

Blockchain in Music Industry & Copyright Infringement

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Abstract—The landscape of internet music is changing as blockchain-based music platforms start to emerge. These platforms are designed to cut away the middlemen, such as collective management organizations and commercial users, allowing right-holders to deal directly with end users. The issues in the past related to the hegemonic role of all the middle agents in the proper management system are already recognized to be solved by blockchain. However, there is still substantial discussion surrounding the practical limitations of blockchain. In light of that, our learning can help us in getting a better understanding of the genuine potential of blockchain technology in the music world by getting rid of the archaic, hierarchical framework, it offers a basis which can unite the whole value chain and reform the music industry, providing one settlement toward the current conflict between artists and mediators. Dismantlement and rebuilding today's intricate system will take time.

Index Terms— Music Industry, Global music copyright database, Payment, Decentralized, Organization, Networking, Financing.

I. INTRODUCTION

This article concentrates on understanding the present inclination in the way people access and tune in to music has fundamentally changed due to digitalisation and the internet nowadays. The requirement of a regular proper structure for protection of the involved musicians and copyright owners has risen from quick technology advancements which changed how music made things and dispersed them, and used for profit online. From a long time, artists have fought to safeguard their electronic creations, frequently discovering that they have been validated and reissued over their access over the internet in user-generated entertainment platforms. This taking advantage is mostly free of cost or might lead to compensation on the smaller side. Presently, the music business is worth US \$54 billion around the globe, which allows the recording world to be responsible for approx. US \$28 billion in net-worth. The world's economy grew for the fourth year in a row in 2019, at its fastest rate since 1997. This profit ratio was mostly fabricated by a 33% increase. An increase in premium streaming services, which now represents 41% of total revenue. Therefore it's obvious how much money is at stake and how important new digital methods of profiting from music are in the current online music industry, (including copying, distribution, premium downloads, premium streaming services etc.). Due to this, the requirement to create an appropriate lawful structure which include all these new applications and types of exploitation arises.

In this study we explore the introduction to the world of blockchain which may offer a chance to modernize the structure of the music business and reinvent the protection of intellectual property and utilizing protected works.

There is a claim that blockchain could bring about long-needed transparency, predictability, and trademark ownership and relay security of juridical obligations, thus forwarding a trustworthy business in the contractualization of licensing terms. This is a blockchain-enabled system is no-alteration, unchangeable, fair, open, more economical, extremely standardized, & computerized. Information that is clear and open makes it easier to identify rights holders, which in turn results in more equitable distribution of royalties on a global scale. Moreover, when using the tools of smart contracts, blockchain could bring into the microscope a legitimate adjustment mechanism which would calculate the original property of rights; accounted calculation of income for all uses of work depend on the directives saved on papers by the partners; and fast, smooth automated process of nobility.

Usually, blockchain is shown as a non-static, sophisticated technology, used as a restraining force for securing and reconstructing the online music business by improving the process of users communicating with the technology. However, it must be remembered that, from a technological and scientific standpoint, only a small number of the conceivable improvements described today are feasible and might be created from both a technological and lawful standpoint blockchain and to estimate the points of change it might imply to the music profession. In the early stages, it describes terminology to characterize the significant technological elements of blockchain. Then, present lawful issues within the music business are discussed. After that, blockchain technology answers what affects the value process when introduced, first from the angle of professionals, from what record labels, producers, and institutes for management. Moreover, there are considerations for blockchain to overcome the value chain for disintermediation, for allowing direct communication between creators and listeners.

II. ABOUT BLOCKCHAIN

A. What is Blockchain?

At its foundation, blockchain is a distributed digital ledger that holds any type of data. Cryptocurrency transactions, NFT ownership, or DeFi smart contracts can all be recorded on a blockchain. Although this type of data can be stored in any traditional database, blockchain is special in that it is completely decentralised. Imagine an Excel spreadsheet or a bank database, but instead of being kept in one place by a single administrator, a blockchain database is held on numerous identical copies on numerous machines dispersed throughout a network. Nodes are the collective name for these distinct computers.

B. Types of Blockchain

Public Blockchain : These blockchains are totally amenable to implementing the decentralisation concept. Anyone with a computer and access to the internet can join the network, there are no limitations. This blockchain is accessible to all users because its name is public, which implies it is not controlled by anyone. Anybody with access to the internet and a computer with decent hardware can take part in this open blockchain. Each computer in the network has a copy of any other nodes or network blocks that are present. We can also carry out transaction or record verification in this open blockchain. Public blockchains that are secured by proof of stake or proof of work potentially replace established financial systems. The smart contract that made it possible for this blockchain to facilitate decentralisation is its more advanced aspect. The public blockchain example: Bitcoin and Ethereum.

Private Blockchain : These blockchains are not as decentralised as the public blockchain, which is more secure than the others because only a small number of nodes can participate in the process. Compared to a public blockchain, these are less transparent. Only certain authorised users have access to them. Blockchains run on a private network. In this, only a select few individuals are permitted to join a network within a business or organisation. This blockchain, with proper security and maintenance, is a great asset for securing information without exposing it to the public eye. As a result, businesses use them for internal auditing, voting, and asset management. Hyperledger and Corda are two examples of private blockchains.

Hybrid Blockchain : It is a hybrid of private as well as public blockchain content, with some parts controlled by one organisation and others made visible like public blockchain. It is a hybrid of both public, private blockchain. There are permission-based as well as permissionless systems in use. Smart contracts provide users with access to information. Even if a primary entity does own a hybrid blockchain, the transaction cannot be altered. It offers a more comprehensive solution towards the health-care industry, authorities, real estate, and finance companies. It provides a solution when data must be made available publicly but must be protected privately. Ripple network and XRP token are Hybrid Blockchain examples.

Consortium Blockchain : It's a creative approach to addressing the organization's needs. This blockchain validates transactions as well as initiates and receives them. Federated Blockchain is another name for it. This is a novel approach to meeting the needs of the organisation. Part of it is public, and part of it is private. The blockchain is managed by more than one organisation inside this case. It has a lot of potential in companies, banks, as well as other payment processors. The organisations' food tracking frequently collaborates to their own sectors, making it a federated way to solve ideal for their use. Tendermint and Multichain are two consortium Blockchain examples.

C. Blockchain In Music Industry

Blockchains enable the creation of a distributed database with immutable and transparent data. The industry can use blockchain technology to create a global database for music copyright and directly boost the earnings of musicians as well as copyright owners, as well as improve transparency besides displaying transactions with in public chain.

- A global music copyright database

There are numerous online music platforms available, including Google Play Music, iTunes, but also YouTube. Company's database stores information about the tunes, such as recorded sound, underlying lyrics, and copyright owner data. The data about tunes in various databases differs slightly. These disparities are difficult to reconcile. Blockchain is a decentralized public ledger. Whenever a node connects to blockchain network, all information is automatically updated, refreshed and synchronised, and every members have the similar information. Blockchain technology finally enabled creation of database file to copyright music.

- Payment without the involvement of third party

Many intermediaries implicated in music distribution, like copyright agents, charge fees. After all of the deductions, copyright holders only left with a tiny sum of money. Furthermore, numerous platforms pay royalties via bank transfer. The procedure is quite slow, taking several days to reach intermediary company and months or years to reach actual right holders. The blockchain, as a stable P2P network platform, can create a direct link among musicians as well as consumers. It can ensure that musicians receive royalties on time and unnecessary deductions from intermediaries are ignored. The royalty payment option then wired with agreement with smart contracts. Once the music been downloaded, the income then automatically distributed to various parties without need for intermediaries. This will reduce deduction of 3rd parties as well as improve the efficiency of royalty payment transmission.



Fig 1. Blockchain flow in Music Industry

III. LITERATURE SURVEY

Tran Ngoc Linh Tam [1] explained the usage of blockchain in context of music which has the potential to address lengthy difficulties with online usage of materials, crediting the right holders, financial flows, and data flows. This is great news for the music business. Blockchain technology provides the possibility of providing right holders greater control over their pieces of art by reducing the amount of "middlemen" interference. Blockchain, however, could also be said to have some drawbacks. In order to completely reveal the truth about blockchain with a goal of exploring its capabilities and minimizing its existential barriers, more forward-thinking measures by technology newcomers into the music industry are therefore needed.

Na Li [2] talked about the work that developed a cutting-edge Hyperledger Fabric-based blockchain paradigm that makes use of different encryptions and arguments. The music files are put into practice as NFTs, and these NFTs then activate the smart contracts. The success of securing the copyrights of the music industry's creators is also evaluated using sophisticated artificial intelligence systems.

Rafik Hamza, et al [3] said in his study that the issue of intellectual property rights is examined in the context of cross-data platform services. The paper's research makes two different tries to examine the rights to property rights. The main challenge is to provide a non-technical security framework for controlling ways of rights to big data.

Luca Turchet, et al [4] discussed the study's goals to evaluate the practical limitations of such integrating technology, recommend fields for additional studies, and notify developers a few of the issues that will need to be resolved. Researchers' priority could change with the arrival of this technology to implementing blockchain-based security protocols for IoMusT applications. The blockchain's characteristics can be utilized by the BloMusT to upgrade and improve the state-of-the-art IoMusT technologies. The development and widespread use of such technological enablers could be viewed as leading to services for musical stakeholders which have never before been observed. But before this paradigm's full potential can be achieved, a variety of scientific challenges have to be resolved.

Silvia A. Carretta [5] examined the Blockchain technology that seems to hold the potential to transform the entire music value chain. By introducing a new legal paradigm for the protection of works of music, it is likely to bring artists benefits. There are still some technical and legal questions to be resolved before this technology could be accepted by parties of the value chain and the general public.

Sijia Zhao, et al [6] explained that music copyright is the right of artists to reproduce, perform and distribute a musical work. Many countries around the world have published related laws and rules to help protect this kind of right. There are still some issues of concern in the digital music industry, including rights and licensing management, levying fees from intermediaries, and piracy problems.

Luis Claudio Arcos, [7] talked about the Blockchain technology which is just the beginning to make an impact upon the entertainment and creative industries. It can aid media companies generate efficiency and boost rights attribution. A very unique selling point is for it to be adopted by large companies. Leading musicians' support can also be needed for it to achieve enough traction.

Ignacio De Leon, et al [8] examined that It is unclear if blockchain will really harmonize the fragmented music industry or add to the cacophony of issues. Policy makers must help design policies to bolster the music industry, ensuring well deserved compensation to artists and promoting budding talent. Despite the pervasive simplistic notion that technology liberates and empowers, not all technological change is necessarily benign or benefits artists. The advent of the internet ushered in very destructive file sharing business models. Policymakers struggled to deal with this and, while eventually Napster's model was deemed illegal, it had already done considerable damage to the industry that still reverberates. We recognize the unenviable task of policymakers to infer policy implications of a technology that is in its incipient stages, but as the saying goes, let us think of the future, after all we will live in it.

Marcus O'Dair, [9] proposed that In recent months, there has been a substantial amount of hype around this technology, and some of the claims have at the very least been made too early. Some of the organizations discussed in this report are already fully operational, at least in beta form; as this report goes public, Dot Blockchain Music (an organization) expects to have a minimal viable product in a matter of weeks. As opposed to that, organizations examining blockchain's potential technology for recorded music is still very much a work in progress.

Yanhui Liu, et al [10] discussed that the violation of electronic patents is getting worse and worse. This paper harnesses the tamper-proof, decentralized, and other properties of this technology to construct property safeguards. Without the assistance of a reliable third party, the system then uses smart contracts to automatically handle the complete whole cycle of digital rights.

Camila Sintonio, et al [11] suggested that the introduction of blockchain-powered models could completely alter the organizational structure of the music industry. The lack of transparency throughout the chain, musicians' weak bargaining position, and ineffective royalty payment mechanisms were some of the primary problems found by the investigation of its supply chain models. The catalogs of Musicoin, Resonate, and Ujo feature primarily independent musicians and labels. There wouldn't be any changes if platforms were paid to be used; instead, there would be an exchange. It's possible that the value the artists captured would start to decline again. But there's no denying that blockchain technology has the capacity to revolutionize the music business.

IV. POTENTIAL USE CASES

Among the many lauded applications of blockchain technology, several are quickly evolving inside the music industry. Blockchain advocates are mainly conducting a study major sectors of industry require improvement: virtual asset administration and royalties billing allocation. To recap, content protection refers to the system that

controls copyrighted content, such as tunes, whereas distribution of royalties makes reference towards how income is assigned to every group involved in the making of composition of tunes. The remainder of the report explains the reason block chain technology isn't essentially an answer for the current problems plaguing the tunes industry, in addition to the evolving use instances within these fields that are fuelling the hype.

A. Reviewing the Rights Management Problem

The record industry has indeed tried it, A number of alternatives to the problem of digital rights, which has been shared similarity with blockchains as it was mentioned previously in the rights management section. Even though All of these current efforts were a failure, a same reasoning applies used once more to solve those problems, but this time to use a different technology. Numerous articles describing how Blockchain technology could be utilized as just a global database in order to reestablish content protection fail to recognize that this technology is only a tool, not a software, that can address this issue. The justification for adopting this, which are listed below, are identical to those in relation to the GRD.

As an example, a few among the articles mention how blockchain is a network which can offer decentralized, global, open access in a secure and reasonable manner. They as well contend that blockchain technologies have the potential to eliminate need for middle-men, effectively connecting the creator and the consumer. At last, the creators emphasize the uniqueness of this technology information storage properties, such as time-stamping and cryptographic hashing, can include metadata —information referring to the ownership information of a musical work—of every song into records. It's important to note the most of articles use the verb "could" rather than "does."

This is due to the fact that the above technically advance form of technology, still it also does not exist for entertainment business, but it also does not exist for similar purposes which the GRD failed, specifically in terms of Transparency, storage, irrefutable records, and metadata are all important considerations, and global openly accessible. It's not really a technical issue; if the GRD was unsuccessful due to technological restrictions, trying to implement blockchain "would" help resolve the protection management issues. Even though the music industry acknowledges the need for a metadata, there is little an inducement to supply it. As it was previously stated, This predicament is the result of these practises. Artist contracts are difficult to understand, there are no industry standards, and file maintenance has been practically non-existent.

This jumbled mess of private data earns record labels, publishers, and Performing Rights Organizations (PROs) because it is less expensive and did leave undeclared earnings for them to profit from Blockchains are not going away and fix this issue; instead, they are going to exacerbate it. If this took arduous and extreme efforts to persuade PROs to incorporate then that information collectively during GRD initiative, it'll be similarly difficult to persuade PROs as well as tags to conform again and the inability seems to be fresh and loans is in the billions and billions. Furthermore, because PROs will be wagering on a brand-new business strategy with no proof of success to back up the risks, this time may necessitate even stronger persuasion tactics. Before such a big industry segment makes the decision to implement a new system, particularly one that aims to alter its conventional methods and reduce profits, the positives must always outweigh the negatives. If blockchain supporters were able to obtain the collaboration of all music organizations and blockchain's abilities had been progressed to be enough, these would be additional benefits.

B. Cons for using blockchain

The use may not be needed at all to resolve an issue rooted in poor commercial practices Aside from beginning. Aside from the initial massive fees and the problem of scalability, there are a number of other factors to consider before deciding this technology over the traditional private mode of a centralized database. For example, supporters argue that removing intermediaries such as publishers will give creators more control over their intellectual property rights and allow for more accurate data collection .Advocates also argue that cutting out the middle - man will return profits to creators rather than lawyers and distributors. This is simply incorrect. To construct the system, aggregate information, make sure the database runs perfectly, and so on, blockchain will need to establish intermediaries, as well as service providers.

Even though blockchain cannot function entirely on its own, money will have to be generated from somewhere in order to pay the new middlemen to keep this complex system running, and this will most likely be deducted from those who benefit from it: the artists. Furthermore, as blockchains are untamperable, lets say if there was a centralized entity to approach, that data cannot be modified or erased without affecting the whole process (for example, removing one file from the last five years adversely affects the entire chain). For an industry in distress because of its long-standing adherence to antiquated business practices with lawsuits over incorrect data, the very last thing the industry wants is a lawless system without no "edit" button.

V. FUTURE TRENDS

BCI believes blockchain technology has a strong ability to impact the record industry in four specific areas:

A. A networked database with information about music copyrights

Any song with recorded sound includes at least 2 copyright laws are required: one covering the sound recording on its own, that belongs to the entertainer and that the music label, and one for all the unused lyrics and music, who belong to either the lyricist or the composer as well as the music publisher. A cryptographic hash could be used to store these on the blockchain. However, advancements in authorship and identification would not be sufficient to compensate for the fact there is not even a single database which documents owner of all song and audio copyrights. Rather, there seem to be innumerable databases, none of which are completely comprehensive; information can differ from one database to the next, and there is no central authority to resolve conflicts. To rectify whatever mistakes, every specific database should be consulted.

B. Quick and hassle-free due payments

Royalties' transactions, as the underlying words and the recorded sound and tunes were slow. It might take a long time for funds to even reach rights holders' bank accounts. It's because fans can hear tracks with the click of a button that appears antiquated 'Friction' also a problem because, by the time the income takes to reach service charges might be deducted from rights owners by more than a performance rights organization, or PRO (Rethink Music 2015, p20). Blockchain This is something that technology does have the potential to alter situations in a variety of ways. the smaller operating cost of the cryptocurrencies, which cover a giant area of deductions, Smaller payments are typically only possible upto eight decimal places. This is incredibly significant due to small size of pretty standard streaming payments. It would enable content producers to receive 'tips,' even if the amounts were small.

C. Openness along the value chain

There's a scarcity of disclosure in the recorded music 'Value chain' Substantial money is available. Sometimes it is given to the wrong group,' whereas 'Big royalties revenue points' which might wind up outside the creator's grasp into a "large black box," then legal owners of the royalty revenues which can't be verified due to the rareness of an industry-wide structure allowing for the use of right to keep the property. Blockchain provides transparency, allowing the rightful owner to be paid via the value chain.

D. Availability of other financing sources

There is clearly a lot of anticipation about the potential applications of blockchain, web3, & metaverse technologies to the music business. Music was always about social gatherings and activities, and new platforms built on immersive and interactive technologies give people additional opportunities to exchange and enjoy music together. This might also lead to a nicer arrangement for creators and means for fans to make sure all the money reaches the people they would like to encourage when combined with blockchains, cryptocurrencies, and smart contracts.

VI. CONCLUSION

The right to reproduce, perform, and distribute a musical piece is known as music copyright. Many nations have released relevant legislation and regulations to support the protection of this form of right. However, there are still certain concerns in the digital music sector, such as the administration of rights and licencing, collecting fees from intermediaries, and pirate issues.

In this, we have studied Blockchain and Smart Contracts-based system to safeguard musical works' intellectual property rights and those of its owners. In our application, we build a bridge between artists and fans. We don't just concentrate on automatic royalty distribution using the blockchain and smart contracts, like other applications that just address the payment function of the music industry, but also address the problem of musical compositions being pirated.

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