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**Blockchain Technology and Music Industry
Applications and Challenges**

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1.Introduction

The recent and ongoing digital revolution has had a huge impact on music: from creation to distribution, promotion and monetization, every phase has been irreversibly shaped by the unstoppable race of progress. Physical sales account only for the 6-10% of the music industry's revenue, while streaming now sits around 80-85% of the total (The Verge, 2019), making it a dominant force for the industry. Although online distribution established a more inclusive space- where artists can create and share their creative work without the need for a label- this revolution also comes with several downsides and issues to consider. Digital music distribution is indeed often subject to controversies. Arguments against this streaming-based system are usually linked to the low royalty payments and the excessive bureaucracy that makes music delivery intricate and royalty collection slow and ambiguous. It is in this background that the technology of Blockchain, first introduced by Satoshi Nakamoto in 2008, could position itself as a revolution in the music supply chain. In this essay, we are going to analyse in which ways blockchain's features could constitute an alternative to the traditional music ecosystem by comparing it with a possible future model, as well as highlighting which challenges and edges may accompany its implementation.

2. Blockchain technology

Blockchain is defined as “an open, distributed ledger that can record transactions between two parties in a verifiable and permanent way” (HBR,K.R.Lakhani 2017). Blockchain is basically a database, but with a particular data storage mechanism. Its main feature, which reveals itself in its name, is that data is stored in groups (blocks) that are chained together in chronological order so that every new information is compiled into an always newly formed block. This fact assures the presence of an irreversible timeline of decentralized data, with each block given an exact timestamp as soon as it is added to the chain (Investopedia, L.Conway, 2020). The strength of this system lies in its digitalization, where every information can have a digital record or signature that could be identified, validated, stored or shared (HBR, K.R.Lakhani, 2017). The deposited information is usually represented by transactions, however, it is also possible to store other types of data such as legal contracts, state identification or inventories. This record of data remains irreversible, permanently recorded and trackable to anyone. Another important feature of blockchain is decentralization: “rather than having a central administrator such as a traditional database, a distributed ledger has a network of chronologically involving replicated databases, synchronized by the use of the internet, and visible to anyone within the network” (L.C.Arcos, The blockchain technology on Music Industry, 2018). When operating Bitcoin transactions, each computer (which is called a node) that holds its blockchain is operated by a different individual or group, so that in order to operate alterations or validate a transaction it is required the consent of every node. In this way, the history of transactions is transparent and every change needs to be accepted by the majority of the nodes before being implemented, ensuring that alterations occur in its best interests. Other than transparency, decentralization and

immutability, the characteristics of blockchain technology are disintermediation and programmability (Digital Innovation, La Blockchain, 2019). Blockchain platforms allow users to manage transactions without intermediaries (meaning without the need of central trusted entities) and actions can be programmed upon the occurrence of certain conditions. With time, blockchain technology has unbound itself from its sole usage as a platform for Bitcoin transactions and it has started to explore new applications. Even if its main implementation remains rooted in the financial sector, blockchain technology is already used today in many other fields such as public administration, logistics, insurance and digital advertising.

The nature of Blockchain makes it the perfect candidate for a possible revolution in the world of the music industry, especially when it comes to addressing the issues of digital distribution. The main feature of blockchain that would result useful in the music distribution context would be its disintermediation. The current music supply chain model is based on a series of transfers that weigh down the process by fracturing the revenue and sacrificing creative rights. By reducing the number of stakeholders involved in the operation, not only the royalty revenue timeline would be reduced and the flow of payments would speed up, but this would also prevent a monopoly on this mechanism. Moreover, the low transaction costs of cryptocurrencies make micropayments feasible, which is particularly useful in the context of streaming, where the size of payments is typically small (The Blockchain Technology on Music, L.C.Arcos).

Blockchain's transparency would constitute another relevant feature. Due to the excessive bureaucracy and the many stakeholders involved, it is also common that funds are being paid to the wrong party or details of streaming reports are being hidden behind Non-Disclosure Agreements, making it difficult for artists to get access to valuable aggregate data regarding their streaming history. Moreover, the absence of transparency is one of the facilitating agents behind the Black box phenomenon. Black box royalties consist of money collected from "unclaimed, unmatched, delayed or otherwise unpaid digital royalties" (Digital Music News, P.Resnikoff 2017). The income can arrive from audits, adjustments or international sources, and last year it amounted to a total of \$2.3 billion (Songtrust.com). This money is then either put on hold or distributed into the industry highest earners that are registered to the same performance rights organisation (Newtones, Understanding Black Box Royalties, Aurelien). The transparency of Blockchain could solve these issues by matching the work with the respective copyright holder and tracking derivative work through the value chain. In this way, a peer-to-peer system would be created where all the participants would be involved at the same level. The additional value brought by blockchain would ultimately be constituted by the creation of a networked database for music copyright information (Music on the Blockchain, M.Dair, 2016). Both the sound recording and the underlying words and music could be stored on the blockchain through a cryptographic hash, available and always updated to all users (Music on the Blockchain, M.Dair, 2016).

The third way in which Blockchain technology could renovate the music industry system is by providing alternative sources of capital for artists. Investors might adopt a new business model, in which they offer resources, networking and activity in exchange for a stake of the artist's income and crowdfunding could introduce new funding and investment options such as tokenization of real-world assets and rapid transactions (Aetsoft, Blockchain development for Crowdfunding). If we had to compare the current music industry model with a possible blockchain one, we could highlight how in the second option the music industry supply chain would radically change the number of its stakeholders by reducing them. The actors involved in the current music industry supply chain are the artist/songwriter, the producers and record engineers, the label, publisher and aggregator. From there, the aggregator sends the product to digital downloads, streaming and radio, while the record label deals with the physical release of the album, radio, live performances and films sync. Along with the publisher, the record label has to deal with Performing Rights Organisations. The scheme is summarized in the figure below.

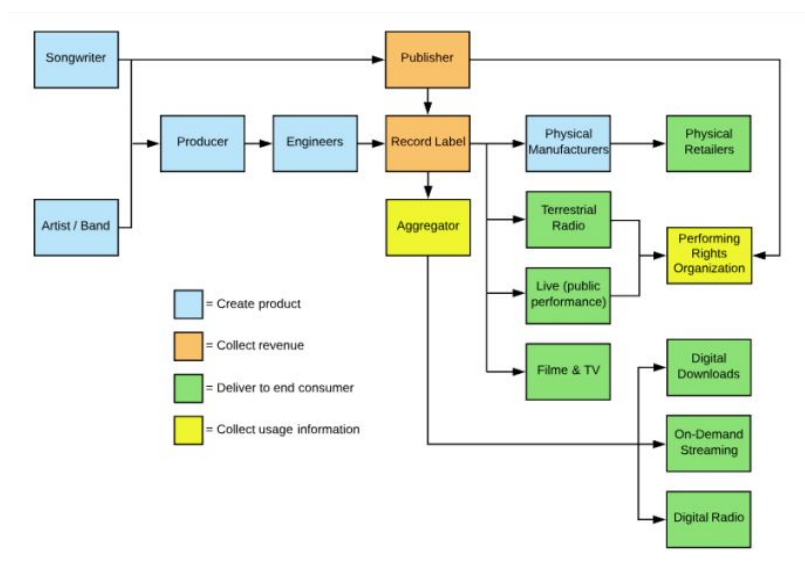


Figure 1. Current music supply chain (The impact on Blockchain on Music Industry, C.Sitonio, A.Nucciarelli, 2018)

In the present scheme of things, artists need to rely on various intermediaries. The aggregators allow artists to release music even without the help of a record label, but in every case “the value captured by is not evenly distributed among the stakeholders” (The impact on Blockchain on Music industry, C.Sitonio, A.Nucciarelli, 2018). Both major and independent artists are affected by this system in the revenue and flow of payment processes. With a model based on Blockchain technology, the artists and the audience could be directly connected without middle links.

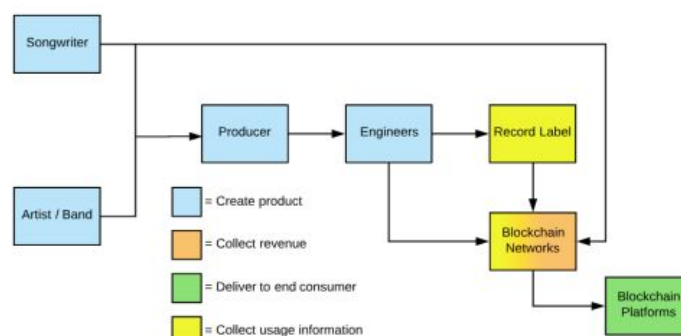


Figure 2. Possible Blockchain-based music supply chain (The impact on Blockchain on Music Industry, C.Sitonio, A.Nucciarelli, 2018)

As we can see from the figure, in this model the aggregator and the publisher are not present anymore. The main difference lies in the direct link between record labels and Blockchain networks: according to this system, music would be directly published on the networks, being accessible to the consumers and generating clearer royalty revenues (The impact on Blockchain on Music Industry, C.Sitonio, A.Nucciarelli, 2018). Substituting the aggregator with the Blockchain network would also indeed translate into fast transactions: when the music is purchased, the transaction is registered on the new block. As soon as all the stakeholders approve it, the block is added to the chain and the cryptocurrency payment is immediately sent to the rightsholder. Another option that could be implemented would be not to reduce the number of intermediaries, but to change their role. Blockchain networks could deal with revenue collection ensuring transparency, while record labels would continue to provide marketing assistance and collect usage information (C.Sitonio, A.Nucciarelli 2018).

Currently, Blockchain is already being used by many music industry companies. Mediachain, which was acquired by Spotify in 2017, is a peer-to-peer data solution for connecting applications to media and information about it. When two parties have information about the same song, Mediachain allows them to share a common identifier for the work. Mediachain was acquired by Spotify in order to solve attribution problems relating to royalty revenue, such as tracking copyright's holders. Another music company which is currently adopting Blockchain technology is K-Tune, a platform created in order to promote the collaboration between different singers, producers and songwriters with a focus on K-Pop. The system consists of two main sections: the arena, where everyone can sell their topline or instrumental and the camp, which is specifically conceived for collaborations. Both options are supported by Blockchain technology, which ensures that everyone gets fair royalty distribution and tracking of the activities. All the transactions on K-Tune are done in ERC20 Token: KTT.

3. Criticism of the use of blockchain technology

Although more and more music companies are adopting Blockchain, there are many issues that need to be addressed in order to implement this technology to a wider scale.

One of the main obstacles consists of its complexity of use. Intermediaries stakeholder such as aggregators or record labels themselves are often seen by the artists as a value, a means that allows them to focus only on music creations. The majority of artists do not want to deal with the mechanism of distribution and royalty collections by themselves, instead, they prefer to entrust this process to labels or publishers. This outlook does not only apply to the artists, but also to the consumers themselves, for which Blockchain technology remains a distant reality, something intrinsically linked to the financial market. A real-life use case of this happened when

Imogen Heap found herself free of any contract deal in 2016 and decided to release her next single “Tiny Human” with the Blockchain technology. The track was released on the Ethereum (a community-built technology based on ETH cryptocurrency) blockchain Mycelia, in partnership with another platform called Ujo. In spite of the numerous press releases and promotional moves, the single sales amounted to only \$133.20 and the track was retired from sale during the same year (D.Gerard, D.Gerard, C.Wagner, 2017, “Attack of the 50 Foot Blockchain”, Chapter 12). The download procedure was extremely complex: the user had to create an Ethereum wallet, exchange bitcoins for ether (now ETH can be traded directly with dollars) and send document evidence only in order to get a download key that would allow the user to start the download.

Another question to address regards metadata collection. As stated before, one of the principal advantages of Blockchain technology would be how it would constitute a networked database for copyright information. In order to collect this data, Blockchain-based platforms would need to interact with the players who actually own these and get licenses to integrate all the datasets into the system. This would mean obtaining support from labels- especially majors- in order to have a vast repertoire that could actually attract consumers on the platform. But in the current state of events, it is unlikely to think that major labels would see any advantage in licensing their data without charging a high fee. Previous attempts to build this type of system have indeed already failed, as happened with the Global Repertoire Database in 2014. The GRD, which was put together by the EU and counted Apple, Amazon and Google among their participants, aimed at building a comprehensive database in order to ease the process of obtaining information around musical rights and works. The project was funded with investments of \$8 million but it ended up with a debt of almost \$14 million (Berklee College of Music Journal,K.Milosic, 2015) caused by the gradual retraction of content from collecting societies and labels. As highlighted in Music Week, the venture had been “scrapped due to a fall-out of collection societies over funding.” Faced with both loss in funding and information, the GRD was therefore unable to proceed. Without the lack of support from major labels or collecting societies, the blockchain-based platforms could suffer from a similar fate : a limited repertoire would not attract enough users. Blockchain-based Ojo platform is an example of this: the catalogue is vast, but it only includes independent and small artists that do not attract listeners.

Even the transparency linked to Blockchain could constitute a problem for some players. As stated before, collecting data on Blockchain platforms would mean universal access to contractual details and copyright data by all the individuals involved. The business of record labels and publishers, which consists in negotiating deals for the content they want to acquire, could be affected by this total transparency as they would be required to state publicly what they have been able to negotiate for that repertoire. This could also facilitate competitors in stealing business and providing offers.

4. Conclusion

In conclusion, considering the current issues of the music distribution and the barriers to a blockchain-based system, it seems that the best solution could lie in a middle ground between the current music industry supply chain and a total disruption of it. Startups that aim to use blockchain as a means of substituting streaming platforms will face severe challenges, and will most likely not succeed in standing out as a valid alternative to the current system. The lack of metadata content granted from labels and the reluctance from artists themselves- who will likely not exchange record labels' advantages and streaming platform exposition for higher independence- could translate in a limited repertoire, classifying these platforms as secondary players in the music industry and therefore, as ineffective agents. Instead, Blockchain technology - as it has happened in the case of Spotify and Mediachain - could be used as a means to optimize already existing processes. The innovation should not demolish the present structure as a whole, but implement it with the know-how and the value of blockchain. By considering the intricacy of the industry and the needs of fast accessibility of the consumers, music companies could solve the existing problems of fair revenue distribution by using smart contracts. A real alternative could be the creation of private blockchains by major labels or publishers themselves. This would enable all the advantages we have highlighted before, such as faster and regular payments and transparency of contracts among the stakeholders involved, but without the collapse of labels and publishers, which often represent important means of support to an artist. All of this could be implemented in the case blockchain would appear as an attractive incentive to record labels- which at the present time is still not certain.

(word count: 2567)

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