

IT MIGHT BE TIME: Opportunities and Challenges in Optimizing the Music Industry in the Digital Era





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Introduction



The music industry's first taste of digital technology was from the inception of MP3 and its companion, the MP3 Player. Its emergence was a game changer as it created a new market for the industry. However, it also generated long-term issues such as music piracy which puts the music industry at a drawback. As a result, streaming platforms are then created as a solution to tackle it. Now, it has become a part of many individuals' lives, whether they are an artist or a mere listener. Yet despite the technological advantage, artists are instead at a disadvantage due to the platforms' lack of transparency, and the minuscule royalty payout using the "per stream" rate. This issue is also amplified by the absence of concrete infrastructure holding the industry's database that involves metadata. In response to these issues, many artists have found their way in making the streaming economy aligned with their interests by employing a fair trade scheme and digital technologies such as blockchain and AI. Thus, this case study is expected to view the current conditions of the music industry, particularly on the management system for music royalties and databases, and potential innovations that can be adopted in solving the issues surrounding it.





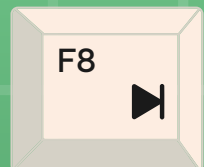
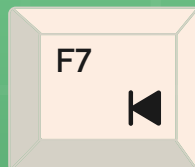
The Music Industry in the Digital Age



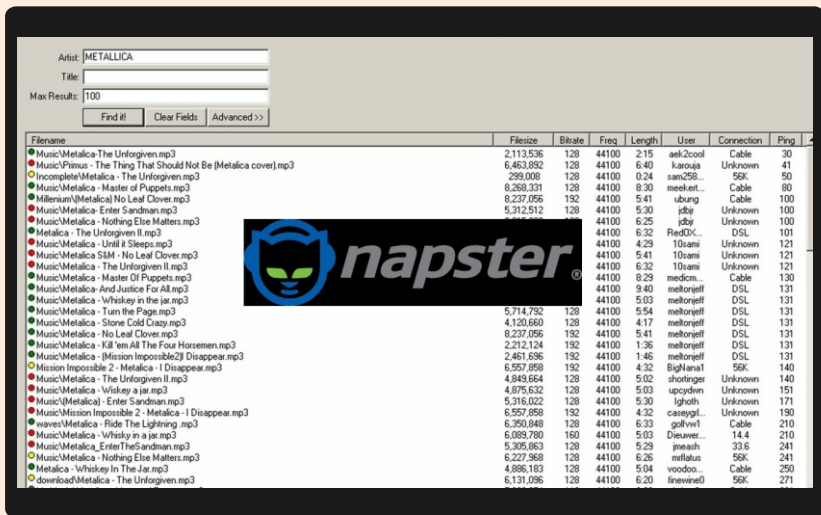
The History Behind the Industry's Technologies

When the World Wide Web gained traction in the late 1990s, there was a hike in emerging technologies in the music industry. One of them is the MP3 Player, a portable digital music player. The MP3, the technology behind it, was first invented by Bernhard Grill, Karlheinz Brandenburg, Thomas Sporer, Bernd Kurten, and Ernst Eberlein. However, the two prominent players in its invention are Karlheinz Brandenburg (a specialist in mathematics and electronics) and Dieter Seitzer (a professor at the University of Erlangen). The MP3 began as a research project under the direction of the Fraunhofer Institut in Germany with the codename EUREKA project EU147, Digital Audio Broadcasting (DAB) in 1987. Known as MPEG Audio Layer III, the MP3 became a standard for audio compression which converts any music file smaller with little to no loss of sound quality.¹ In hindsight, the audio file takes less space: with only one-twelfth the size of a CD format whilst maintaining the same quality.

Not long after the release of the MP3 format, the MP3 Player came into the scene as the technology became more accessible to music fans worldwide. In its earlier days, however, these music files can only be downloaded and stored on PCs, which became a hassle for those who prefer to listen to music on the go using portable devices such as the Sony Walkman. Due to this high demand for portability, companies started to invent and sell portable devices to store MP3 files.² While the earliest models of the MP3 Player were impractical in design, expensive, and has minimal storage, many companies started to experiment with creating portable music players that are not only affordable and compact but also stylish.³ One of them was Apple's iPod, which became a major hit in its debut. Its ability to store 1,000 songs was regarded as a game-changer in the music industry. Since then, iPod has notably dominated the market in the 2000s but also created a market for similar devices.⁴



The accessibility of MP3-format audio files also led to the rise of illicit activities such as music piracy, an act of illegal music downloading. The compressed files not only made users easily transfer them from one device to another but also share them with other users. This sparked the development of notorious file-sharing sites with the likes of Napster, KaZaa, and Limewire which in turn gave rise to free peer-to-peer (P2P) music transfers.⁵ While these platforms were an opportunity for listeners to access a vast library of their favorite artists' works—a way for other listeners to find potential favorite artists of their own along the way—it instead brought the industry immense financial loss. In the U.S., for instance, music piracy costs the economy US\$12.5 billion in total output each year.⁶ In addition, annual revenue losses from music piracy total US\$2.7 billion for the downstream retail sector as well as the sound recording sector.⁷ As a result, these P2P websites, along with the users themselves, were dragged into legal battles that ended with costly fines and the eventual shutdown of the websites.⁸



The Peer-to-Peer (P2P) music transfer platform Napster

Source: metispartners.com



The situation pushed the need to invent a solution to combat the skyrocketing acts of music piracy. Apple's launch of iTunes, an app that provided legal acquirement of songs for its users, was one of the earliest attempts. Released on 9 January 2001, iTunes was considered a revolutionary invention for the music industry: not only it provided users the ability to simply burn CDs and manage digital music files, but record labels were also at an ease of mind. Steve Jobs, the founder of Apple, struck a deal with five major record labels to sell their works on iTunes to counteract the financial loss from music piracy.⁹ The business model was profitable for the industry, and thus iTunes—along with the iPod that came a year later—was deemed a success.

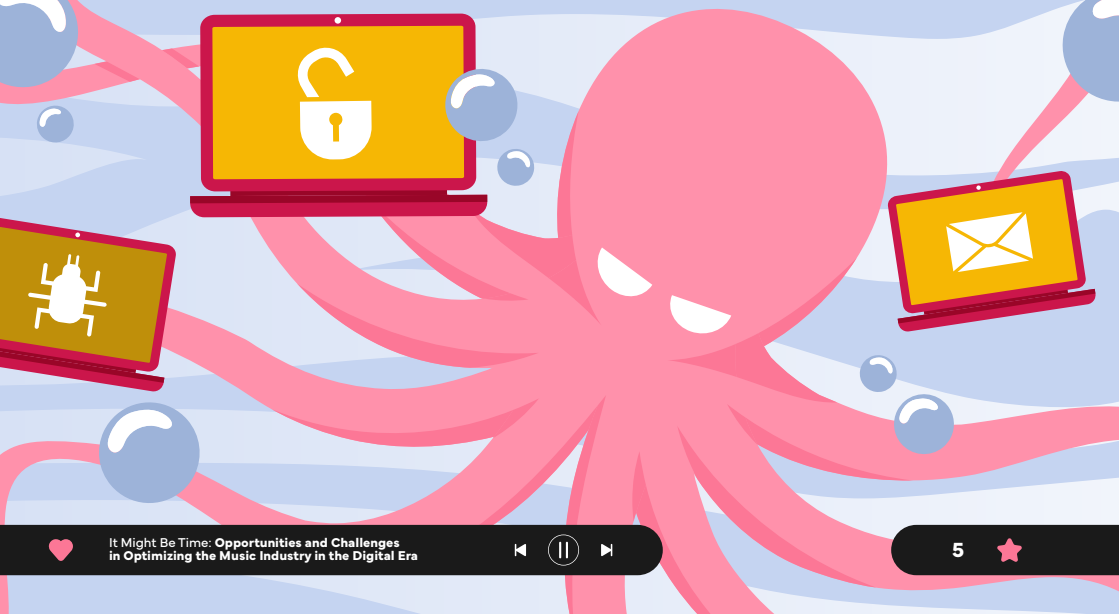
In the early to mid-2000s, streaming services became the forefront of the music industry, with the likes of Pandora, Spotify, and Myspace. Pandora, one of the first music streaming platforms that was officially launched in 2005, offered a variety of radio stations that catered to the users' genre interests. The app also became an inspiration for another app, Spotify. Officially launched in 2008 by a Swedish start-up, Spotify offered users a free music streaming service with advertisements along with an ad-free upgrade for those who are interested in a subscription service. On the other hand, Myspace was initially a social network platform for users to connect and for artists to promote their music while building their own fan following.¹⁰ The website's streaming service, Myspace Music, was eventually launched in 2008, five years after its inception.

Although these music streaming services have their own advantages, Spotify was the most successful for the years to come. With the growing popularity of Spotify, which garnered an annual revenue of US\$10.374 billion in 2021, it became a trailblazer for other streaming platforms to follow suit with its steps.¹¹ From Apple Music to Jay Z's Tidal, it signaled the rise of music mass consumption in the digital age. The phenomenon also created a series of problems that also put artists, the main players in the industry, at a pitfall.

Current Arising Issues in the Music Industry

Music piracy is an ongoing issue to this day since websites that provide free access to download music still exist. However, it has been settling down throughout the years due to the universal use of music streaming services.^{12,13} Statistics show that the number of music streaming subscribers is approximately 524 million worldwide in the second quarter of 2021, compared to 487 million in the first quarter.¹⁴ This rapid rise in users also contributed to a growth of up to US\$16.9 billion in revenue or 65 percent of the total global recorded music revenue.¹⁵

Although the growing revenue meant more financial benefits for the industry, the reality is not the same for the artists themselves. Studies have shown that royalty payments for artists from streaming services are instead inequitable.^{16,17,18} Popular streaming platforms such as Spotify and Apple Music unfairly compensated the artists who published their works through their platforms with a minuscule amount of royalties. By using the “per stream” rate that is less than a dollar, independent artists must be able to garner more than thousands of streams to reach an adequate profit.¹⁹ Negotiating the royalty amount also has its own difficulties: rates offered to independent artists and record labels are similarly less using a “take it or leave it” scheme.²⁰ Essentially, independent or “sidestream” musicians are at a disadvantage compared to their mainstream counterparts.²¹



Lack of transparency is also another element that has been criticized by artists, both mainstream and sidestream. The initial problem pertaining to royalties was the questions of how and where the royalties accumulated, and when it is distributed to the artists. However, with major record labels such as Sony, Universal, and Warner taking a significant influence over streaming platforms, artists are criticizing the lack of information relating to the percentage of royalties distributed to them.²² Due to the nondisclosure agreements between artists and labels, they are at a vulnerable point in which renegotiation might not be in their best interests.²³



Platform	Pay per stream	Streams to get \$1,000
 Pandora	\$0.0013	769,231
 Spotify	\$0.0033	303,030
 Amazon Music	\$0.004	250,000
 Deezer	\$0.0064	156,250
 Youtube Music	\$0.008	125,000
 Apple Music	\$0.01	100,000
 Tidal	\$0.013	76,924

List of “per stream” rates by today’s music streaming platforms 

Source: [headphonesty.com](https://www.headphonesty.com)

Although royalty payments are the core problem of today’s music industry, another issue with equal importance is the music and songs database infrastructure.²⁴ The key element of the database—one that is highly disputed between artists and labels—is metadata, which holds information on song credits. Unfortunately, this particular aspect is underreported due to its complex nature which ranges from different data formats to the tools utilized to manage the data.²⁵ In hindsight, metadata management seems like an easy task, but the issue itself delves deeper than the administrative aspect: there are a lot of technical aspects that need to be taken into account as well.²⁶



Understanding Music Royalties and Metadata



What are Royalties?



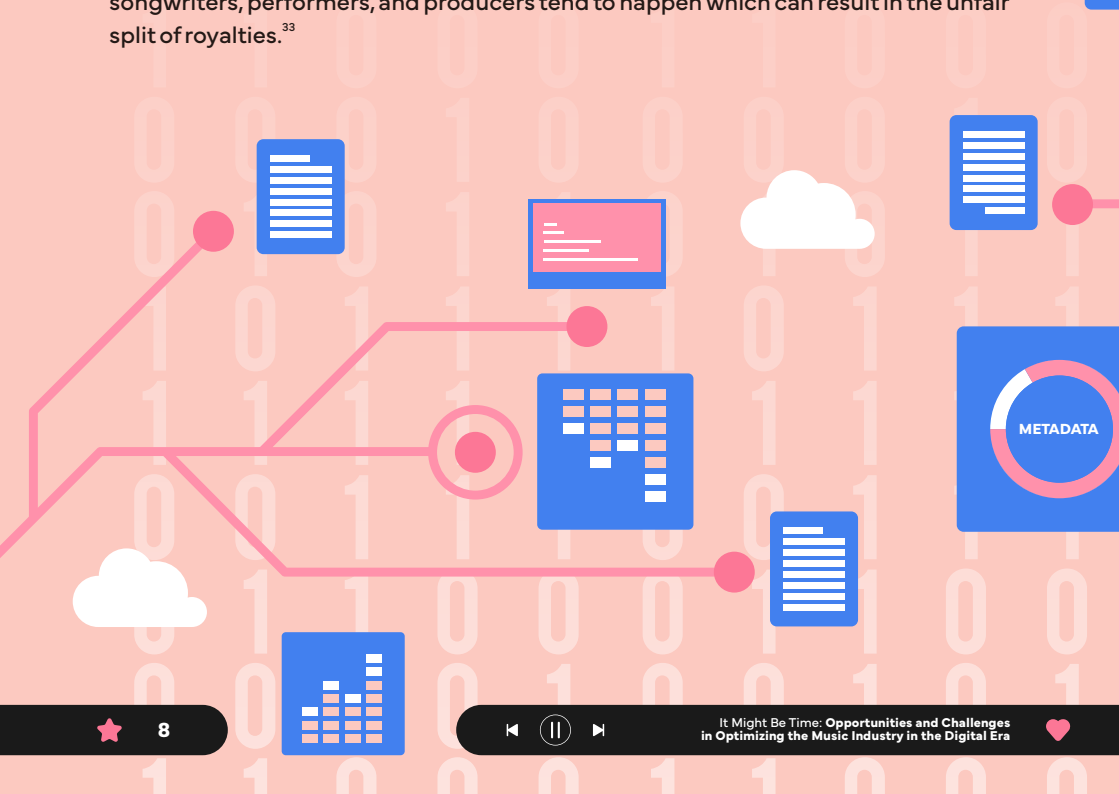
Songs are commonly played in different situations, whether that is in public spaces such as restaurants, hotels, and malls, to live performances such as concerts. Royalties are then paid to the artists in order to compensate for their songs' usage. In the context of music, the artists' works tend to be used in commercial settings, including that of streaming platforms. Hence, it is necessary for the users to pay royalties to the artists as the rights holders. Royalties are a part of the copyright law—which is within the intellectual property law—where rights regarding the financial compensation for the usage of creative works are regulated. It also constitutes the different aspects of music (sound recording and composition), along with how it is utilized by different entities and in its settings.²⁷ As such, it revolves around the various types of royalties. The terms used for these types varied, but there are two umbrella types of royalties: recording royalties and publishing royalties.²⁸

Recording royalties are essentially earned from the use of the song's sound recording.²⁹ This includes digital reproduction of the song through streaming or downloading which then generates royalties for the rightsholders. The earned royalties are usually sent to the record labels or distributors before it is passed to the artists, which can cause problems pertaining to the rights of the sound recording. In recent times, however, most independent artists can receive royalties directly since they finance and distribute their production independently, giving full rights to the sound recording.



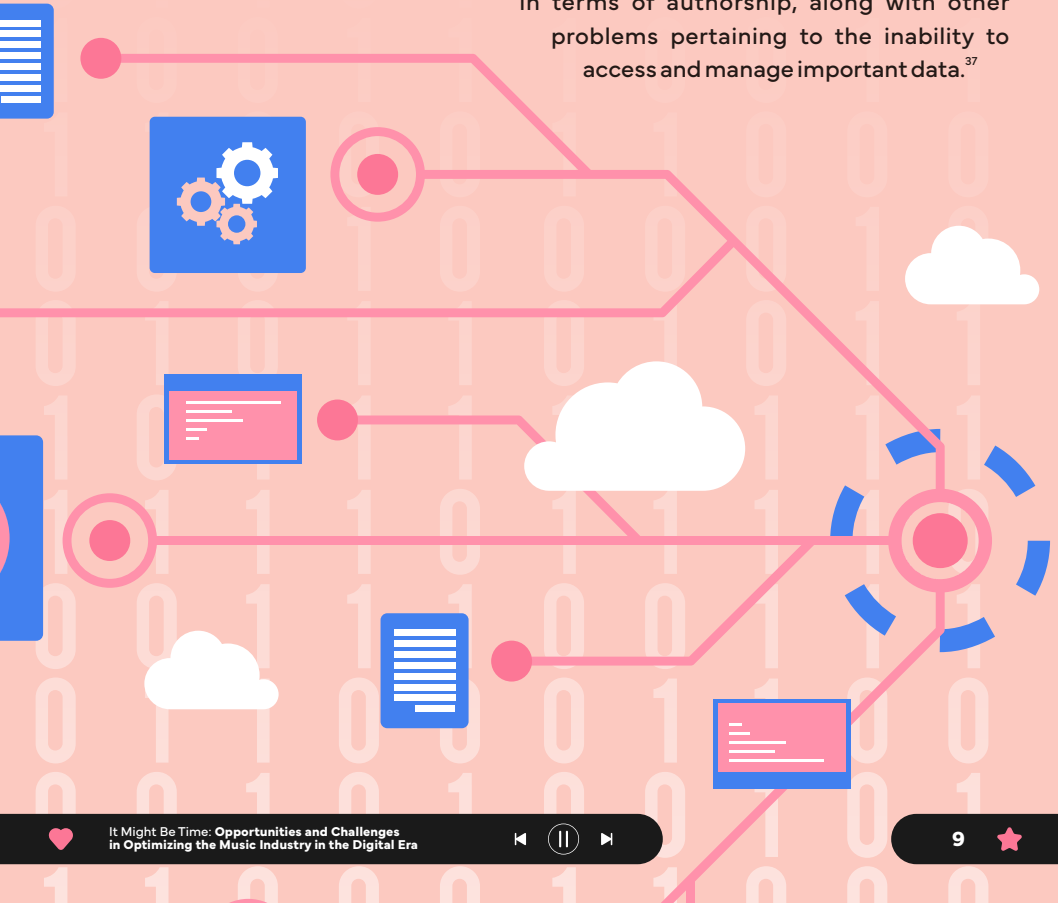
Publishing royalties, also known as compositional royalties, are broken down into four categories: mechanical royalties, performance royalties, micro-sync royalties, and print royalties.³⁰ Mechanical royalties are applied when the musical composition of a song is reproduced physically (e.g., earned from the physical format of the song such as vinyls, CDs, and cassettes) and digitally (obtained from streaming services). Performance royalties are generated from songs that are played in public spaces with commercial intent; this includes restaurants, hotels, cafes, and radio broadcasts to those live performances such as concerts. This type of royalty is also applied to music streaming services. Royalties can also be earned from online platforms such as Instagram, TikTok, and Youtube, where the song is synchronized to videos. These are defined as micro-sync royalties. On the other hand, print royalties are earned from the sale of sheet music (which constitutes musical notation and lyrics) which can be a physical or digital reproduction.³¹

These various types of royalties and their intersection with one another can maximize the artists' profits from the use of their works. For instance, streaming songs from digital provider services (e.g., Spotify and Apple Music) can generate both mechanical and performance royalties.³² Such cases can be an advantage for the artists and the individuals involved in the song's creation. Nonetheless, agreement disputes with record labels or publishers regarding the rights between songwriters, performers, and producers tend to happen which can result in the unfair split of royalties.³³



The term “metadata” has a few definitions according to its context. In essence, it is defined as “data that provides information about other data”.³⁴ In the context of music, it refers to information pertaining to who wrote what and in what proportion. The metadata usually includes a collection of data of the song file, which generally includes the artist name, producer, writer, song title, release date, genre, or track length.³⁵ By providing metadata that is completed and thorough, it correctly gives credit to those who are involved in the creation of the song.

Due to its correlation with credits, the matter of royalties and copyright comes into question. With the involvement of various individuals (known as rights holders), there is a high risk of incorrect data input which can result in no royalty payments for all the parties involved.³⁶ Moreover, the metadata can vary between one database and another which makes it extremely difficult to maintain the same information in various databases. As result, this issue can cause conflicts of interest in terms of authorship, along with other problems pertaining to the inability to access and manage important data.³⁷





Current Regulations Surrounding Royalties and Metadata

Since it is under copyright law, regulations pertaining to the accumulation and distribution of royalties have already existed in various countries. In the U.S., for instance, royalties are regulated under the Music Modernization Act (MMA), where Title I of the Musical Works Modernization Act and Title III of the Allocation for Music Producers Act specifically regulates the matter of mechanical royalties collection and distribution through a mechanical licensing collective.^{38 39} As for Indonesia, the government has implemented Government Regulation (GR) No. 56/2021 on the Management of Royalties Accumulation which is derived from Law No. 28/2014 on Copyright. The law enforces the accumulation of royalties through “license fees” for those who use songs in commercial spaces which are collected first by the National Collective Management Organization (*Lembaga Manajemen Kolektif Nasional* or LMKN) and then distributed by the recognized Collective Management Organizations (*Lembaga Manajemen Kolektif* or LMK).^{40 41}

On the other hand, music metadata is still a relatively novel concept with no legal precedents to refer to so far. However, discussions pertaining to the ways to regulate and manage the matter have been circulating around the world. In the Global North, questions relating to the use and ownership of music metadata and its compliance with the EU's General Data Protection Regulation (GDPR) have been brought up. With the nature of metadata being parallel to personal data (i.e., “information that identifies an individual, even without a name attached to it”) along with the artists' work (identified through the International Standard Recording Code or ISRC), issues such as the third-party use and artist data ownership are taken into consideration due to its possible effects towards long-term benefits received by the artists.^{42 43 44} As for the Global South, Indonesia's GR No.56/2021 has introduced a music database management system known as Song and Music Information System (*Sisten Informasi Lagu dan Musik* or briefly known as SILM) in hopes to have a database that is integrated, transparent, and accountable.⁴⁵ While the application of SILM is still in its development stage, many artists have criticized the absence of artists' involvement along with allegations of corruption pertaining to the platform's development.^{46 47}





Opportunities and Challenges

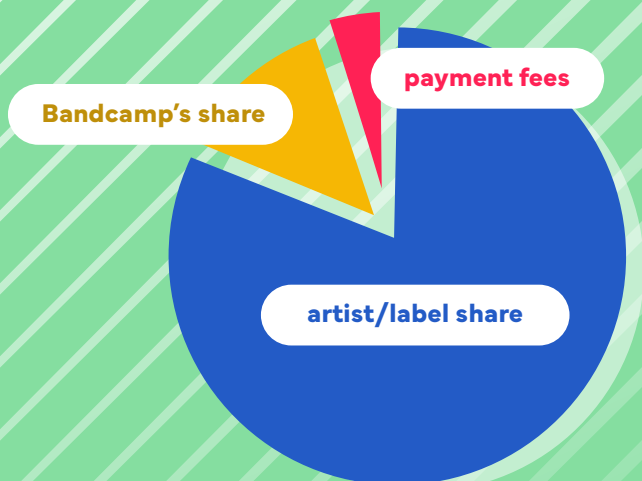


Potential Innovations for the Music Industry in the Digital Era



With issues surrounding the unfairness and lack of transparency in streaming platforms' royalty acquisition and payment, independent artists took the matter into their own hands by employing a platform with a fair trade scheme. The earliest model comes from Bandcamp, an online music store that is catered to independent artists, labels, and music fans.⁴⁸ Unlike today's streaming platforms, Bandcamp offers a variety of formats, ranging from digital albums and tracks to physical works (vinyl records, CDs, cassettes, and t-shirts). What also makes the platform enticing for artists is its revenue-sharing model that heavily benefits the artists and labels: an average of 82% of the revenue goes to the artists or their labels while the platform's fee is 15% of the sales.^{49 50} As for the fans, the platform became a space for them to directly support artists and foster communities with fans alike.⁵¹





A pie chart of Bandcamp's revenue sharing model



Source: Bandcamp

Another platform that offers the same scheme is The Store Front, a digital music store created by Indonesia's music collective Noisewhere. The Store Front took inspiration from Bandcamp and based its revenue-sharing model on the platform by amplifying it to 90 percent.⁵² The launch of TSF was a response to support independent artists at a time when Indonesia's music industry was suffering amid the COVID-19 pandemic.⁵³ The platform also provides a monthly financial report which they published publicly on their social media as a part of their manifesto.⁵⁴ Another project from The Store Front that was highly acclaimed is their "Mix-A-Tape" which offers music fans/buyers to create their own mixtape from the platform's digital catalog.⁵⁵ In hindsight, the project is a solution to music piracy and the culture of building mixtapes—an activity that might be viewed as illegal despite not coming with a commercial intent but rather a personal hobby and appreciation towards the artists.⁵⁶

On a more technological level, artists and labels have also kickstarted the use of digital technologies such as blockchain and artificial intelligence (AI). The objective of the application is not only to decentralize the music industry's system, but also to create value that is aligned with the interests of the artists themselves.⁵⁷ So far, there are two potential ways these technologies can be implemented: blockchain-based management systems and AI music tagging.

Blockchain technology, which is mostly associated with the finance industry, has also taken a place in the music industry as an antithesis to the rigid, complex system of royalty payments. While it can be an alternative source of capital for artists, blockchain also serves as a way for disintermediation from record labels: artists have control over pricing and terms of use of their works.⁵⁸ As such, blockchain's smart contracts could also be a solution for the matter of royalty distribution between the rights holders. Smart contracts—a collection of programs on a blockchain that are utilized to fulfill an agreement so that the participants involved may be assured of the result right away—not only bypasses intermediaries, but also allows revenue from a stream or a downloaded work to be distributed automatically in accordance with the agreed splits of royalties between the right holders.⁵⁹

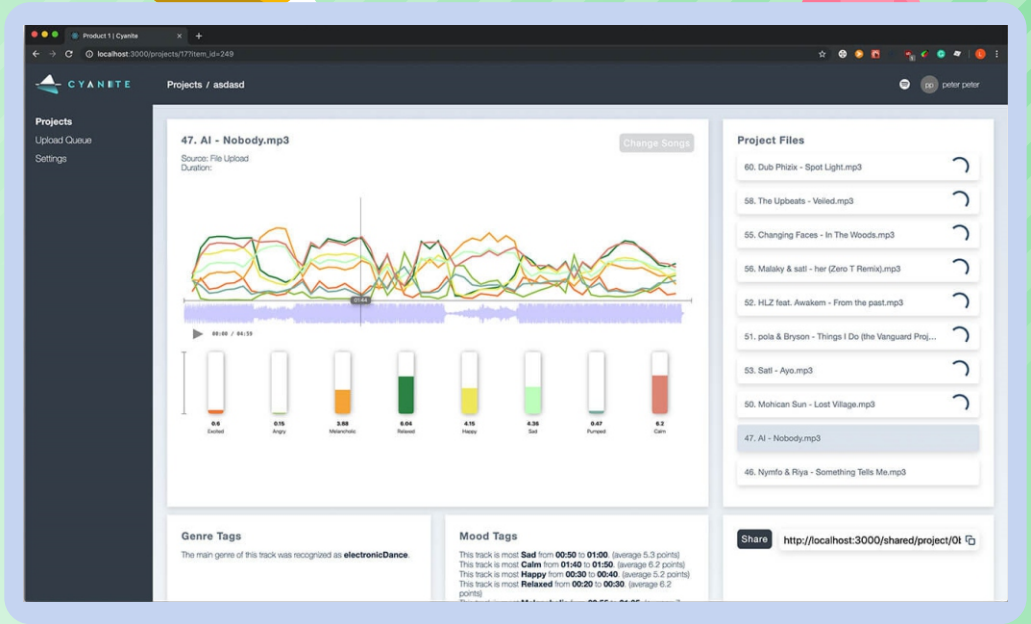
Moreover, the technology facilitates the opportunity for artists to go beyond the use of country-based currencies, payment networks, gateways, and distribution platforms. Such flexibility—which is similar to Bitcoin—then allows artists to offer ownership to fans worldwide which can help in growing the value of the artists' works through promotion and distribution.⁶⁰ Essentially, blockchain not only provides fair compensation, but also a platform for potential communities of music fans to cultivate.



As for the issue with copyrights, blockchain could offer a comprehensive, networked database for music metadata. There have been several projects going underway, with the likes of Imogen Heap's Mycelia. Founded in 2018, the blockchain-based project offers artists a tool known as the Creative Passport which supports artists in managing their metadata and finding new artists to collaborate with through an interactive profile map.⁶¹ The project's tool also expects to publish information that expands from the typical song credits, which range from payment information and the location where the song was written to the instruments that were used in its creation.⁶² Another project, the Dot Blockchain Music Initiative, is currently working on using technology that can house MP3 or WAV files with information that contains the individuals that should be paid and how they can be contacted.⁶³

AI has also been employed for the management of music metadata through music tagging. The number of songs added varied on different platforms.⁶⁴ For example, Spotify—the world's leading streaming platform—maintains a database of 82 million songs and a record of 60,000 new songs uploaded daily.⁶⁵ Due to the massive volume, it can be difficult to manage the music database, particularly the metadata of each song. By applying AI to such tasks, artists can easily navigate not only the administrative constraints of metadata management but also the technical aspects of it. Several start-ups have launched AI-powered tools that facilitate artists to efficiently manage, extract, index, and retrieve information from their works. One of them is Cyanite, a company that uses an AI-based engine for music search and tagging.⁶⁶ The platform offers various services that surpass the typical music tagging tool, such as music metadata visualization and their songs recommendation engine.⁶⁷





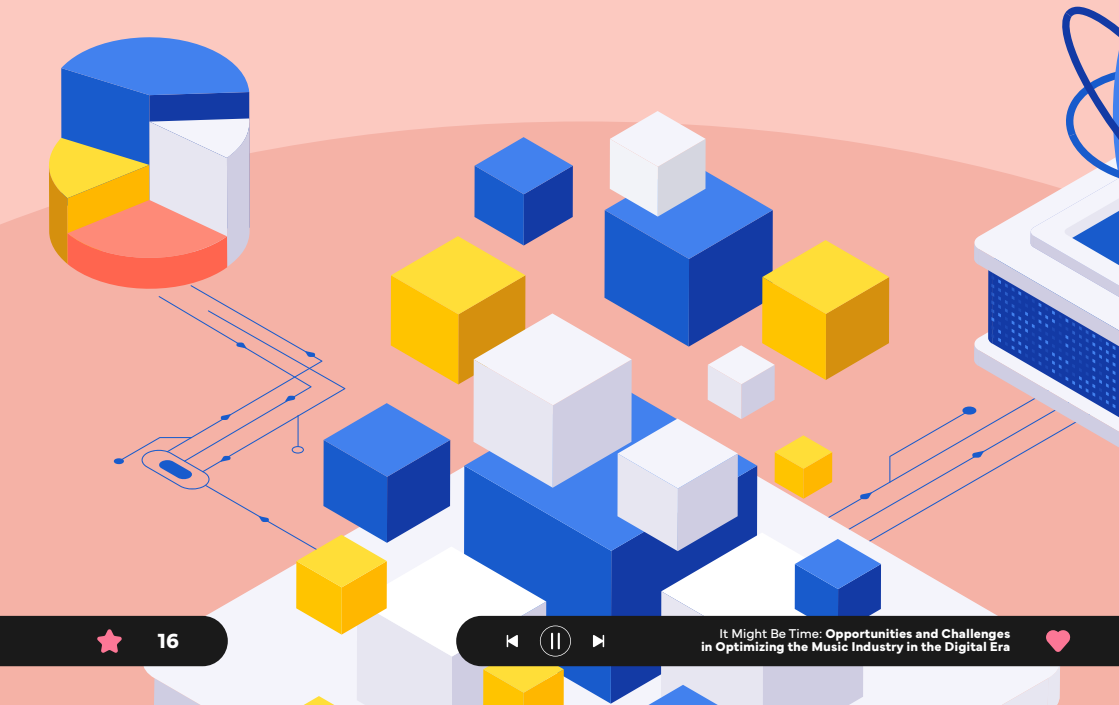
The user interface of Cyanite's AI-powered music search and tagging

Source: Music Tech

≡ Challenges in the Technologies' Implementation

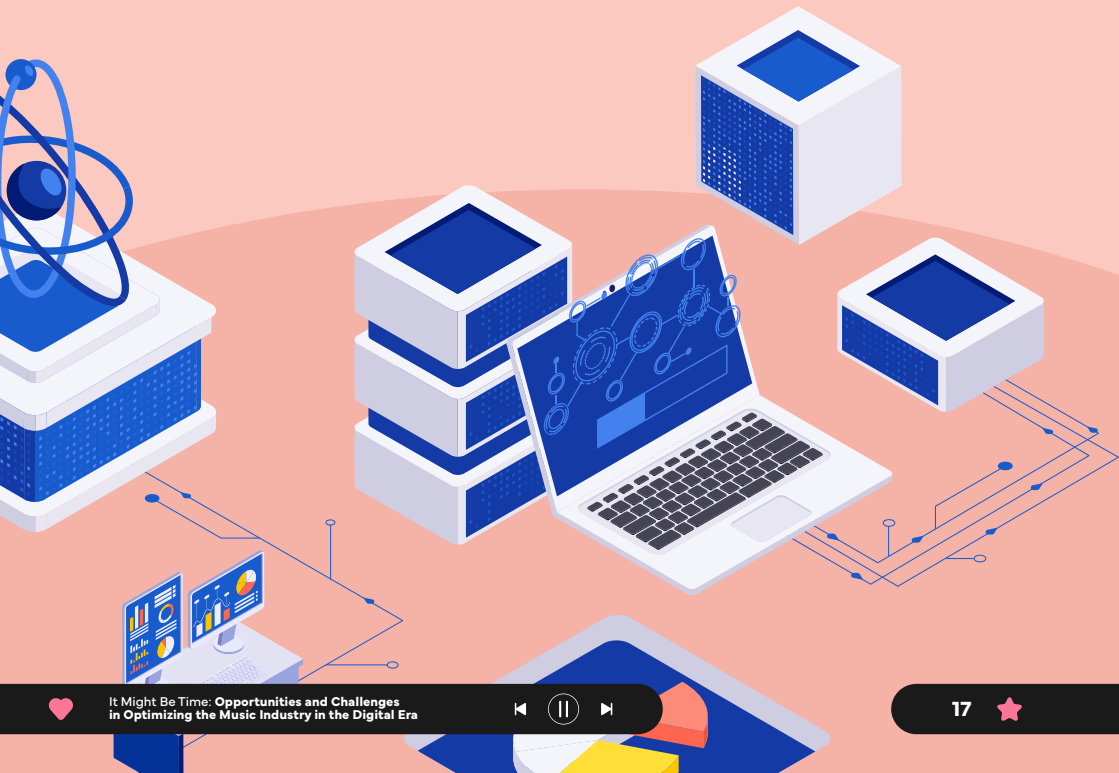
Conventional methods of implementing the fair trade system, such as Bandcamp and The Store Front, have been considered as successful alternatives to the distribution of royalties in the music industry. Even so, these platforms are inherently not innovative, hence there are no technological constraints in their application. This is due to the platforms' use of the website and social media as their tool of marketing and transparency which is both easy to use and accessible to the public. Regardless, these platform have their share of challenges, such as the values of the platform and the artists not being aligned with one another.⁶⁸

Newer concepts such as blockchain applications, however, are riddled with challenges, ranging from issues of accessibility to compliance with current governance and regulation. As for the former, it has been an ongoing issue for developing countries to access and adopt blockchain technology. Indonesia, for instance, has promoted the use of blockchain for numerous purposes as it promises a potential boost for the country's economy. However, its implementation is still limited to specific uses that mostly focus on the finance industry.⁶⁹ In addition, the public's knowledge of its use is still lacking despite improvements in digital infrastructure.⁷⁰



In terms of governance and regulation, the matter poses a question that is beyond the allowance of the technology's implementation. Royalties are still a disputed matter in the music industry, hence the way blockchain technology is applied by various organizations and entities—-independent artists, not-for-profit organizations, collective management organizations, and record labels—can differ from one another. Not-for-profit organizations such as Heap's Mycelia focus on a decentralized mechanism of royalty payment through blockchain. Meanwhile, collective management organizations and record labels would prefer to use a centralized system. Such an instance not only could lead to clashes of interest, but also affect how newcomers access the network.⁷¹

As for AI-powered engines, the technology's implementation poses ethical dilemmas that have long been a concern. In the context of users'/artists' data usage, copyright-protected data can be an issue that slows down the company's development of the tool.⁷² Moreover, the personal data of the users, in this case, artists, is also another added aspect to the issue of training data sets. Other dilemmas such as system biases could also lead to incorrect use of the technology.⁷³ Since most start-ups that develop these technologies hailed from the Global North, the data used would orient on "western music".⁷⁴ Such an instance could lead to the developed tools turning a blind eye to artists from other regions.





Conclusion

Technological advancements in the music industry should come as no surprise considering how significant music is in the daily lives of many. From the MP3 player to streaming platforms that can be accessed with a touch on the screen, these technologies are developed not only to contribute to the industry's growth, but also to enhance the experience of music listening for users and fans alike worldwide. But despite these advancements, foundational aspects such as royalties and music metadata are becoming more complex due to the involvement of streaming services. In response, artists are starting to launch projects that introduce technologies such as blockchain and AI to solve the matter, with the likes of Heap's Mycelia and Cyanite. While it promises decentralization and innovation in the music industry, its implementation comes with its own challenges, ranging from accessibility, governance, and regulation, to that of ethical dilemmas surrounding the technologies' applications.

Since the adoption of these technologies poses both positive and negative effects in the long run, there are several recommendations that can be taken by the stakeholders in the music industry. First, a standardized network of blockchain systems can help in facilitating the plurality of networks—centralized and decentralized—to minimize the emergence of interest disputes. Second, data sharing between different companies; doing this not only solves the problem of the lack of data sets for training the system, but also offers unique data sets that are beyond the company's region. By incorporating these into the application of both blockchain and AI, it can foster transparency, accountability, and fairness in the development of the industry's digital technologies.



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