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# Digital transformation, blockchain and music industry: a review from the performers' Collective Management Organizations (CMO)

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## **Abstract**

This paper study the challenges from the digital transformation of the music industry and the potential role of blockchain from the perspective of the Collective Management Organizations (CMO). Building on desk research and primary data from 9 semi-structured surveys with C level executives, this empirical analysis identifies main projects, their state of development and perspectives for this technology in music industry. Findings conclude that there are a limited number of blockchain projects led and/or with relevant participation of CMO and most of them are just research, proof of concept or pilots, far from a massive commercial phase. In addition, blockchain is not a priority for CMO and its adoption is not a priority in the digital transformation of this companies. The low quality of the data in the origin and the potential governance issues among different stakeholders within music industry appear as the main barriers for blockchain to be considered as a global solution. Ultimately, results in the paper provide a snapshot about the current state and future curve of adoption of blockchain as a solution to manage intellectual property rights in music industry.

## **Keywords**

digital music ecosystem; digital transformation; blockchain; Collective Management Organization; CMO;

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# 1 INTRODUCTION

*“Imagine if, some months, half your salary would go to some rando company you’d never even met - sometimes all of it. This is what happens regularly to songwriters due to the metadata mess and entities wrongly claiming royalties that aren’t theirs”*. Helienne Lindvall, a professional songwriter and musician, tweeted this devastating sentence on 12<sup>nd</sup> October 2022.

This issue is popularly known as the unclaimed black box royalties and it was estimated in a range from 200m to \$2,5bn in 2019 by Billboard (Billboard, 2019). Recent analysis by the Ivors Academy estimates it up to £500 million in 2021 by the Ivors Academy (Ivors Academy, 2021).

The digital age has provoked great changes in the way that music is consumed and compensate to rightsholders (Hesmondhalgh, 2020). First, there have been a huge growth of consumption derived from streaming that has displaced the rest of the traditional physical sales, representing around three quarters of the whole business in the case of recorded music (IFPI, 2023). This massive expansion of consumption involves that former paper-based processes are no longer possible for intellectual property rights allocation and royalty management.

However, a bunch of problems has been stated around these processes. From the lack of governance in intellectual property laws to the complexity of music royalties accounting, relevant issues related to the validated information such as the lack of metadata standards or the absence of unified databases involves wrong transactions, inefficiencies, and inaccuracies in the royalties’ allocation process. The result is that rightsholders not only receive their payments with delay, but also, quite often they are not receiving the remuneration they deserve.

Blockchain technologies emerges as a potential solution to similar problems in other industries. Kapsoulis et. al identify, their features as especially attractive for music copyright, such as transparency, trustability, traceability, decentralization, conflict resolution and efficiency (Kapsoulis et al., 2020). Other authors emphasize the relevance of blockchain in the viability of different ‘smart contract’ developments, a form of efficiently adapting music copyright management to the liquid nature of digital environments (Halgamugue & Guruge, 2022; Hardjono & Pentland, 2019; Rauman, 2021).

However, despite blockchain technologies having been repeatedly named as transformative for the copyright management in the music industry, there are no assessments on the digital transformation advances from the perspective of the CMO and on the adoption of blockchain technologies as a potential solution to the current challenges in music copyright management.

Within this context, this paper aims to address this gap by investigating which are the challenges from the digital transformation of music industry from the perspective of the Collective Management Organizations (CMO) and the role that blockchain can play on them. To this objective, research combines a qualitative approach with primary and secondary data sources. First, desk research is used

to map the main projects related with blockchain with involvement and/or participation of at least one CMO. Then, authors have gathered primary feedback from a semi-structured survey conducted among a purposive sample of 9 relevant C level executives of different CMO.

As a result, the paper identifies the adoption of blockchain technologies by the CMO, analyzing the level of knowledge about blockchain technology applied to the collective management of intellectual property rights and the perception of its possible usefulness for Collective Management Organizations (CMOs).

This paper is structured in five sections: after this introduction, the second section reviews the characteristics of blockchain and the main solutions, both in general and in the music industry, with particular emphasis in collective management organizations; then, third section details the methods and the description of the sample under analysis before to the results and discussion section. Last section compiles the main conclusions and suggests further avenues of research.

## **2 METHODOLOGY**

The methodology followed combines a qualitative approach with both primary and secondary data sources. As a first step, desk research and field work are used to assess the current state and trends for digital transformation of the CMO, including the adoption of blockchain technologies (if any).

Authors have reviewed the state of the art about the development and incorporation of blockchain technologies in the collective management around the world, including both commercial and pilot solutions. The objective is to map the main blockchain projects/solutions developed and/or with the involvement of at least one CMO.

Then, a semi-structured survey has been conducted among a purposive sample relevant executives of different CMO related to performers' rights. The objective of this qualitative research is mainly exploratory with non-standardized data, so semi-structured survey offers enough flexibility to address different interviewee profiles while covering the same dimensions of data collection (Noor, 2008).

In this case, this data collection approach allows to obtain two streams of feedback: firstly, inside information about the digital transformation priorities of the organizations under study; as well as the potential role of blockchain both in collective management and, in general, in music industry. CMO representatives are indicated for this purpose considering they have a deep knowledge about the current workflows of rights, including general issues and main constraints. Further research could extend the sample with other type of stakeholders such as record labels, publishers and/or digital music service providers (DMSPs).

## 2.1 *Survey design*

The semi-structured survey combines open, multiple choice and close-ended answers to permit comparability, collect more in-dept information and to uncover evidence, considering important aspects remarked by each interviewee.

The survey includes four set of questions: (a) manager/executive background and previous experience both in music industry as well as taking his/ her current position. Additionally, the type of organization they represent is categorized; (b) general questions about the role of different technologies in music industry; (c) specific questions about the current and potential use of blockchain both in music industry and collective management. And (d) privacy choices. The full questionnaire can be found in the Appendix A.

As indicated in the survey, all responses are managed as confidential by default and are anonymously included in the paper, without mention people or companies' names, unless the interviewee provide explicit authorization to mention their name and/or company as a participant and/or associate them with their answers.

## 2.2 *Stakeholders' identification and data collection*

The survey has been delivered only to managers/executives from collective management organizations related to performers' rights (performers' CMO), excluding those organizations related to other types of repertoires/rights (Music Licensing Companies (MLCs), Mechanical Rights Organizations (MROs), or Reproduction Rights Organizations (RROs)) according to the World Intellectual Property Organization (WIPO) categorizations<sup>1</sup>.

To disseminate the survey, authors have contacted with the main performers' CMO federation in the world: the Societies' Council for the Collective Management of Performers' Rights (SCAPR). SCAPR is the international association for the development of the practical cooperation between performers' CMO. According to its their Statutes, members should be organizations authorized by national lay or by way of assignment, license or any other similar contractual arrangement to manage the rights assigned to them for the benefit of performers. In addition, organizations have to accomplish two additional

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<https://www.wipo.int/copyright/en/management/#:~:text=Various%20types%20of%20collective%20management,as%20contractual%2Fvoluntary%20collective%20management.>

criteria: (i) they are owned and/or controlled by their members; and (ii) they have to be organized on a not-for-profit basis. At the time of writing, SCAPR<sup>2</sup> represents 56 CMOs from 41 countries (SCAPR, 2023).

In addition, the survey has been also distributed through AEPO ARTIS, the major international association for performers' CMO in Europe. As in the case of SCAPR, AEPO ARTIS is a non-profit making organization that represents collective management organizations of performers' neighboring rights. At the time of writing, AEPO ARTIS represents 38 CMOs from 28 European countries<sup>3</sup>.

Finally, authors have reached individually a group of performers' CMO that are not members of SCAPR nor AEPO Artis. Due to its relevance and size, authors have contacted firstly with SoundExchange as it is no longer a SCAPR member since 2018. SoundExchange is the collective management organization in charge of collect and distribute performers' rights in the United States and it is the largest performers' CMO in the world in terms of distributions. In addition, authors have also reached directly to a group of five performers CMO based in Latin American region, to gain diversity.

The selection of this specific type of CMO (performers' CMO) is due to two main reasons: at a methodological level, authors consider that it is better to delimit the sample to a specific intellectual property right in terms of gaining consistency and accuracy for the results and conclusions. Further research could include primary data from other/s type of organizations to complete the picture. In addition, authors experience in music industry provides a professional network that allows to reach more representative people within performers' CMO.

In practical terms, the survey was distributed through online invitation by email using the surveys' service Typeform between February and June 2023 (still ongoing).

### *2.3 Sampling and analysis*

The survey was distributed to 89 different CMO's, and the response rate was 10%. At the time of writing, 9 executives (N = 9) have participated in the survey covering different typologies of performers' CMO and jurisdictions, as indicated in the corresponding Tables 1 and 2.

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<sup>2</sup> <https://www.scapr.org/our-ordinary-and-associate-members>

<sup>3</sup> <https://www.aepo-artis.org/about/#membersmap>

As presented in table 1, four of the interviewees are executives of organizations dealing with featured and non-featured artists rights. And two of them belongs to CMO dealing with owners of the master rights, in addition to artists' rights. From authors' professional experience in the music industry, this sample also guarantees that different sensibilities and states of technological development are represented in the sample.

Table 1. Categorization of performers' CMO surveyed during the analysis (N=9). Survey guarantee confidentiality and anonymity by default.

CMO	Country	Type of member (s)			
		Artists / Featured performers	Non featured performers	Owners of the master / Rightsholder	Other (which one/s)
SoundExchange	USA	✓	✓	✓	Songwriters and/or composers Engineers, Producers, Mixers
AAAI	Argentina	✓	✓	X	X
CPRA	Japan	✓	✓	X	X
SENA	Netherlands	✓	✓	✓	Conductors
AIE	Spain	✓	✓	X	X
RAAP	Ireland	✓	✓	X	X
PPL	United Kingdom	✓	✓	✓	X
SAMI	Sweden	✓	✓	X	X
European CMO 1	European country	✓	✓	X	X

In addition, table 2 shows that all the respondents held relevant positions in their organizations as C-Level executives and/or officers of information technology aspects. And they all have more than five years of experience in music industry.



Thanks to this background and previous experience, they are a representative sample to provide well-founded feedback about the present and future of music industry, especially talking about digital transformation strategies and their implications.

<b>Executive / Manager name</b>	<b>Executive / Manager role</b>	<b>Company name</b>	<b>Country</b>	<b>Years of experience in music industry</b>
Luis Bonilla	CTO	SoundExchange	USA	More than 5 years
Dante Mariani	CIO	AADI	Argentina	More than 5 years
A3 - Prefer to be anonymized	C level executive	CPRA	Japan	More than 5 years
Sander Teekens	Data & IT manager	SENA	Netherlands	More than 5 years
A2 - Prefer to be anonymized	C level executive	AIE	Spain	More than 5 years
Colman Clinch	CEO	RAAP	Ireland	More than 5 years
Mark Douglas	CIO	PPL	United Kingdom	More than 5 years
Stefan Stråle	Head of Digital solutions & IT	SAMI	Sweden	More than 5 years
A1 - Prefer to be anonymized	CIO	European CMO 1	-	More than 5 years

Table 2. Categorization of performers' CMO executives (C Level/Directors) surveyed during the analysis (N=9). Survey guarantee confidentiality and anonymity by default.

Finally, the data analysis is developed by using the framework proposed by Miles and Huberman (Miles & Huberman, 1994). The analysis was the result of an iterative process, including the and the review of the relevant literature on the topic.

### 3 FINDINGS AND DISCUSSION

Research findings are presented in the following four sections: first an overview of the main music blockchain projects with participation of at least one CMO, as well as the main trends identified during the process. Then, building on the experts' survey, authors provide an examination of the digital transformation challenges both in the music industry as a whole and in the particular case of performers' collective management. Third section discusses the present and future of blockchain-based implementations, including experts' reflections about the main advantages/opportunities and difficulties/challenges ahead.

#### *3.1 CMOs managing rights in musical works: a map of the main blockchain projects in music*

Table 3 displays the results of the desk research about blockchain projects in music developed and/or participated by at least one CMO managing rights in musical works. This analysis is a snapshot of the blockchain strategies of this type of organization and it is limited by the available information publicly. However, it is useful to understand the main trends in terms of scope, state of development of the projects and relevance in their digital transformation strategies, especially considering common areas and approaches.

During desk research, authors have found that blockchain projects with the participation of CMO started in 2017. Previously, Teosto, the organization that manages the copyrights of music authors in Finland, joined the Music Tech Fest Blockchain Lab in Berlin, 2016. During a five days-course, experts with different backgrounds explored ways in which blockchain technology could improve the music industry REF. The result was a white paper summarizing the pros and cons of blockchain, considering the perspective of different stakeholders.

Next year, in 2017, Teosto launched Pigeon, a joint project with the Finnish private company Chainfrog. In addition, Teosto partnered their counterparts Koda (Denmark) and Tono (Norway) under the Polaris Nordic alliance. They aim to build a backend system for music rights collection and distribution. In 2019, the joint project partnered up with the private blockchain-based company Revelator.

Also in 2017, PRS (United Kingdom), ASCAP (United States) and SACEM (France) announced their collaboration in ELIXIR, the first joint projects involving three of the main authors' organizations in the world. As in the case of Pigeon, ELIXIR was a pilot project to understand the potential of blockchain technology but with no specific roadmap to the commercial phase in the short term.

From 2017 to 2022, authors have found seven additional projects with participation of at least one CMO. The analysis of them brings some common aspects. First, blockchain projects seems to be an issue of

authors' CMO. The exploratory partner project between SENA and BUMA (Netherlands) in 2019 is the unique project lead by a performers' organization and it was just a preliminary study.

Besides, the state of development of the projects is rather exploratory: the majority are pilots with no clear roadmap to the commercial phase, apart from those led by JASRAP (Japan). Furthermore, there are only two projects in production, both in 2022, developed by SACEM (France) and JASRAP (Japan). SACEM's project, Musicstart, is a service that allows authors/composers/arrangers to create proof of anteriority on their creations. The service is offered by URights, a subsidiary of SACEM and it is free for its members. Non-members could choose to pay to protect one work (one-off payment of 3.99€), or a subscription model to protect as much works they want to (4.99€ per month). In the case of JASRAP's project, KENDRIX, is the logical evolution of their previous works. In this case, they have developed a management tool for musical works of their members, aiming to solve common issues among creators such as object unauthorized use and spoofing of their music.

As a summary from this analysis, authors concludes that the adoption of blockchain is far to be a reality for organizations managing rights in musical works. Desk research does not permit to draw strong conclusions on the causes of this slow adoption curve, but the quantity and the size of the projects reveal that, at the time of writing, blockchain is more a commercial or marketing-oriented word than a technological driver for this type of organizations.

Table 3. Blockchain projects developed and/or participated by at least one CMO (musical works)

Project Solution /	URL	CMO(s) (Country)	Type of members <sup>i</sup>	Degree of implementation	Launch Year	Main objective / Description
ELIXIR - Joint project: SACEM, PRS, ASCAP	<a href="https://www.prsformusic.com/press/2017/prs-for-music-ascap-and-sacem-initiate-joint-blockchain-project">https://www.prsformusic.com/press/2017/prs-for-music-ascap-and-sacem-initiate-joint-blockchain-project</a>	SACEM (France) PRS (UK) ASCAP (US)	Authors / Publishers	Pilot	2017	The goal of the project is to prototype how the music industry could create and adopt a shared, decentralized database of musical work metadata with real-time update and tracking capabilities.
Pigeon – Joint project Teosto and Chainfrog	<a href="https://www.teosto.fi/en/teosto-develops-a-blockchain-platform-for-music-copyright-organisations/">https://www.teosto.fi/en/teosto-develops-a-blockchain-platform-for-music-copyright-organisations/</a>	Teosto (Finland)	Authors / Publishers	Prototype, pilot	2017	Developing a blockchain platform for faster and more transparent tracking and processing of royalties for music authors and publishers

<p>Joint project: SENA-BUMA</p>	<p><a href="https://sena.nl/files/original/sena-annual-report2019.pdf">https://sena.nl/files/original/sena-annual-report2019.pdf</a> <a href="https://sena.nl/files/original/sena-annual-report2019.pdf">https://sena.nl/files/original/sena-annual-report2019.pdf</a></p>	<p>SENA (Netherlands)</p> <p>BUMA (Netherlands)</p>	<p>Artists / Owners of the master</p> <p>Authors / Publishers</p>	<p>Preliminar study</p>	<p>2019</p>	<p>Joint study on how blockchain technology might be integrated into the music rights field. After an in-depth exploration of the pros and cons, it was decided not to make any further investments into the possible implementation of this technology at this time.</p>
<p>Joint Project: Revelator, BMAT, and Teosto</p>	<p><a href="https://www.teosto.fi/en/faster-payments-for-music-rights-holders-pilot-project-by-teosto-revelator-and-bmat/">https://www.teosto.fi/en/faster-payments-for-music-rights-holders-pilot-project-by-teosto-revelator-and-bmat/</a> <a href="http://bloomen.io/how-and-why-teosto-the-cmo-of-finland-supports-exchange-of-metadata-of-musical-works/">http://bloomen.io/how-and-why-teosto-the-cmo-of-finland-supports-exchange-of-metadata-of-musical-works/</a></p>	<p>Teosto (Finland)</p>	<p>Authors / Publishers</p>	<p>Pilot</p>	<p>2019</p>	<p>Polaris Works API</p> <p>Kendraio</p>
<p>JASRAC, verification experiment</p>	<p>-</p>	<p>JASRAC (Japan)</p>	<p>Authors / Publishers</p>	<p>Trial</p>	<p>2019</p>	<p>Verification experiment on the use of blockchain to manage transaction records for copyrighted material usage</p>

JASRAC demonstration experiment	<a href="https://www.jasrac.or.jp/ejhp/release/2020/0204.html">https://www.jasrac.or.jp/ejhp/release/2020/0204.html</a>	JASRAC (Japan)	Authors / Publishers	Trial	2020	Demonstration experiment by developing a blockchain base and web application that will record "hash value of digital content", "creator ID", "timestamp information" for each music work. Arbitrary metadata relating to the music work can also be added to this record
Joint project: Algorand, SIAE	<a href="https://algorand.com/resources/ecosystem-announcements/siae-launches-4-million-nfts-on-algorand-for-creators">https://algorand.com/resources/ecosystem-announcements/siae-launches-4-million-nfts-on-algorand-for-creators</a>	SIAE (Italy)	Authors / Publishers	Pilot	2021	-
MusicStart	<a href="https://www.musicstart.com/">https://www.musicstart.com/</a>	SACEM (France)	Authors / Publishers	In production, beta	2022	A new blockchain-based creative protection service, available via its subsidiary URights, allowing authors or composers, including beginners, to create

						proof of anteriority of their creations
KENDRIX	<a href="https://kendrix.jp">https://kendrix.jp</a> <a href="https://www.jasrac.or.jp/ejhp/release/2022/0628.html">https://www.jasrac.or.jp/ejhp/release/2022/0628.html</a>	JASRAC (Japan)	Authors / Publishers	In production, beta	2022	Closed system to manage and certificate the works.

<sup>i</sup> Authors and/or publishers; featured performers / non featured performers and/or owners of the master.

### 3.2 Digital transformation challenges in music industry / collective management and the role of blockchain

#### 3.2.1 Digital transformation challenges

Table 4 shows the average score received by the five proposed digital transformation themes. According to the feedback from surveyed executives, massive data storage is the main impactful challenge for CMOs in the medium term, followed by information trustability and integration architectures. On the other side, massive data processing and data visualization seem to be the less relevant digital transformation aspects to be considered significant by the digital transformation strategies of the CMOs. Deepening in the results, none of the respondents have considered data visualization as the main challenge for their companies during the next 5 years.

Technology challenge	Data Visualization	Massive data processing	Integration architectures	Information trustability	Massive data storage
CMO executives (N = 9)	1,89	2,67	3,33	3,44	3,67

Table 4 – Survey respondents - Technology challenges average score

#### 3.2.2 Relevance of new technologies

Similarly, Table 5 displays the average score received by the eight considered technologies in terms of the impact on the CMOs operations during the next 5 years. Artificial Intelligence (AI) and Machine Learning (ML) lead the survey, followed by cloud storage & computing, Internet of Things (IoT) and real time synchronization systems. Blockchain and Robotic Process Automation (RPA), with the same average score and Virtual Reality (VR) and/or Augmented Reality closed the rating as the less impactful technologies for the interviewees' company operations.

Technology	VR and/or AR	Robotic Process Automation (RPA)	Blockchain	Real-time sync systems	Internet of Things (IoT)	Cloud Storage and computing	Machine Learning (ML)	Artificial Intelligence (AI)
CMO executives (N = 9)	3,44	4,11	4,11	4,44	4,67	4,89	5,11	5,22



Table 5 – Survey's respondents - Technology impact prevision average score.

### 3.3 *About the adoption of blockchain: present, future and challenges ahead*

#### 3.3.1 *Blockchain current adoption*

Regarding to the potential adoption of blockchain for their activities, only three of the CMOs in the sample have conducted or plan to conduct research or pilot projects in this area, with no practical implementation at the time of writing. Besides, none of the CMOs in the sample use currently blockchain technology to manage music rights and distribute royalties. In addition, interviewees do not provide any blockchain-based solutions in other CMO, additionally to those gathered in the Table 3 as a result of the desk research. Specifically, Kendrix (JASRAC, Japan), Teosto initiatives and joint project among PRS, SACEM and ASCAP are just mentioned as examples.

Considering the representativeness of the sample, these answers are insightful about current the state of development and adoption of blockchain in this field.

#### 3.3.2 *Future of blockchain adoption in music industry and/or in collective management*

Looking into the future, there is no common understanding about if there is an opportunity in the use of blockchain in music industry and/or in collective management, but none of the surveyed executives consider blockchain is the solution for data management problems and, as a consequence, none of them think it will be adopted in the short or medium term.

Two of them summarized as follows:

*“I do not see that blockchain will revolutionize the industry as a whole, but it will find implementations in certain areas and maybe grow organically over time.”*

*“I don't think blockchain will impact the music industry as a whole.*

*You can achieve the same results with already-existing technologies. There's no need to reinvent the wheel.”*

In particular, two of them do not even consider any opportunity for this technology in music industry. One of them, Mark Douglas, CIO in PPL (UK) details publicly their views on that in summer of 2022 (Music Business Worldwide, 2022).

Mark Douglas (CIO at PPL, UK): *“[...] This key attribute of blockchains doesn't address the challenges we face in music data. Our problem is that the necessary data is not being captured in the first place. Our problem has never been not having a tamper-proof place to store that data, it has been one of data management. ”*

Rest of the surveyed executives considers that blockchain could help at some extent. While most of these types of answers are references to general advantages of the technology (traceability, trust, transparency, immutability...), two interviewees provide potential examples in terms of and payments.

*“Most logical response is that a) blockchain will be used to include all rights, participations, identifiers and credentials of all actors during the production process of a recording (i.e. create the digital footprint of the recording); b) blockchain will be used to clear rights and usage and make pay per play possible via microtransactions to all right holders using smart contracts.”*

*“At CMO level, blockchain could be used to build a global database or monitoring, assuring that information is immutable.”*

In practical terms, there exists a general agreement to note that governance and not technological issues will be the main barrier to put into practice.

*“However, I do not think the music industry will resolve governance issues in the next 10 or more years when it comes to blockchain.”*

*“The main barrier to implement this type of solution would not be technological, but in terms of governance.”*

*“Could be hard to implement a solution that is accepted and used by all parties.”*

Building on these governance issues, several of the interviewees note that the main problem to be solve is the low quality of the data, especially in the initial moment when a musical work is created. There are misinformation, mistakes, and omissions when information related to the musical work is fixed primary, and these issues are dragged along time.

During his interview in Music Business Worldwide, Mark Douglas pointed out this issue as fundamental:

*“Firstly, it is a fundamental shift in behaviours we need. We need artists, and those around them, to understand the importance of data management and to then follow good processes to make sure that it is captured and passed on. [...]”*

*Secondly, the absence of a counterparty to verify the data that is being added to a blockchain is a problem. So much so that the primary strength of a blockchain becomes its massive Achilles’ heel.”*

Two of the C level interviewees emphasized similar arguments related to the data quality and to the difficulties to establish a s:

*“Integrity and immutability of the data are smaller issues than data quality.”* (Related to the opportunity of blockchain and main challenges/risks)

*“There are no authoritative sources of data to create the first link of the chain.”*

#### **4 PRELIMINARY CONCLUSIONS**

This paper aims to evaluate the opportunities and challenges of blockchain in the digital transformation of music industry as a whole and in the case of collective management organizations

Building on desk research and primary data from a representative survey with performers’ CMO executives, results provide deeper insights into the real perspectives of adoption of this technology within the music industry.

As first insight, the paper provides a map with the main projects during the period 2017-2022. The conducted desk research shows that there are a limited number of blockchain projects led and/or with relevant participation of CMO. Going deeper, most of them are just research, proof of concept or pilots, far from a massive commercial phase. Authors’ CMOs from Finland (Teosto), Japan (JASRAP) and France (SACEM) appear as the most active organizations in this field, with no performers’ CMO developing projects in this field according to publicly available information.

From the point of view of CMO, massive data storage, information trustability and integration architectures are the most significant challenges when considering their digital transformation strategies. Consequently, artificial intelligence and machine learning, first, and cloud storage and computing, secondly, appear as the key technological enablers for these organizations in the short and medium term.

On the other side, blockchain is not a priority. It cannot solve the ‘original sin’ when we talk about attribution problems in music industry: data is not being properly caught when music is created. In governance issues far ahead technological aspects emerge as the main barriers to overcome when music industry consider to adopt blockchain.

The consequence is that, at the time of writing, CMO probably will not lead the adoption of blockchain, and it is not a central issue in any of their digital transformation strategies. They wait and see how the rest of the music industry adopt (or not) blockchain in a reactive position

These insights and conclusions are framed as a snapshot in an ever-increasing complex environment as music industry. The main limitations are due to the nature of the sample, in this case limited to executives of performers’ CMO, not including organizations managing authors/composers rights or other relevant stakeholders such as labels or publishers. Despite the long experience of the interviewed executives in

music industry permit to guarantee the consistency of the results, further research could broaden the sample to include some of these other roles/stakeholders, looking for new visions in terms of strategy.

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## ANNEXES

### *A - Questionnaire for CMO managers/executives*

Thank you for your time to contribute to this research.

The purpose of the research is studying the challenges from the digital transformation of the music industry.

Particularly, we will start analyzing the level of knowledge about blockchain technology applied to the collective management of intellectual property rights and the perception of its possible usefulness for Collective Management Organizations (CMOs).

In addition, this research aims to know the advantages or disadvantages observed by actors in CMOs who have participated in experiences using blockchain-based systems and the advantages/opportunities and difficulties/challenges they have observed in relation to the implementation of the technology.

The questionnaire takes about 20 minutes to be completed.

Please, we really appreciate any recommendation about people in and/or out of your organization to answer the questionnaire.

- **Interviewed background**

- Name and surname
- Professional experience in music industry:
  - More than 5 years
  - Between 2 and 5 years
  - Less than 2 years
- Current company name and position:
- Are you working now in a CMO?:
- Currently I am working in a CMO that manages intellectual property rights for...
  - Artist/featured performers
  - Non featured performers
  - Owners of the masters /rightholders
  - Publishing companies/rightholders
  - Songwriters and/or composers
  - Other

- General questions about technology in music industry and collective management
  - "What technology challenges do you believe will have the most significant impact on the future of your company's operations in the next 5 years?"
    - Data visualization
    - Massive data processing
    - Integration architectures
    - Information trustability
    - Massive data storage
  - "What new technologies do you believe will have the most significant impact on the future of your company's operations in the next 5 years?"
    - Virtual Reality (VR) and/or Augmented Reality (AR)
    - Robotic Process Automation (RPA)
    - Blockchain
    - Real-time sync systems
    - Internet of Things (IoT)
    - Cloud storage & Computing
    - Machine Learning
    - Artificial Intelligence
  - From your point of view, do you see any opportunity in the use of blockchain in the music industry? For what?:
  - What risk(s)/challenge(s) do you see for the use of blockchain technology in the music industry in the future?:
  - Is there any opportunity/benefit(s) of blockchain technology to collective management? Which?
  - What are the challenges/risks of blockchain technology to collective management?
  - Has your organization conducted any research or pilot projects to explore the potential use of blockchain technology? Any practical implementation? For what?
  - Do you know/can you provide any specific examples of blockchain-based solutions in other CMO or in the music industry in general?
  - How do you see the use of blockchain technology impacting the music industry as a whole, and how do you plan to stay ahead of the curve in this regard?
- Specific questions about the current/potential use of blockchain
- Does your organization currently use blockchain technology to manage music rights and distribute royalties?
  - Yes
  - No
  - For those answering Yes:
    - How does your organization currently use blockchain technology to manage music rights and distribute royalties?



- Can you provide more details about the specific blockchain-based solutions that your organization is currently using or developing to manage music rights and distribute royalties?
- What is the main challenge has your organization faced in implementing and using blockchain technology? And how are your organization addressing it?
- Has the use of blockchain technology improved the transparency and efficiency of your royalty distribution process? How?
- Have you encountered any challenges or concerns related to the security and scalability of blockchain technology? How have you addressed these issues?
- How has your organization worked with other stakeholders (e.g. music creators, right holders, technology partners) to develop and implement blockchain-based solutions for the management of music rights?
- What advice would you give to other CMOs considering your experience on the use of blockchain technology in their operations?
- How do you globally assess the introduction of blockchain in your company
- For those answering No:
  - Do you envision the adoption and implementation of blockchain technology in your organization in the mid/long term (>3-5years). If so, what steps are you taking to prepare for this?
  - What potential benefits would you see for your organization in using blockchain technology to manage music rights and distribute royalties in the future?
  - What potential risks/challenges do you see for your organization in using blockchain technology to manage music rights and distribute royalties in the future?
  - How do you see blockchain-based solutions evolving in the future, and what steps are your organization taking to stay ahead of the curve in this regard?
- Confidentiality
  - Would you like to provide us permission to link your name/position/company name to your responses in the report?
  - Would you like to provide us permission to mention your position/company name in the list of respondents to the questionnaire?