How Blockchain Technology Can Revolutionize the Music Industry

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I. Introduction

The music industry is driven on smoke and mirrors – distributors and record labels are not usually willing to disclose who owns the rights to what music in what territory and for what type of use.[1] Meanwhile, an underlying information access asymmetry compromises the relationship between content creators[2] and intermediaries (i.e. labels, publishers and streaming services).[3] In this archaic system, intermediaries take transactional fees without any reasonable present day justification, and royalty payments are often delayed and/or distributed to the wrong persons.[4] Yet, Paul McCartney's recent lawsuit against Sony,[5] Duran Duran's lost lawsuit with Sony/ATV,[6]

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    1 *See* George Howard, Everything In Its Right Place: How Blockchain Technology Will Lead To A More Transparent Music Industry 7–9 (2017).

    2 This paper will use the term "content creator" to reference artists, musicians, songwriters, or anyone else responsible for the contribution of any music-related media content.

    3 *See* Imogen Heap, *Blockchain Could Help Musicians Make Money Again*, Harvard Business Review, June 5, 2017, *available at* https://hbr.org/2017/06/blockchain-could-help-musicians-make-money-again, {https://perma.cc/D9XF-HPJK}.

    4 *Id.*

    5 *See* Jonathan Stempel, *Paul McCartney Settles with Sony/ATV Over Beatles Music Rights*, Reuters (June 30, 2017, 9:34 AM), https://www.reuters.com/article/us-

and Dr. Dre's lawsuit against Death Row Records[7] demonstrate that content creators are now, more than ever, pushing for fairness and transparency within the boundaries of the music industry.[8] In this context, the blockchain ledger, a completely transparent and secure peer-to-peer sharing platform, offers a solution.

The widespread implementation of blockchain technology within the music industry equates to (a) increased royalty payouts for content creators; (b) increased overall transparency; (c) automation of payments; and (d) the removal of unwanted third-party intermediaries.[9] The blockchain ledger introduces a music ecosystem more suitably adapted to the technological advances in our society; advances unaccounted for in the current, antiquated system in place.[10] The inherent transparency of the blockchain ledger itself, combined with the use of smart contracts, and an all-encompassing global copyright database resurrects the excitement of peer-to-peer sharing that faded with the once popular music-sharing platform, Napster,[11] and all but ensures an improved relationship between content creators and fans. This new music ecosystem - a completely open platform, free of any prior restrains - presents content creators with a unique opportunity to shape their own financial futures.

This paper will examine how blockchain technology can effectively remedy various ongoing issues in the music industry. This paper proceeds as follows: Part II will provide a brief introduction and explanation of the blockchain ledger, cryptocurrencies, and smart contracts; comprehension of the arguments made in favor of blockchain's widespread adoption in the music industry requires a fundamental understanding of the blockchain

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people-paulmccartney/paul-mccartney-settles-with-sony-atv-over-beatles-music-rights-idUSKBN19L2ET, [https://perma.cc/F5UM-SQZH].

    [6] *See Duran Duran 'Shocked' After Losing Legal Copyright Battle*, BBC News (Dec. 2, 2016), https://www.bbc.com/news/entertainment-arts-38182418, [https://perma.cc/AG42-F9N9].

    [7] *See* Young v. Wideawake Death Row Entm't LLC, No. CV 10-1019 CAS (JEMx), 2011 U.S. Distr. LEXIS 158553, 2011 WL 12565250 (C.D. Cal. 2011).

    [8] Heap, *supra* note 3.

    [9] *See id.*

    [10] *See* Jared S. Welsh, Comment, *Pay What You Like - No, Really: Why Copyright Law Should Make Digital Music Free for Noncommercial Uses*, 58 Emory L.J. 1495, 1522 (2009) ("[N]ew technologies have actually helped to increase the demand for recorded music by making its consumption more convenient and reducing search costs[,] . . . [yet] the industry continues to lose profits . . . protecting its entrenched capital [and] defending its outdated methods in court rather than updating them").

    [11] *See* H. Michael Drumm, Note, *Life After Napster: Will its Successors Share its Fate?*, 5 Tex. Rev. Ent. & Sports L. 157 (2003) (discussing the demise of Napster).

technology itself. Subsequently, in Part III, this paper examines blockchain technology's ability to transform the music industry and strengthen the overall relationship between content creators and fans. In particular, it will analyze how the separation between content creators and fans will subside instantaneously, owing to the use of (1) Smart Contracts; (2) the implementation of a uniform, decentralized global copyright database; and (3) the blockchain ledgers' ability to accurately track and encrypt data. Part IV introduces several blockchain-based startups (such as Grammy-award-winning recording artist's Imogen Heap's Mycelia) that utilize the blockchain ledger in a variety of different ways, presenting innovative and sophisticated solutions to some of the music industry's on-going issues.[12] Finally, Part V assesses barriers to the widespread adoption and usage of blockchain technology within music industry, followed by predictions regarding how likely, and when, if ever, a blockchain-based paradigm shift in the music industry will result.

II.   INTRODUCTION TO BLOCKCHAIN TECHNOLOGY

A.   Introduction

Blockchain technology proffers a revolutionary framework that may one day completely restructure today's outdated and unbalanced music industry. Understanding the mechanisms by which this transformation may eventually materialize requires a basic understanding of several blockchain technologies. The following section simplifies the principle characteristics of the blockchain ledger, cryptocurrencies, and smart contracts.

B.   Introduction to the Blockchain Ledger

Blockchain, the technology at the heart of Bitcoin and other digital currencies, is an open, distributed ledger with the ability to record transactions between two parties efficiently, and in a verifiable, permanent manner.[13] The blockchain ledger stores information in a fashion that makes it virtually impossible to add, remove, or change data without detection from other users; to that end, experts consider the blockchain ledger virtually impossible to corrupt.[14] The specific mechanism making this network so

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[12] *See* Heap, *supra* note 3.
[13] *See* Heap, *supra* note 3.
[14] *Blockchain – The New Technology of Trust*, GOLDMAN SACHS, https://www.goldmansachs.com/insights/pages/blockchain/, [https://perma.cc/QV5V-83YE] (last visited Nov. 16, 2018) (on file with the Harvard Law School Library).

uniquely secure is called a Proof-of-Work ("PoW") system: in a PoW system, thousands of computers authorize, back, and achieve consensus on every transaction.[15] No singular entity owns the blockchain; thus, it is immutable and there is no single point of penetration or vulnerability for those attempting to hack or otherwise corrupt the data on the blockchain ledger.[16]

To that end, blockchain is the first technology that enables the transfer of digital ownership in a decentralized and trustless manner.[17] The implications of living in a world where contracts and data are completely transparent and secure, and where transactions can be executed more quickly and efficiently without third-party intermediaries, in theory, revolutionizes and disrupts the customary mechanisms by which traditional industries operate.[18] For example, in the world of finance, third-party intermediaries, such as lawyers and bankers, may no longer be necessary; and in the world of music, the need for third-parties such as music publishers, music managers, and music distributers may become altogether discretionary.

C. *Introduction to Bitcoin and Cryptocurrencies*

Satoshi Nakamoto[19] originally developed the blockchain ledger as part of the digital currency Bitcoin.[20] While Bitcoin, a type of digital currency, operates on the blockchain platform, the two differ completely in functionality.[21] Bitcoin is a type of cryptocurrency.[22] A cryptocurrency is a "purely electronic form of money designed to take advantage of the distributed, de-

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[15] Howard, *supra* note 1, at 23.

[16] Arthur Iinuma, *What Is Blockchain And What Can Businesses Benefit From It?*, Forbes Apr. 5, 2018, https://www.forbes.com/sites/forbesagencycouncil/2018/04/05/what-is-blockchain-and-what-can-businesses-benefit-from-it/#f8cb04675fe8, [https://perma.cc/QM26-MMF2] (on file with the Harvard Law School Library).

[17] *Id.*

[18] *Id.*

[19] *See* Jeffrey Tucker, *Why It's Okay That Satoshi's Real Identity Remains Anonymous*, Forbes (Oct. 21, 2018, 12:55 PM), https://www.forbes.com/sites/jeffreytucker/2018/10/21/i-dont-want-to-know-satoshis-real-identity/#1547d8e62247, [https://perma.cc/W66H-9X2K] ("One of the beautiful aspects of Bitcoin is that the creator is still unknown. 'Satoshi Nakamoto' is a pseudonym").

[20] *See* Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, Bitcoin, Nov. 16, 2018, *available at* https://bitcoin.org/bitcoin.pdf, [https://perma.cc/4P3C-8463].

[21] *See* Matt Lucas, *The Difference Between Bitcoin and Blockchain for Businesses*, IBM, May 9, 2017, https://www.ibm.com/blogs/blockchain/2017/05/the-difference-between-bitcoin-and-blockchain-for-business/, [https://perma.cc/T89X-ZDJ8] (on file with the Harvard Law School Library) (discussing the relationship between Bitcoin and Blockchain; specifically, distinguishing between the two. According to Lucas,

centralized, and trust-building nature of the blockchain."[23] Hence, Bitcoin is a digitalized, unregulated currency with no central authority, bank, or administrator and it can be sent from user-to-user on the peer-to-peer Bitcoin network without intermediaries.[24]

George Howard, CIO of Los Angeles music rights company Riptide and associate professor at Berklee College of Music and Brown University analogizes Bitcoin's relationship with blockchain to the relationship between pornography and the Internet.[25] According to Howard,

> "Bitcoin is simply a currency that utilities the Blockchain as a decentralized registry of transactions . . . thus, in the same way pornography drove the early development of the internet, these early adopters of Bitcoin – motivated by the promise of utilizing the nascent technology to satisfy their very specific needs – may end up creating markets and technologies that ultimately lay the foundation for more generalized uses."[26]

To Howard's point, the early success and popularity of Bitcoin and other cryptocurrencies, while potentially fleeting, has led to increasing global interest and awareness of the underlying blockchain technology.[27] As Howard correctly predicted, this global attention has driven the innovation of several other blockchain-based technologies – most notably, smart contracts. Smart contracts, in essence, "digital contracts," are arguably the most promising application of blockchain technology to date.[28]

Bitcoin was the first application of the blockchain, and this is probably where the confusion between the two technologies began).

[22] *See* Nakamoto, *supra* note 20.

[23] OMID MALEKAN, THE STORY OF THE BLOCKCHAIN: A BEGINNER'S GUIDE TO THE TECHNOLOGY THAT NOBODY UNDERSTANDS 15 (2018).

[24] *See* GOLDMAN SACHS, *supra* note 154.

[25] *See* HOWARD, *supra* note 1, at 13.

[26] *Id.* at 14.

[27] *See* Jamie Ballard, *79% of Americans are Familiar with at Least One Kind of Cryptocurrency*, YOUGOV, Sept. 6, 2018, https://today.yougov.com/topics/finance/articles-reports/2018/09/06/cryptocurrency-bitcoin-popular-americans, [https://perma.cc/6XK2-3VWZ] (on file with the Harvard Law School Library); *Global Blockchain Market Grows as Financial Organizations Adopt the Technology*, MARKETWATCH, Sept. 14, 2018, https://www.marketwatch.com/press-release/global-blockchain-market-grows-as-financial-organizations-adopt-the-technology-2018-09-14-9183510, [https://perma.cc/2M9R-5YT8] (on file with the Harvard Law School Library).

[28] *See* Joe Liebkind, *Are Smart Contracts the Best of Blockchain?*, INVESTOPEDIA, Oct. 12, 2017, https://www.investopedia.com/news/are-smart-contracts-best-blockchain/, [https://perma.cc/T48D-VTSN] (on file with the Harvard Law School Library).

D.   *Introduction to Smart Contracts*

Smart contracts allow for two or more parties to implement their own terms and conditions into a binding digital ledger.[29] Smart contracts automatically enforce obligations on parties once these terms and conditions are met.[30] Proponents of smart contracts envision a future where commerce takes place exclusively using smart contracts, eliminating the need for contractual drafting and intermediation by courts altogether.[31]

The following illustration demonstrates how smart contracts operate in practice: Someone wants to sell their smartphone, and in today's world that person utilizes a platform such as Amazon, or EBay, that acts as an intermediary between buyer and seller.[32] Often, banks process the payments on these platforms, which will cost the buyer, and occasionally the seller, extra money in the form of a transactional fee.[33] Now, because of smart contracts, which enable peer-to-peer transactions, the exchange of commercial goods and services between two or more parties is possible without the need for any third-party intermediary.[34] The transactional fees that intermediaries and central authorities (in this example, Amazon, EBay, and the bank) customarily secure will no longer be unavoidable.[35] As it relates to the music industry, smart contracts prove especially valuable to smaller name content creators. These smaller name content creators, especially those without the backing of a major record label, often struggle to make a living for themselves in the current system in place – a system that forces them to surrender most of their profits to centralized management and intermediaries.[36]

Smart contracts, while certainly disruptive in their own capacity, are just one of various blockchain-based mechanisms with the potential to revo-

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[29] HOWARD, *supra* note 1, at 23.

[30] *See id.*

[31] *See generally* Jeremy M. Sklaroff, Comment, *Smart Contracts and the Cost of Inflexibility*, 166 U. PA. L. REV. 263 (2017).

[32] *See* Oliver Herzfeld, *Smart Contracts May Create Significant Innovative Disruption*, FORBES (Feb. 22, 2016, 11:28 AM), https://www.forbes.com/sites/oliverherzfeld/2016/02/22/smart-contracts-may-create-significant-innovative-disruption/#29b238c1396a, [https://perma.cc/D5DS-ZG5G] (discussing platforms, such as eBay, that "facilitate the purchase of goods or engagement of services to be provided by third parties").

[33] *Id.*

[34] *Id.*

[35] *Id.*

[36] *See* Andrew Rossow, *Blockchain Aims to Be The Biggest Stage For Empowering Music Artists*, FORBES (May 27, 2018, 8:39 PM), https://www.forbes.com/sites/andrewrossow/2018/05/27/blockchain-aims-to-be-the-biggest-stage-for-empowering-music-artists/#274ae0173e0b, [https://perma.cc/G4XH-PEB8].

lutionize the music industry. Part II will discuss these other mechanisms in further detail, examining how exactly their widespread implementation within the music industry can benefit content-creators and fans alike.

III. How Blockchain Technology Can Transform the Music Industry

A. *Introduction*

The secure nature of blockchain technology abridges the gap between content creators and consumers by cutting out intermediaries, allowing for quick and seamless transactions and ensuring the transparency of all music-related information.[37] Then, if in fact blockchain technology lays the foundation for a new music ecosystem, the relationship between content creators and fans will strengthen over time. In this light, blockchain technology has the potential to change the landscape of the music industry for the better. These profound changes manifest themselves in three ways. First, smart contracts completely corrode the traditional relationship between content creators and intermediaries.[38] No longer will content creators rely on intermediaries, such as purchasing platforms and financial brokers that traditionally yield sizeable dividends of content creators' royalty payments.[39] Rather, these content creators will receive direct and fair compensation each time one of their musical works is used.[40] These facilitated transactions will appeal to all content creators – especially amateur content creators who do not have the backing of a major record label.[41]

Second, widespread implementation of the blockchain ledger within the music industry provides content creators with valuable information regarding the use and sales of their musical works.[42]

Lastly, fans and content creators both benefit from the creation of a global database registry that stores all copyright data. As it stands, "the title to any given piece of music and performance is recorded in multiple, often-

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[37] *See* Howard, *supra* note 1, at 23.

[38] Imogen Heap, *Smart Contracts For the Music Industry*, Medium, Mar. 15, 2018, https://medium.com/humanizing-the-singularity/smart-contracts-for-the-music-industry-3e641f87cc7, [https://perma.cc/ZLY8-ZKVD] (on file with the Harvard Law School Library).

[39] *See* Howard, *supra* note 1, at 23.

[40] *See* Heap, *supra* note 3.

[41] *Id.*

[42] *Id.*

conflicting and/or incomplete records of who owns the rights to what."[43] Collective management organizations ("CMOs") often fail to acknowledge and/or compensate content creators for their works.[44] The implementation of this universal ledger guarantees that content creators will receive correct and timely compensation and accreditation.[45]

B.   *Smart Contracts Facilitate Quick, Accurate, and Secure Payouts*

Reports suggest that the average musician makes $23.40 for every $1,000 of her music sold - a meager two percent net profit.[46] Labels, publishers, and streaming services exploit the information imbalance between themselves and content creators, perpetuating an inequitable arrangement between the two sides.[47] Smart contracts, conversely, eliminate the need for content creators to navigate their way through costly purchasing platforms and financial brokers - allowing them to sell their products directly to their fans and consequently eliminating all transactional costs.[48] More specifically, smart contracts allow the original creator of a musical work to determine how/if/when/and at what exact price others can use her works.[49]

Execution of a smart contract over the blockchain network de facto eliminates the need for third-party intermediaries to review and/or confirm transactions. Use of these self-executing contracts binds all involved parties to the rules and determinations of the underlying code; and so, smart contracts may, in the not so distant future, eliminate the need for attorneys and litigation entirely – ergo, cutting costs for content creators.

This revamped business model is especially valuable to smaller name content creators, without the backing of a major record label, and less revenue at their disposal. With facilitated transactions and an accessible, decon-

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[43] *Blockchain: Recording the Music Industry: How Blockchain Technology Could Save the Music Industry Billions*, PRICEWATERHOUSECOOPERS LLP, https://www.pwc.fr/fr/as sets/files/pdf/2018/07/pwc-blockchain-recording-music-industry.pdf, [https://perma .cc/48BM-C2TH] (last visited Nov. 17, 2018) (on file with the Harvard Law School Library).

[44] *Id.*

[45] *See id.*

[46] *See* C. BYUN, THE ECONOMICS OF THE POPULAR MUSIC INDUSTRY: MODELLING FROM MICROECONOMIC THEORY AND INDUSTRIAL ORGANIZATION 95 (2014).

[47] *See* Heap, *supra* note 3.

[48] Yessi Bello Perez, *Imogen Heap: Decentralising the Music Industry with Blockchain*, MYCELIA FOR MUSIC, http://myceliaformusic.org/2016/05/14/imogen-heap-decentral ising-the-music-industry-with-blockchain/, [https://perma.cc/LF2T-GYBK] (last visited Nov. 17, 2018) (on file with the Harvard Law School Library).

[49] *See id.*

gested market, a new wave of amateur content creators will likely step into the new blockchain-enabled music industry. This influx of new content creators will likely lead to an influx of overall music published, quantity-wise, and as a result, both fans and content creators triumph.

1. Does the Music Modernization Act Already Ensure Quick, Accurate and Secure Payouts – Absent Smart Contracts?

In late 2017, Congress introduced the Music Modernization Act ("MMA").[50] On October 11th, 2018 President Donald J. Trump officially signed the MMA into law.[51] According to President Trump, the MMA introduces new business conditions within the music industry that, "close[ ] loopholes in our digital royalties laws to ensure that songwriters, artists and producers receive fair payment for licensing of music."[52]

President Trump, in this instance, fails to grasp the underlying issues and liberties at stake within the music industry – issues that the MMA itself fails to wholly address. The bill, while certainly "a great step forward towards a fairer music ecosystem that works better for music creators, services, and fans,"[53] fails to resolve the more troubling issues in place within the music industry. The MMA perpetuates an inequitable system that discriminates against content creators.[54] While the MMA strives to reward content creators with greater disbursements,[55] and very well may succeed in doing so, the blockchain ledger presents content creators with an even more sizable distribution of revenue by extinguishing the need for intermediaries entirely.[56] The blockchain ledger ensures that all imputed data is incorruptible; on the same token, smart contracts and self-publication (through the

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[50] The technical name for this act is the Orrin G. Hatch – Bob Goodlatte Music Modernization Act. *See* Orrin G. Hatch-Bob Goodlatte Music Modernization Act, H.R. Con. Res. 1551, 115th Cong. (2018) (enacted).

[51] Ed Christman, *President Trump Signs Music Modernization Act Into Law With Kid Rock, Sam Moore As Witnesses*, BILLBOARD, Oct. 11, 2018, https://www.billboard .com/articles/business/8479476/president-trump-signs-music-modernization-act-law-bill-signing, [https://perma.cc/8UA8-HAFB] (on file with the Harvard Law School Library).

[52] *Id.*

[53] *See* Bruce Houghton, *Industry Reacts to Music Modernization Act Passage: AIMP, BMI, A2IM, NMPA, SoundEx, ASCAP, More*, HYPEBOT, Sept. 19, 2018, https:// www.hypebot.com/hypebot/2018/09/industry-reacts-to-music-modernization-act-senate-passage-soundexchange-ascap-riaa-c3-more.html, [https://perma.cc/2C8V-XZ3H] (on file with the Harvard Law School Library)

[54] *See* Christman, *supra* note 51.

[55] *Id.*

[56] *See* Heap, *supra* note 3.

ledger) enable content creators to safely sell their works on their own terms.[57] On the other hand, with the MMA in place, the threat of data corruption and misappropriation looms.[58]

Consider section J(i)(II) of the MMA, establishing that (after a three year holding period) one-hundred percent of unclaimed royalties will go to publishers based on market share.[59] Enforcement of this provision would cause a great deal of independent songwriters to lose out on royalties because of copyright issues, incomplete data, or misspellings on their songs.[60] Antithetically, none of these arbitrary reserve clauses exist on the blockchain ledger, and content creators will never be penalized for marginal errors - errors that, under the MMA, could potentially cost them millions of dollars.[61] Instead, blockchain technology offers content creators an inherently fair and transparent platform – i.e. an alternative absent any loopholes.

C.   Utilizing the Blockchain Ledger to Track Music Sales

Within the current framework of the music industry, the power of information lies in the hands of a select view.[62] The distributors and record labels receive all the relevant data – like how many times a track has been listened to.[63] "Getting the music out there and distributed is not a problem. Where the disruption now needs to happen is in the curation of the feedback, on the data that we, as [content creators], need to receive," says Grammy-winning recording musician, and blockchain enthusiast Imogen Heap, adding: "Artists very rarely receive meaningful data relating to their tracks."[64]

In this context, the benefit of a secure, decentralized, distributed ledger enables content creators to view how many times their track has been

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[57] *Id.*

[58] *See* Daniel Sanchez, *3 Major Problems With The Music Modernization Act*, Digital Music News, Feb. 27, 2018, https://www.digitalmusicnews.com/2018/02/27/music-modernization-act-major-problems/, [https://perma.cc/E9JK-TGXC] (on file with the Harvard Law School Library).

[59] Orrin G. Hatch-Bob Goodlatte Music Modernization Act, H.R. Con. Res. 1551, 115th Cong. (2018) (enacted).

[60] *See* Sanchez, *supra* note 58.

[61] *See id.*

[62] *See* Heap, *supra* note 3.

[63] *See* Perez, *supra* note 48.

[64] *Id.*

played,[65] where their track has been played, and who specifically has been playing their track.[66] The data encrypted on the blockchain ledger helps content creators make better-informed and well-educated business decisions.[67]

For example: a content creator utilizing the blockchain ledger observes that the majority of the sales from her recently released album come from South Africa. In effect, the prospect of increased ticket sales from sold out arenas may incentivize her to book an additional few dates in South Africa on her upcoming tour. More specifically, if the same content creator notices that her music is extremely popular in Cape Town, and Durban, and Johannesburg, it would behoove her to play shows in those particular cities. Her logic behind these decisions is as follows: if she decides to book a venue on her upcoming tour in Cape Town, or Durban, or Johannesburg, or any combination of the three, where she *knows* she has more fans, she is more likely to sell more tickets, and sell more merchandise (assuming, of course, she is not already one of the world's most famous content creators). Following this logic, if the same content creator notices that her music is extremely popular in Africa, but conversely, her sales in Europe prove dismal, she may be inclined to promote herself more in Europe, and play a few more shows in Paris, or Barcelona, or London, or any combination of the three, in an effort to boost her brand.

D.   *Implementation of a Global Copyright Database*

The overwhelming need for transparent data within the music industry extends far beyond the need for meaningful data from music sales. Content creators are often not properly recognized for their creative efforts, and in effect, not compensated.[68] The blockchain ledger offers a solution to this issue, allowing content creators to upload all elements of their musical works onto a single, unified database.[69] "Things such as lyrics, musical composition, liner notes, cover art, licensing information, audio and video per-

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[65] For the purposes of this paper, the terms "track," "song," and "musical work" are used interchangeably to represent all varieties of "musical pieces" or creative content produced by a content creator.

[66] *See* Heap, *supra* note 3.

[67] *Id.*

[68] *Id.*

[69] *Id.*

formances of the work would get logged into this global, inclusive, and easily verified peer-to-peer system."[70]

Thus, the third way that blockchain technology can revolutionize the music industry is through the creation of a transparent, decentralized database that stores the copyright data from all artistic creations. Implementation of this global registry remedies the issue of often-conflicting and/or incomplete records.

Past efforts to establish a single point of works recognition within the music industry failed.[71] The Global *Repertoire Database* ("GRD") undertook the last major effort to create a global database of every song ever created, including an exhaustive listing of all the copyright owners.[72] On July 9 2014, PRS for Music (the UK's leading collection society) officially declared the GRD a failure, and, since then, no major efforts towards the implementation of a single global registry have been made.[73] Considering the old English-language proverb, "necessity is the mother of invention,"[74] it seems surprising that the music industry is still bereft of a workable solution to the existing information asymmetry between content creators and intermediaries. Fortunately, the blockchain ledger presents content creators with a viable path to successful implementation of a global copyright database.[75] Leading the path is Grammy-award winning musician Imogen Heap.[76]

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[70] *The State of Music: How Blockchain Can Disrupt The Music Industry*, Medium, May 2, 2017, https://medium.com/@sostereo/the-state-of-music-how-blockchain-can-disrupt-the-music-industry-d95bda2f63ac, [https://perma.cc/2RVE-SLKY] (on file with the Harvard Law School Library).

[71] PricewaterhouseCoopers LLP, *supra* note 43.

[72] *Id.*

[73] *See Statement on the GRD*, PRS for Music, July 9, 2014, https://www.prsformusic.com/press/2014/statement-on-the-grd, [https://perma.cc/P7MH-6AWH] (on file with the Harvard Law School Library).

[74] *Necessity is the mother of invention*, Cambridge Dictionary, https://dictionary.cambridge.org/us/dictionary/english/necessity-is-the-mother-of-invention, [https://perma.cc/Q2FV-MBLS] (last visited Nov. 23, 2018) (on file with the Harvard Law School Library).

[75] *See* Heap, *supra* note 3.

[76] *Id.*

IV.   STARTUPS HAVE ALREADY BEGUN TO UTILIZE BLOCKCHAIN TECHNOLOGY TO COMBAT ON-GOING ISSUES IN THE MUSIC INDUSTRY

A.   *Imogen Heap's Mycelia: A Revolutionary Music Sharing Platform*

Imogen Heap stands at the forefront of blockchain innovation in the music industry: her startup Mycelia will allow content creators to store all the information from their songs in one accurate, global database.[77] Mycelia embodies the quintessential spirit of what blockchain technology hopes to accomplish – a decentralized ledger that provides ultimate transparency and allows for secure peer-to-peer transactions.[78]

Thanks to steaming platforms, music is more accessible than ever.[79] Nonetheless, the business model intrinsic to streaming does not support content creators; intermediaries continue to purposefully muddle and obscure valuable information, and CMOs struggle to correctly distribute royalty payments in a timely fashion.[80] As it stands, 20-50% of music payments do not get distributed to their rightful owners.[81] Widespread adoption of this global registry not only solves the information asymmetry between content creators and intermediaries, but also assures that rightful copyright owners are correctly paid and acknowledged. Heap's Mycelia envisions a utopian platform that safeguards content creators' valuable information: an industry where "artists, songwriters, performers and musicians – the real owners of the industry – will be the main benefactors, for they will finally be able to own their creations and get their due for their efforts."[82]

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[77] Perez, *supra* note 48.

[78] *See* Heap, *supra* note 3.

[79] *See 10 Technologies that Revolutionized the Music Industry*, MEDIUM, Jan. 4, 2018, https://medium.com/singulardtv/10-technologies-that-revolutionized-the-music-in dustry-aa3023ad3132, [https://perma.cc/5MHT-T35Q] (on file with the Harvard Law School Library).

[80] *See* PRICEWATERHOUSECOOPERS LLP, *supra* note 43.

[81] David Gerard, *Why You Can't Put The Music Industry On A Blockchain*, HYPEBOT, Nov. 12, 2018, https://www.hypebot.com/hypebot/2017/08/why-you-cant-put-the-music-industry-on-a-blockchain-excerpt.html, [https://perma.cc/Y5J E-MPNT] (on file with the Harvard Law School Library).

[82] Ben Dickson, *How Blockchain Technology Can Change the Music Industry*, TECH-CRUNCH, 2016, https://techcrunch.com/2016/10/08/how-blockchain-can-change-the-music-industry, [https://perma.cc/7JUM-PS4V] (on file with the Harvard Law School Library).

1.   Mycelia's Creative Passport and Creative Passport Database

Spearheaded by Imogen Heap and Mycelia, The Creative Passport is a "one stop shop which allows everyone to access data verified by [content creators]."[83] Mycelia's Creative Passport project aims to be the uniform, digital container for all "verified profile information, IDs, acknowledgements, works, business partners and payment mechanisms for all music makers."[84] Ideally, Heap's Creative Passport project will emerge into what she calls a "Creative Passport Database" – the singular copyright database within the music industry.[85] All content creators and fans are able to access the Creative Passport free of charge, but third-party services wishing to use the data for commercial and licensing purposes must pay a fee.[86] Thereafter, the underlying blockchain technology enables the direct distribution of these fees to the Creative Passports' holders (i.e. content creators).[87] This system, utilizing the underlying blockchain ledger and smart contracts, ensures content creators are correctly paid and accredited.[88]

Still and all, various challenges to establishing a successful global copyright database present themselves in the wake of Mycelia's Creative Passport project. For instance: will content creators update their profiles with accurate and timely information? The Creative Passport project's success seemingly relies on whether or not content creators will keep their profiles up-to-date with relevant information. By the same token, successful implementation of Mycelia's Creative Passport Database will require widespread cooperation from content creators.

A.   *3Lau and Audius: Alternatives to Traditional CMOs*

An ongoing battle continues between content creators (the copyright holders) and CMOS regarding the fair distribution of royalties for their music.[89] In simple terms, CMOs are responsible for collecting and distributing

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[83] *Creative Passport Change Maker Forums*, MYCELIAFORMUSIC, http://myceliafor music.org/creativepassport-changemaker-forums/, [https://perma.cc/N2YL-K377] (last visited Nov. 21, 2018) (on file with the Harvard Law School Library).

[84] *Creative Passport*, MYCELIAFORMUSIC, http://myceliaformusic.org/creative-pass port/, [https://perma.cc/BY2E-WSNG] (last visited Nov. 21, 2018) (on file with the Harvard Law School Library).

[85] *See id.*

[86] *Id.*

[87] *Id.*

[88] *Id.*

[89] *See* Jacob Enoch & Frederikke Boogard, *INSIGHT: Could Blockchain Solve the Discrepancy Between Technology, IP Law?*, BLOOMBERG, July 6, 2018, https://www

royalty payments to the appropriate content creators each time someone plays, uses, or performs the content creators' musical work.[90]

These CMOs (usually national entities) and globalization makes it so that content creators will have to deal with multiple CMOs in all the other places that the composition is either played or used.[91] For example, in Europe alone, 28 collection societies collect royalties in 28 different markets.[92] This process can be incredibly time consuming, considering that a content creator would have to register with multiple CMOs in different jurisdictions.[93] On top of that, CMOs charge commissions, diluting the amount a content creator earns from royalty payments.[94]

Blockchain-based startup companies now offer an alternative to CMOs that would resolve the time consuming process of registration with multiple CMOs, as well as the issue of diluted royalties.[95] Ujo, a blockchain-based start-up, allows for content creators to register their music and license their songs upon payment of a fee directly to users, without the interference of any CMO.[96] Songwriter Imogen Heap used Ujo in 2015 to launch the song "Tiny Human" for $0.60 per download.[97] The release of "Tiny Human" on the blockchain-based Ujo platform was by no means a success, earning Heap a grand-total of $133.20.[98] The lackluster launch of "Tiny Human" served more as a testament to the learning curve involved with using cryptocurrencies, as opposed to any problems with the underlying blockchain technology. The launch of "Tiny Human," while certainly disappointing, was a

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.bna.com/insight-blockchain-solve-n73014477160, [https://perma.cc/9A73-S44D] (on file with the Harvard Law School Library).

[90] *See* PRICEWATERHOUSECOOPERS LLP, *supra* note 43.

[91] *See id.*

[92] *See id.*

[93] *See id.*

[94] *See* Enoch & Boogard, *supra* note 89.

[95] *See* PRICEWATERHOUSECOOPERS LLP, *supra* note 43.

[96] *See* UJO MUSIC, https://ujomusic.com (last visited Nov. 20, 2018) (on file with the Harvard Law School Library).

[97] *See* 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-block chain-for-music-a85eaeaca7ad, [https://perma.cc/26F8-SFUV] (on file with the Harvard Law School Library).

[98] David Gerard, *Why Spotify Wants Blockchain & How All The Music Industry's Blockchain Dreams Can Come True*, HYPEBOT, https://www.hypebot.com/hypebot/2017/05/why-spotify-wants-blockchain-how-music-industry-blockchain-dreams-work.html, [https://perma.cc/US49-VV5S] (last visited Nov. 17, 2018) (on file with the Harvard Law School Library).

step in the right direction; innovation in its early stages oftentimes faces setbacks.[99]

C.   *Vevue and CustosTech: Startups Battling Piracy*

Experts suggest that sharing any media content unlawfully could be extremely difficult, or impossible if the entire Internet was built on the blockchain ledger.[100] With this end is view, Vevue, a blockchain streaming service, is creating a blockchain-based technology to track the life cycle of any content.[101] "If someone copies content tracked by our technology by any possible means, including videoing or recording a screen, our platform will be able to identify the owner of the device/system where the content was last played," says Vevue founder Thomas Olson.[102] Vevue is developing a smart computational engine to perform the task of protecting media content.[103] Vevue's blockchain-based media tracking includes three components: 1) the assignment of a unique ID to video content stored on the blockchain ledger and activating a surveillance smart contract; 2) the technology enabling the smart contract then performs an internal search for illegal duplicates of the video; and 3) then the automatic triggering of a desired copyright action.[104] Vevue is one of many promising and experimental blockchain-based startups focusing on copyright protection.[105]

Another blockchain-based startup, CustosTech, uses the blockchain ledger to help owners of intellectual property fight piracy.[106] CustosTech, a South African tracking company, rewards individuals commonly referred to as "bounty hunters," with Bitcoin once the "bounty hunters" detect pirated

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[99] *See generally* National Academies of Sciences, Engineering, and Medicine, The Power of Change: Innovation for Development and Deployment of Increasingly Clean Electric Power Technologies 54 (2016) (discussing obstacles that hinder the progress of innovation in the early stages).

[100] Craig Adeyanju, *Blockchain in Media: How Can Blockchain Fight Piracy?*, CoinTelegraph, Aug. 8, 2018, https://cointelegraph.com/news/blockchain-in-media-how-can-blockchain-fight-piracy, [https://perma.cc/76G9-MRLB] (on file with the Harvard Law School Library).

[101] *See Blockchain is the New Internet*, Vevue, https://www.vevue.com/blockchain/, [https://perma.cc/FEC3-SJW4] (last visited Nov. 17, 2018) (on file with the Harvard Law School Library).

[102] Adeyanju, *supra* note 100.

[103] *See* Vevue, *supra* note 101.

[104] Adeyanju, *supra* note 100.

[105] *Id.*

[106] *How It Works*, CustosTech, https://custostech.com/tech/, [https://perma.cc/W3US-7BHQ] (last visited Nov. 17, 2018) (on file with the Harvard Law School Library).

copies of the media.[107] CustosTech does this using a propriety forensic watermarking technology that makes it possible to embed a monetary reward, linked to a unique serial number into media, and for the purposes of this paper, audio files, during the encoding process.[108] This process, commonly referred to as "digital watermarking," is one of the many inventive ways in which blockchain technology is being used to battle piracy.[109]

While a variety of creative and effective blockchain-based solutions work towards combatting piracy and other issues in the music industry, certain barriers to blockchain technology's widespread implementation threaten the long-term prospects of innovative startups, like CustosTech and Vevue.

V.   Barriers to Widespread Adoption

A.   Issues with Cryptocurrencies

The release of Imogen Heap's single "Tiny Human," while innovative and bold, only made Heap $133.20.[110] The threat of infinitesimal sales numbers will deter even the most avid blockchain enthusiasts within the music industry from transitioning to a blockchain-based music ecosystem.

The biggest culprit for Heap's disastrous launch was the level of difficulty involved in purchasing the single.[111] Purchasing "Tiny Human" on the blockchain-based start-up Ujo was difficult to navigate for even the most avid blockchain enthusiasts.[112] After clicking "Download" on the page, the instructions required the creation of an Ethereum wallet,[113] followed by a redirection to a Bitcoin exchange so that the user could buy Bitcoins and then exchange them for ether (the cryptocurrency used by Ethereum[114]). Acquiring the Bitcoins required buyers to either send their money and some government identification to an unregulated exchange, and

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107   *Id.*

108   Adeyanju, *supra* note 100.

109   *Id.*

110   *See* Gerard, *supra* note 98.

111   *See* Hatching Amazing, *supra* note 97.

112   *Id.*

113   *Id.*

114   Ritesh Modi, *Introduction to Blockchain, Ethereum and Smart Contracts — Chapter 1*, Medium, May 16, 2018, https://medium.com/coinmonks/https-medium-com-ritesh-modi-solidity-chapter1-63dfaff08a11, [https://perma.cc/EX9P-8ZBN] (on file with the Harvard Law School Library) ("Ether is the currency of Ethereum. Every activity on Ethereum that modifies its state costs Ether as fee and miners who are successful in generating and writing a block in chain are also rewards Ether.

finally, after all this, a download key appeared.[115] Adding to the confusion, the entire process was incredibly glitchy and slow.[116]

The complicated launch of "Tiny Human" illustrates the primary barrier to blockchain technology's widespread adoption by the general public, and that is the current level of difficulty associated with using and understanding cryptocoins and blockchain-based platforms. At the moment, the variety of widely used cryptocurrencies, such as Etherium and Bitcoin, make the process of buying coins and converting them even more confusing to the average consumer.[117] The use of different blockchain currencies for different content creators would cause mass confusion among these content creators' fan bases.[118] As a result, the push for blockchain technology's widespread implementation throughout the music industry will likely fail if this issue persists.

Thus, while the blockchain ledger has the potential to provide a quicker and "seamless experience for anyone involved with creating or interacting with music,"[119] current confusion over the complexity of the payment system in place derails the blockchain ledger's popularity among the general public.[120]

Keeping all this in mind, the blockchain's functionality grows in proportion to its population (i.e. its overall usage). A larger network equates to greater information sharing and increased transparency. Following this logic, if blockchain technology does not gain significant traction among the general public, the music industry is unlikely to adopt blockchain technology as a whole. Then, the technology will remain experimental in the context of the music industry until the vast majority of the public, and fans in

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Ether can easily be converted to dollars or other traditional currencies through Crypto-exchanges.").

[115] *See* HATCHING AMAZING, *supra* note 97.

[116] *Id.*

[117] *See generally* HATCHING AMAZING, *supra* note 97.

[118] *See generally id.*

[119] *See* Heap, *supra* note 3.

[120] CUSTOSTECH, *supra* note 106. Confusion over the complexity of the payment systems associated with cryptocurrencies has derailed the blockchain ledger's *overall* popularity among the general public. Keep in mind: a plethora of blockchain-based technologies do not require users to utilize cryptocurrencies at all. For example, consider CustosTech's statement on its website, noting that their clients need not ever interact with cryptocurrencies: "The Custos team comprises of some of [sic] engineers and economists specializing in cryptocurrency. They take the responsibility of managing the Bitcoin. As a client, you will never interact with the Bitcoin directly. You will also be shielded from any volatility of the currency. The Bitcoin and blockchain form a part of the back-end of the technology."

particular, become more comfortable with blockchain technology and the cryptocurrencies that utilize the blockchain ledger as a platform.

B. Restrictive Governance and Regulation

Regulation of blockchain technology would, without question, corrupt the integrity of a technology that prides itself on its decentralized nature. The incorporation of a central regulating source, such as the government, opens up the possibility and the obvious danger that erroneous and/or dangerous information is either accidentally or purposefully entered into the distributed ledger (the blockchain). " Governance and regulation could have consequences for the integrity of the data, given the obvious danger that erroneous information is entered, accidentally or otherwise, onto an immutable ledger."[121] In effect, regulation would compromise what is arguably the most promising attribute of blockchain technology – its *security*.

As a result, proponents of blockchain technology and its value within the music industry may be dissuaded of the blockchain ledger's potential if it is in fact regulated. While the fear of regulation and centralization remains a looming threat to the future of blockchain technology's successful implementation and widespread usage in the music industry, no discussion of when or how legislatures would deal with the issue has yet arisen. Though, as blockchain technology's influence and reach grows, those with the most to lose by transitioning to a blockchain-based music industry, such as CMOs, publishers, and producers, will likely lobby for its regulation (in the context of the music industry).

C. Widespread Adoption

1. Resistance from Current Incumbents

Whether major labels, publishers, and CMOs will willingly adopt blockchain technology remains unclear; these incumbents have little genuine incentive to innovate.[122] Intermediaries and financiers will likely attempt to squash any form of a blockchain-based revolution that develops within the music industry. Even so, these incumbents are outmatched in size and influence, by content-creators and fans seeking to change the com-

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[121] Blockchain For Creative Industries Research Cluster, *Music on the Blockchain*, MIDDLESEX UNIVERSITY, July 2016, at 18, *available at* https://www.mdx.ac.uk/__data/assets/pdf_file/0026/230696/Music-On-The-Blockchain.pdf, {https://perma.cc/P64P-SJYR}.

[122] *See* HOWARD, *supra* note 1, at 10.

plex of the music industry *now*. If the blockchain ledger is adopted in mass by the general public (i.e. consumers) and the major regulatory and financial institutions that influence the general public, then these resistant incumbents will have no choice other than to conform at the will of content creators and fans alike.

    2.   Likelihood of Widespread Adoption by Leading Institutions

    Nearly all financial institutions currently engage in blockchain-based research.[123] Globally, venture capitalists invested more than one billion dollars into blockchain-based startups in the first five months of 2018[124] and one blockchain-based payments company, Circle, is the beneficiary of $110 million.[125] Prominent proponents of blockchain-based technology have begun to reveal themselves, near and far. Even Dubai, representing the United Arab Emirates, recently announced that it set its sights on becoming the first blockchain-powered government by 2020.[126] With content creators, incumbents, and fans unlikely to shift to a blockchain-based music industry overnight, the global corporate and political investment surrounding blockchain technologies lends credence to the popular belief that adoption of blockchain-based platforms by large corporations can become widespread enough to disrupt society as a whole, inclusive of the music industry, in the not so distant future.[127]

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    [123] Marco A. Santori, Craig A. DeRidder & James M. Grosser, *How Blockchain Will Revolutionize Commercial Transactions*, Law360, A LexisNexis Company (2016) (on file with the Harvard Law School Library).

    [124] Jason Rowley, *With at Least $1.3 Billion Invested Globally in 2018, VC Funding for Blockchain Blows Past 2017 Totals*, TechCrunch, https://techcrunch.com/2018/05/20/with-at-least-1-3-billion-invested-globally-in-2018-vc-funding-for-block chain-blows-past-2017-totals/, [https://perma.cc/36V6-P6B6] (last visited Nov. 17, 2018) (on file with the Harvard Law School Library).

    [125] Romain Dillet, *Circle Raises $110 Million (or 13,300 BTC)*, TechCrunch, https://techcrunch.com/2018/05/16/circle-raises-110-million-or-13300-btc/, [https://perma.cc/P2YP-YJPT] (last visited Nov. 17, 2018) (on file with the Harvard Law School Library).

    [126] Supara Dutt D'Cunha, *Dubai Sets Its Sights on Becoming the World's First Blockchain-Powered Government*, Forbes (Dec. 18, 2017), https://www.forbes.com/sites/suparnadutt/2017/12/18/dubai-sets-sights-on-becoming-the-worlds-first-block chain-powered-government/, [https://perma.cc/WA6S-GGP4].

    [127] *See* Blockchain For Creative Industries Research Cluster, *supra* note 121, at 21.

3.   Reaching Critical Mass

Cryptocurrencies are challenging to use, and the prospect of purchasing and transferring cryptocoins can deter buyers from using blockchain-based purchasing platforms.[128] Additionally, it remains uncertain whether the majority of buyers feel comfortable enough with the high level of transparency the blockchain ledger guarantees.[129] Fans may not wish to share data about their transactions on a public ledger, for whatever reason.[130] Similarly, many content creators may feel the same way; more established content creators, in particular, may wish to downplay their earnings, fearing complete disclosure would make fans less willing to purchase their work.[131]

Emerging blockchain-based publishing platforms, such as Dot Blockchain Music, offer content creators a solution to this privacy issue, allowing content creators to limit the amount of information they publish on the public ledger.[132] Specifically, Dot Blockchain Music does not require content creators to share any data beyond what the startup refers to as the "Minimum Viable Data."[133] For content creators, this approach alleviates the perceived pitfalls of complete transparency on the blockchain ledger, but a comprehensive shift to a blockchain-based platform may appear too tedious an undertaking for content creators and fans alike.[134]

For example: all content creators are financially incentivized, in theory, to join Mycelia's Creative Passport project, so it follows logically that over time most content creators will join Heap's network. Nevertheless, recent studies in the field of behavioral economics put forth a new axiom of the "irrational consumer," displacing that of the "rational consumer."[135] Formerly, behavioral economists advanced the following theory: since consumers are rational beings, they make rational decisions to maximize their pleasures.[136] Newer studies, instead, posit that consumers are in fact irra-

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[128] *See generally* HATCHING AMAZING, *supra* note 97.

[129] *See* Blockchain For Creative Industries Research Cluster, *supra* note 121, at 13.

[130] *Id.*

[131] *Id.*

[132] *Id.*

[133] *Id.*

[134] *See* Derek Thompson, *The Irrational Consumer: Why Economics Is Dead Wrong About How We Make Choices*, THE ATLANTIC (Jan. 13, 2013), *available at* https://www.theatlantic.com/business/archive/2013/01/the-irrational-consumer-why-economics-is-dead-wrong-about-how-we-make-choices/267255/, [https://perma.cc/8FER-6ZXA].

[135] *Id.*

[136] *Id.*

tional and prone to a variety of biases and prejudices; moreover, consumers tend to avoid making difficult decisions.[137] In short, laziness most often trumps logic.[138]

Accordingly, while content creators are financially incentivized to contribute to Mycelia's Creative Passport project, new developments in the field of behavior economics point to the fact that financial incentives may not be enough.

Nevertheless, if leading societal institutions collectively adopt the blockchain ledger as a resolute alternative to our current transactional contract-based system, then hesitant content creators, resistant incumbents, and the critical mass will be obliged to follow.[139]

VI.   CONCLUSION

Ripe with opportunity, the blockchain ledger offers content creators a promising solution to a decades-old problem with the antiquated system in place – a new music ecosystem founded on principles of fairness and transparency.

The blockchain ledger, a powerful self-publishing platform, solves various major issues within the music industry seemingly all at once, enabling content creators to bypass the complexities of the modern day music industry. The application of blockchain technology and, specifically, smart contracts to the music industry instantaneously resolves the ongoing battle between content creators and intermediaries.[140]

Smart contracts facilitate quick, accurate, and secure payouts for content creators, altogether eliminating the need for intermediaries such as labels, publishers, CMOs, and attorneys. Next, content creators, utilizing the blockchain ledger to track sales of their music, will finally be able to forge a more profitable relationship with their fans. Moreover, implementation of a global copyright database solves the troubling information access asymmetry between content creators and intermediaries.

Startups such as Mycelia, Ujo, Vevue, and CustosTech, among many others, demonstrate the effective utility of the blockchain ledger to solve a variety of diverse issues within the music industry. Even so, while the blockchain ledger offers the transformative power to "change . . . well, eve-

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[137]   *See* Thompson, *supra* note 134.

[138]   *See id.*

[139]   *See* DANIEL KAHNEMAN, THINKING, FAST AND SLOW 19 (2011).

[140]   *See* Heap, *supra* note 3.

rything,"[141] there are no doubt serious barriers to its widespread usage and adoption within the music industry. These barriers include, but are not limited to: potential governance and regulation, difficulty using cryptocurrencies, and resistance from current music industry incumbents.

Thus, for the blockchain ledger to effectively remedy ongoing issues within the music industry, fans and content creators alike will need to take a leap of faith and embrace blockchain technology and the changes it brings about for what they are: *revolutionary*.

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[141] Oscar Williams-Grut, *Goldman Sachs: 'The Blockchain can change. . . well everything'*, BUSINESS INSIDER (Dec. 2, 2015, 10:58 AM), https://www.businessinsider .com/goldman-sachs-the-blockchain-can-change-well-everything-2015-12, [https:// perma.cc/DPY7-ZLX7].