible to users within an organization or a group of organizations.[62]

Until now, blockchain technology has been developed into different types for various purposes.[63] The first generation of

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56 Aaron Wright & Primavera De Filippi, *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* (Mar. 10, 2015) (available at https://ssrn.com/abstract=2580664).

57 Spencer Bogart & Kerry Rice, *The Blockchain Report: Welcome to the Internet of Value*, NEEDHAM & COMPANY, LLC (Oct. 21,2015), https://needham.bluematrix.com/sellside/EmailDocViewer?encrypt=4aaafaf1-d76e-4ee3-9406-7d0ad3c0d019&mime=pdf&co=needham&id=sbogart@needhamco.com&source=mail&utm_content=buffer0b432&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer.

58 *Id.*

59 *Id.*

60 Sarah Underwood, *Blockchain Beyond Bitcoin*, 59 COMM. OF THE ACM 15 (2016).

61 Roman Beck, *Beyond Bitcoin: The Rise of Blockchain World*, 51 COMPUTER, 54, 56 (2018).

62 GARETH WILLIAM PETERS & EFSTATHIOS PANAYI, UNDERSTANDING MODERN BANKING LEDGERS THROUGH BLOCKCHAIN TECHNOLOGIES: FUTURE OF TRANSACTION PROCESSING AND SMART CONTRACTS ON THE INTERNET OF MONEY 5 SSRN (2015), https://ssrn.com/abstract=2692487.

63 *Id.* at 2, 5.

blockchain application is Bitcoin blockchain which, as described by Satoshi Nakamoto in 2008, is to manage the Bitcoin cryptocurrency.[64] Another noteworthy kind of blockchain is Ethereum which is developed by Ethereum Foundation.[65] Ethereum is an open-source computing platform which runs small computer programs called smart contracts for the purposes of automating the execution of transactions upon the satisfaction of specific conditions.[66] Like Bitcoin blockchain, Ethereum has its own cryptocurrency, namely Ether.[67] Because Ethereum is a public, permission less network, anyone can connect to the network and to program, execute and validate smart contracts without involving a central coordinator.[68] Another most recent blockchain initiative is Hyperledger project hosted by Linux Foundation.[69] As opposed to Bitcoin and Ethereum, Hyperledger project provides permissioned blockchain networks with known identities.[70] It proposes a set of open source blockchains which are designed to be extensively general-purpose platforms, such as Fabric and Sawtooth, in order to accommodate as many business cases as possible.[71] These platforms are also different from

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64 *See* Satoshi Nakamoto, *Bitcoin: A Peer-To-Peer Electronic Cash System* (2008), https://bitcoin.org/bitcoin.pdf (explaining how blockchain is used to manage the cryptocurrency "Bitcoin"); *see also* Jason Wu, *Basics of 1st Generation Blockchains and Applications in the Financial Payment System* (Nov. 18, 2018), *https://medium.com/datadriveninvestor/basics-of-1st-generation-blockchain-and-its-applications-in-financial-payment-system-6bcca0d36976* (explaining that "Bitcoin" was the "first widely adopted global distributed public transaction ledger.").

65 James Rinaldi, *Peer to Peer Digital Rights Management Using Blockchain*, U. OF THE PACIFIC 1, 25 (2018).

66 Maher Alharby & Aad van Moorsel, *Blockchain-Based Smart Contracts: A Systematic Mapping Study,* FOURTH INT'L CONF. ON COMPUTER SCI. AND INFORMATION TECH. 125, 127 (2017).

67 Michael Crosby, *et. al.*, *Blockchain Technology: Beyond Bitcoin*, 2 APPLIED INNOVATION REV. 6, 13, 15 (2016).

68 Rinaldi, *supra* note 65, at 26.

69 Jan Felix Hoops, *An Introduction To Public And Private Distributed Ledgers,* NETWORK ARCHITECTURES AND SERV. 41 (Sept. 2017), https://www.net.in.tum.de/fileadmin/TUM/NET/NET-2017-09-1/NET-2017-09-1_06.pdf.

70 *Id.* at 45.

71 Luke Owens et al., *Inter-Family Communication in Hyperledger Sawtooth and its Application to a General Token Functionality*, DISTRIBUTED COMPUTING AND INTERNET TECHNOLOGY 389 (Gunter Fahrnberger et al. eds., 2019).

Bitcoin and Ethereum for not relying on the exchange of cryptocurrency.[72]

Given the decentralized nature of blockchain and its progressive development, it is being described as a "game changer" outside and inside the music community about this technology. Blockchain is expected to eliminate the inefficiencies of the current right management form by cutting out the intermediaries.[73] However, this is not the whole story. The next Section of this Part thus investigates the advantages of blockchain in mending the existing problems which face the current right management system and unveils its practical constraints.

3.2 Advantages and disadvantages of blockchain to online right management

3.2.1 Multi-territorial licensing issue

As discussed in Section 2.1 above, the online music market consists of fragmented and unstable repertoires. In this regard, blockchain application, which is not subject to any authority or territorial limitation,[74] could enable rightsholders to directly grant licenses of their works to any participant on the blockchain network all over the world. This means that the layers of intermediaries and the inherent obstacles to the obtainment of licenses for online use by commercial users could be removed. This scenario would reduce the possibility of exposing individual users to illegal use of musical pieces. In addition, any rightsholder, regardless of territorial barriers, can sign up for

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72 *Id.*

73 *See Blockchain Reengineering the Media Value Chain*, ACCENTURE (Aug. 31, 2017), https://www.accenture.com/us-en/insight-reengineering-media-value-chain (noting the implications of blockchain technology for trust in business relationships).

74 *See* Giovanni Perani, *Blockchain: Is Self-Regulation Sufficient?*, MEDIUM (May 2, 2018), https://medium.com/coinmonks/blockchain-is-self-regulation-sufficient-5bb68ac7e33f (discussing the lack of regulation of blockchain technology).

music blockchain-based platforms to upload their content to the network. Accordingly, such open-ended process may gradually create a universal music database, which could enable global reach for both rightsholders and users. In this regard, blockchain-based platforms could promote cultural diversity of the music industry because the rightsholders, whose artistry is only of interest to a small group of commercial and individual users, could easily popularize their creations on the worldwide blockchain network.

Despite the advantages above, some opine that blockchain may fragment the online music sector in a different way. In particular, there are a number of platforms which are based on different types of blockchain.[75] Currently, while Mycelia and Ujo use Ethererum, Peertracks deploys MUSE, Dot Blockchain Music initially using Bitcoin blockchain has shifted to Hyperledger Sawtooth.[76] Over time, the music industry may end up seeing multiple versions of blockchain-based platforms.[77] Such plurality may promote competition among platform operators, which might benefit rightsholders and users. However, the existence of different platforms would reduce the possibility of creating a unified global repertoire.

Moreover, different groups of stakeholders might wish to adopt different types of blockchain which best suits their interest. To be specific, rightsholders and users may prefer public, permissionless blockchain because such blockchain architecture is most likely to offer them absolute control of the system. In contrast, private, permissioned blockchain may be the preferred choice of platform operators and regulators since pre-selected nodes still

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75 *See, e.g.*, *Types of Blockchains & DTLs (Distributed Ledger Technologies)*, HUB, https://blockchainhub.net/blockchains-and-distributed-ledger-technologies-in-general/ (last visited Mar. 8, 2019) (explaining various types of blockchains and platforms that use each type).

76 *Dot Blockchain Media Advances Music Rights Transparency with Intel Technology and Hyperledger Sawtooth Blockchain*, CISION PR NEWSWIRE (Aug. 22, 2017), https://www.prnewswire.com/news-releases/dot-blockchain-media-advances-music-rights-transparency-with-intel-technology-and-hyperledger-sawtooth-blockchain-300507343.html.

77 Andreas Gabl & Stephan Ulrich Krehl, Application of Blockchain Technology and Crowdfunding to Solve Structural Inefficiencies in Digital Rights and Patents—A Comparative Analysis (June 2017) (unpublished M.S. thesis, Massachusetts Institute of Technology) (on file with Massachusetts Institute of Technology Libraries).

allow a certain scope for interference and modification of the system. As a result, it is uncertain as to which platform would become a standard practice to lead the music world. There is also an unanswered question as to how the databases of the various platforms on different blockchains could be reconciled.

3.2.2 Attribution issue

The current fingerprint technologies and attempts to develop a unified copyright database, as mentioned in Section 2.2 above, have not succeeded. Hence, the music industry has been left with incomplete and inaccurate copyright databases. With the emergence of blockchain technology, professionals believe that it could be possible to create a reliable database of copyright and licensing information.[78] The reason for this opinion is that blockchain could support the incorporation of any copyright data, including identities of songwriters, performers, producers, publishers and other "behind the scenes" contributors into music files.[79] Such complete acknowledgement could help all contributors who participate in the production to be publicly recognized for their creations.[80] In practice, this idea was implemented by the prototype project in the collaboration between Imogen Heap, an English singer-songwriter and composer, and Ujo Music, an Ethereum blockchain platform which enables rights holders to license their musical pieces.[81] In this project, Heap's track "Tiny Human" was released on Ujo Music's website, which was embedded with full credits, such as all musicians and mastering engineer.[82]

Another salient example is the joint blockchain project initiated by three CMOs, including the American Society of Composers, Authors, and Publishers based in the United States (ASCAP), the Society of Authors, Composers and Publishers of

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78 *Blockchain Music without the Middlemen?*, MUSIC ALLY, http://musically.com/wp-content/uploads/2016/05/blockchain-report.pdf (last visited Mar. 8, 2019).

79 *Id.*

80 Arezzo, *supra* note 23, at 557.

81 *Imogen Heap Releases a Single on a Blockchain Based Music Platform*, FT REPORTER (Nov. 30, 2016), http://ftreporter.com/imogen-heap-releases-a-single-on-a-blockchain-based-music-platform.

82 *Id.*

Music based in France (SACEM) and the Performing Right Society based in the United Kingdom (PRS).[83] This project aims at organizing a platform which links the International Standard Musical Work Code and the International Standard Recording Code; as a result, sound recordings could be matched with the associated musical works.[84]

In addition, since the underpinning principle of blockchain is to lessen the interference of a trusted third party, information on music blockchain-based platforms would be almost instantly uploaded by rights holders and verified by participants in the network. As the information is genuine, it would be easier to identify the rightful owners of any component of a song and reward them for their works.[85] In practice, this potential of blockchain is implemented by the project of Spotify upon its acquisition of blockchain startup Mediachain.[86] The objective of this project is to establish a platform which helps Spotify to identify rights holders and figure out legitimate claims over authorship and ownership of musical pieces.[87] Another noteworthy example of blockchain application for this purpose is Ascribe, a blockchain-based content record platform, which helps to ease the tracking of ownership and attribution of musical pieces and allows rights holders to license their works.[88]

Moreover, on blockchain network, each block of transactions

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83 Ian Allison, *Major Music Rights Societies Join Up for Blockchain Copyright Using IBM and Hyperledger*, INT'L BUS. TIMES UK (Apr. 7, 2017) https://www.ibtimes.co.uk/major-music-rights-societies-join-blockchain-copyrights-using-ibm-hyperledger-1615942.

84 *Id.*

85 *See* Jamie Bartlett, *Imogen Heap: Saviour of the Music Industry?*, THE GUARDIAN (Sept. 6, 2015), https://www.theguardian.com/music/2015/sep/06/imogen-heap-saviour-of-music-industry (describing new platforms that attempt to do so through blockchain technology and smart contracts).

86 Sarah Perez, *Spotify Acquires Blockchain Startup Mediachain to Solve Music's Attribution Problem,* TECHCRUNCH, https://techcrunch.com/2017/04/26/spotify-acquires-blockchain-startup-mediachain-to-solve-musics-attribution-problem/?guccounter=1 (last visited Feb. 15, 2019).

87 *Id.*

88 *See* Marcus O'Dair, *The Networked Record Industry: How Blockchain Technology Could Transform the Consumption and Monetisation of Recorded Music*, NEMODE (Mar. 2016), http://www.nemode.ac.uk/wp-content/uploads/2012/12/ODair-The-networked-record-industry-REPORT-1.pdf (describing the uses of Ascribe).

contains the hash of the previous block, which creates a chain of linked blocks.[89] Accordingly, given that the information on transfer of copyright can be encoded into blockchain, the chain of ownership information could always be tracked.[90] Therefore, the blockchain-based platform would serve as a ledger of ownership history.[91] Since data is synchronized across the network, all users can quickly be updated with any changes to copyright information.[92] Another benefit of blockchain, in this regard, is to reduce unlawful uses of contents for producing derivative works. For instance, a person who wishes to make remixes or mash-ups of pre-recorded music could easily locate and contact right holders to obtain licenses. Meanwhile, right holders would also be able to trace how their works are used.

Notwithstanding the benefits of blockchain discussed above, sceptics contend blockchain is a technology, which ultimately requires human intervention.[93] Specifically, accurate data must rely on the individual who originally entered the data.[94] There might be a situation in which users of blockchain-based platforms upload an infringed piece of music.[95] In this case, one might argue the verification mechanisms of blockchain require other participants to review and report the infringed content.

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89 *Id.*

90 *Id.*

91 *See* MELANIE SWAN, BLOCKCHAIN: BLUEPRINT FOR A NEW ECONOMY 39 (2015) (describing the legal implications of the blockchain timestamp feature).

92 *See* George Howard, *Union Square Ventures' Andy Weissman on the Blockchain and the Music Rights 'Nirvana State'*, FORBES (July 19, 2015), https://www.forbes.com/sites/georgehoward/2015/07/19/union-square-ventures-andy-weissman-on-the-blockchain-and-the-music-rights-nirvana-state/#18fae4ae3563 (noting the public nature of the ownership interests listed on the blockchain).

93 *See* Kevin D. Werbach, *Trust, But Verify: Why the Blockchain Needs the Law*, 33 BERKELEY TECH. L.J. 489, 527 (2018) (discussing the need for human involvement in smart contracts application, as there are certain aspects of contracting that computers cannot perform as well as humans can).

94 Harrison Speck, *The Future of Music Coalition—Moral Rights Docket Filing,* CIPA PROFESSIONAL REPORTS (May 15, 2017), https://ecommons.cornell.edu/bitstream/handle/1813/54766/Harrison_Speck_Prof_Report_Moral_Rights_Docket_FMC_5-15_CIPA.pdf

95 Nick Vogel, *The Great Decentralization: How Web 3.0 Will Weaken Copyrights*, 15 J. MARSHALL REV. INTELL. PROP. L.136, 148 (2015) (noting the risks of anonymous uploads to the blockchain ledger).

However, some cast doubt on the possibility of the blockchain network in verifying copyright and attribution information. For instance, one person may upload a recording to the blockchain-based network over which he claims the ownership when in fact he/she is not the lawful owner of such recording. Subsequently, he/she may get his/her family members or acquaintances, who also participate in the network, to validate his false claim.[96] Thus, Gabison suggests the piracy issue might even increase in the decentralized blockchain system.[97] On the other hand, O'Dair suggests permissioned blockchain will come into play because pre-selected trusted users can verify the data.[98] Notwithstanding, there is still a risk the private, permissioned blockchain network might be tampered by validating nodes or administrators with ill intent.[99]

Accordingly, it should be admitted the potential of blockchain in creating authentic copyright database is undeniable. If all accurate information relating to a piece of music, including attribution, licensing terms and transfers of ownership, could be recorded, verified and traced on blockchain-backed platforms, right holders and users would benefit from such comprehensive and readily available copyright data. However, it is difficult to guarantee the absolute reliability on such platforms because the system itself is not resistant to incorrect data input by ill-intentioned parties.

3.2.3 Payment issue

This research mentions in Section 2.3 above that royalty payment is normally slow and deducted by a number of intermediaries prior to reaching right holders. To address this issue, certain blockchain technologies can run smart contracts, which automate transactions upon the satisfaction of relevant

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96 Silver, *supra* note 27, at 45-46.

97 Garry Gabison, *Policy Considerations for the Blockchain Technology Public and Private Applications*, 19 SMU SCI. & TECH. L. REV 327, 329 (2016).

98 O'Dair & Beaven, *supra* note 44, at 475-76 (suggesting the need for a new area of law corresponding to problems specific to blockchain technology.

99 Curtis Miles, *Blockchain Security: What Keeps Your Transaction Data Safe?* BLOCKCHAIN PULSE (Dec. 12, 2017), https://www.ibm.com/blogs/blockchain/2017/12/blockchain-security-what-keeps-your-transaction-data-safe/ (noting that a blockchain network still depends on its infrastructure).

conditions.[100] Accordingly, rightholders would no longer depend on the negotiation of price and royalty distribution through the complex structure of the middlemen. Instead, blockchain can allow royalties to be directly and almost instantaneously distributed to rightholders as music is consumed.[101]

Moreover, blockchain-based platforms could allow the split of payment so that a certain percentage of royalties would be automatically transferred to each contributor who has been involved in the creation of a song.[102] Rightholders could even decide the price as well as licensing terms and conditions which are embedded in each track.[103] One real-life example of such potential of blockchain is Imogen Heap's track "Tiny Human" available on Ujo Music platform, in which Heap decided price and terms of use.[104] At the time of purchase, near-real-time payments on a pre-programmed split are directly passed to each contributor of the song.[105]

Besides, given that rightholders and users do not have to rely on a trusted intermediary to license creations and collect royalties, transaction costs can be reduced.[106] As a result, users would only have to remunerate rightholders for what they actually wish to consume without paying extra money for various intermediaries' service fees. Accordingly, blockchain might enable a fair compensation scheme in which rightholders could monetise their artistry and users could enjoy pricing based on the products' real cost.[107]

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100 O'Dair & Beaven, *supra* note 44, at 474.

101 Silver, *supra* note 27, at 40.

102 George Khouri, *How Could Blockchain Technology Disrupt the Music Industry?*, MEDIAWRITES (Jul. 5, 2017), https://www.mediawrites.law/how-could-the-blockchain-disrupt-the-music-industry/.

103 O'Dair, *supra* note 40, at 15.

104 *Id.* at 12-13.

105 *See Blockchain Platform Ujo Music Opening up in Early 2017*, MUSICALLY (Sep. 2, 2016) http://musically.com/2016/09/02/blockchain-platform-ujo-music-opening-up-in-early-2017/ (describing the licensing arrangements possible through blockchain-distributed music).

106 *See* Reuben Grinberg, *Bitcoin: An Innovative Alternative Digital Currency*, 4 HASTINGS SCI. & TECH. L.J. 159, 170 (2011) (noting the decline in transaction costs among micro-payment processing platforms).

107 Benji Rogers, *How the Blockchain and VR Can Change the Music Industry (Part 1)*, CUEPOINT (Nov. 23, 2015), https://medium.com/cuepoint/bc-a-fair-trade-

Notwithstanding, the above advantage of blockchain is not without controversy. Although the advocates of blockchain believe in its potential to help authors and performers to gain fair payment, it is still unclear as to whether direct licensing schemes on blockchain-based platforms would increase rightholders' income. It might be true that blockchain can help rightholders to have more revenue share from each track purchased. However, the lack of brand and marketing support by the intermediaries, which blockchain-based platforms cannot offer, may lead to less positive marketing effects, and thus reduce overall earnings.[108]

In addition, most blockchain-based platforms currently require payment in virtual currency, which is subject to fluctuation.[109] For instance, users who wished to purchase track "Tiny Human" on Ujo Music's website had to convert actual money into Ether.[110] Another platform called Aurovine uses its bespoke token, namely Audiocoin.[111] Despite the advantages which this approach may have, one obvious disadvantage is the limited use of bespoke token. Accordingly, while a bank card is readily available and easy to use in order to stream or download recorded music from the major distribution models, such as iTunes or Spotify, the blockchain-based platforms which depend on the exchange of digital currency may limit at least the consumption of basic internet users. It is also worth noting that the adoption of cryptocurrency into the mainstream of finance is still unclear because of the risks associated with it, such as fraud, security, legal uncertainty, and money laundering.[112]

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music-format-virtual-reality-the-blockchain-76fc47699733.

108 Sadia Sharmin, Music Copyright Management on Blockchain: Is It Legally Viable? 46 (June 14, 2018) (unpublished LLM thesis, Uppsala University) (on file with Uppsala University).

109 William J. Luther, *Cryptocurrencies, Network Effects, and Switching Costs* 3 (Mercatus Center Working Paper No. 13-17, 2013), https://ssrn.com/abstract =2295134.

110 Hatching Amazing, *Part 1: How We Tried to Buy Imogen Heap's Song on Ethereum*, MEDIUM (Jan. 24, 2016), https://medium.com/hatching-amazing/part-1-how-my-ssn-prevented-me-from-buying-music-on-the-blockchain-and-why-blockchain-for-music-a85eaeaca7ad.

111 *What Are AudioCoins?*, AUROVINE, https://aurovine.com/audiocoins (last visited Feb. 12, 2019).

112 *See* Andrew Nelson, *Cryptocurrency Regulation in 2018: Where the World Stands Right No*w, TNW (Apr. 27, 2018), https://thenextweb.com/hardfork /2018/04/27/cryptocurrency-regulation-2018-world-stands-right-now/ (reporting

Moreover, in practice, there are a number of performers transferring their rights to record labels to gather fixed upfront money and investment to record and distribute their pieces of music.[113] Accordingly, performers' income in such advance payments from record labels does not depend on the level of consumption by individual users.[114] In this case, from the performers' perspective, the assumption of direct rightsholder-to-fan sale which is offered by blockchain-based platforms is not a given.[115]

3.2.4 Data transparency issue

The main reason for the lack of data transparency, as set out in Section 2.4 above, is the existence of different intermediaries without adequate technology for processing information. Blockchain would solve this problem by lessening the need for the middlemen and enabling network-wide synchronization of data. Accordingly, rightholders could obtain nearly instant data on how their works are used and where revenue is derived from. The "Tiny Human" project gives some sense of how this promise of blockchain could work. Since Ethereum blockchain, which is deployed by this project, enables the use of smart contracts, the platform accommodates the immediate split of revenues for each contributor.[116] Whenever the song is streamed or downloaded, data on how much each musician could earn is available.[117] Moreover, the system also displays the information on transactions, including the wallet of the payee, the type of licenses, the number of the transaction block and the amount of payment.[118]

U.S. Treasury officials' concerns over illicit uses of cryptocurrencies).

113 De Leon & Gupta, *supra* note 50, at 25

114 *See* Robert Levine, *Will Tech Startups Finally Make Record Labels Obsolete? Not So Fast*, BILLBOARD (Nov. 21, 2017), https://www.billboard.com/articles/business/8046123/unitedmasters-tech-startups-record-labels-obsolete-not-so-fast (describing the advantages to artists of using record labels).

115 De Leon & Gupta, *supra* note 50, at 25.

116 Camilia Sitonio & Alberto Nucciarelli, The Impact of Blockchain on the Music Industry 9 (July 8, 2018) (conference paper), https://www.researchgate.net/publication/326225903_The_Impact_of_Blockchain_on_the_Music_Industry.

117 *Id.* at 6.

118 Stefano Conti, The Impact of Blockchain on Music Industry: The Effect of

Based on such available information, rightsholders could capture usage insights on consumption, such as numbers, age groups and location of individual users, so that they could identify music trends[119] and devise a viable plan for releasing their songs. It is worth noting that blockchain could also help creators to develop their fan base by offering rewards to listeners who promote the songs or contribute valuable contents to the network.[120] The platform of this kind has already existed in Peertracks, which increases consumer engagement by trading so-called Notes.[121] Notes are a kind of reward which rightsholders offer to their superfans.[122] Notes-holders can receive privileges decided by rightsholders, such as discounts on merchandise, tickets or backstage passes.[123]

Meanwhile, in the case where complete transparency is not desirable, especially where the information is considered to be commercially sensitive,[124] blockchain-based platforms could allow different levels of disclosure. A working prototype of this solution is the blockchain-backed Creative Passport project initiated by Imogen Heap.[125] Creative Passport is a digital container of verified identification information, works, achievements, business partners and payment mechanism for music makers.[126] Creative Passport holders will be able to grant permission to access data by individual users for free while making information available to commercial users for a fee.[127]

Transparency on Disintermediation 83 (Apr. 19, 2018) (unpublished Master's thesis) (on file with University of Modena and Reggio Emilia).

119 Sitonio & Nucciarelli, *supra* note 116, at 9.

120 De Leon & Gupta, *supra* note 50, at 25.

121 *See Three Startups Trying to Transform the Music Industry Using the Blockchain*, BITCOIN MAGAZINE (Nov. 13, 2015), https://bitcoinmagazine.com/articles/three-startups-trying-to-transform-the-music-industry-using-the-blockchain-1447444594/ (explaining the use of Notes).

122 *Id.*

123 *Id.*

124 *See* O'Dair & Beaven, *supra* note 44, at 475 (suggesting that artists may not want their earnings, and the sources of those earnings, to be readily accessible).

125 *Creative Passport,* MYCELIA, http://myceliaformusic.org/creative-passport/ (last visited Mar. 8, 2018).

126 *Id.*

127 *Id.*

Although the transparency of data on blockchain network can be increased, the mechanism for verification of data seems problematic. In the case of public, permission-less blockchain, all nodes need to process all transactions.[128] Accordingly, scholars are concerned that blockchain-based platforms cannot store and verify a vast amount of data when the network is extensively growing.[129] As an illustration, the global service providers Spotify and Apple Music have more than thirty million songs and play millions of streams a day.[130] Meanwhile, in public, permission less blockchain, such as Bitcoin, the processing time for a block to be created is every ten minutes.[131] Therefore, the potential of blockchain in providing real-time data remains elusive. Moreover, even in the case of private, permissioned blockchain, the capacity of blockchain to manage huge data volumes of the whole music industry is still questionable.[132]

4 Observations and findings

From the issues of the current right management system, which have been presented above, it can be seen that the music community is in doubt as to whether collective right management is still a suitable arrangement for ensuring rightholders' interests.[133] Especially, there is a sense that those problems are driven by the involvement of a number of intermediary layers. Accordingly, solutions may be found in the concept of disintermediation, which is to phase out the middlemen in the

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128 *See* David Gerard, *Why You Can't Put The Music Industry On A Blockchain*, HYPEBOT, http://www.hypebot.com/hypebot/2017/08/why-you-cant-put-the-music-industry-on-a-blockchain-excerpt.html (last visited Mar. 8, 2019) (questioning where the manpower for broad verification of blockchain-encoded information will come from).

129 *Id.*

130 Tom Bruce & Grace Shallow, *Spotify vs Amazon Music vs Apple Music vs YouTube Music: Which Is The Best Music-Streaming Service?,* EXPERT REVIEWS (Dec. 10, 2018), http://www.expertreviews.co.uk/technology/1405999/spotify-vs-amazon-music-vs-apple-music-vs-youtube-music-which-is-the-best-music-streaming.

131 Nakamoto, *supra* note 64, at 4.

132 Underwood, *supra* note 60, at 16.

133 *See* Sylvie Nérisson, *Has Collective Management of Copyright Run Its Course? Not So Fast*, 46 INT. REV. INTELL. PROP. & COMPETITION 505, 507 (2015) (calling for more attention to the issue).

licensing process. For instance, Spotify encourages authors and creators to bypass other intermediaries in order to license musical pieces directly to the online music distributor.[134] However, taking into account the power of Spotify as a major international distributor, it would be difficult to expect that rightholders would have a fair share of the pie.[135] Therefore, the music industry is looking for new opportunities in emerging technologies. This is where blockchain is hoped to be the missing piece, which could solve the puzzle.

On that note, as of this writing, blockchain has created numerous expectations among the music community. Certain potentials of blockchain in ameliorating major problems of the current right management system should be acknowledged, including facilitating the online use of works, creating copyright database, tracing royalty payments, and increasing data transparency. However, this technology still has some practical barriers and to a certain extent even adds to the cacophony of issues. Therefore, it is arguable as to whether the advantages of blockchain in music online could outweigh its disadvantages. For the time being, one response to these arguments might be to claim that blockchain-based platforms cannot offer absolute certainty beyond all doubt, but this technology is bringing about certain positive changes to the current online music landscape. Accordingly, despite the constraints of blockchain, this technology is worth experimenting with to demystify the immediate and long-term results.

Moreover, blockchain application in music online is still in the early stage. Hence, at the moment, any claims on its promise or perils could be premature. It would be likely that the nature, benefits, and drawbacks of the future versions of blockchain might be different from those as set out in this research. Indeed, with the participation of the leading technology/Internet companies to the blockchain world, such as IBM, Microsoft and Amazon, there seem to be ongoing efforts in exploring and

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134 Lucas Shaw, *Spotify Gives Artists Another Way to Circumvent Record Labels*, BLOOMBERG (Sept. 20, 2018), https://www.bloomberg.com/news/articles/2018-09-20/spotify-gives-artists-another-way-to-circumvent-record-labels.

135 *See* Leon & Gupta, *supra* note 50, at 9 (noting that the positive trends in profit sharing may not necessarily benefit artists).

addressing blockchain's limitations.[136] Therefore, in the future, the role of blockchain in truly serving as a problem solver of the online music industry will be reinforced if further technological improvements are made.

CONCLUSION

While the music community is hungry for solutions to chronic problems around online usage of works, credit to rightholders, financial and data flows, the application of blockchain in the music context has been translated into the potentials to solve such problems. Blockchain technology holds out the hope that rightholders would be given greater control over their creations by limiting the scope of "middlemen" interference. However, blockchain may also arguably entail certain drawbacks. Therefore, more progressive steps by technology entrants into the music industry should be taken in order to entirely unveil the truth about blockchain with a view to exploring its capabilities and mitigating its existential barriers.

136 *See* ICOBox, *Google, Microsoft, IBM & Amazon Make Massive Blockchain Advancements*, MEDIUM (Aug. 1, 2018), https://medium.com/icobox-io/google-microsoft-ibm-amazon-make-massive-blockchain-advancements-a73cc2b4ea15 (announcing the development of tech giants' movements in the blockchain world).