



centre
national
de la musique

Music streaming: impact of UCPS settlement model
Common methodology calculations and analysis

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1. Introduction

In its capacity as an observatory for the music sector in France, the Centre national de la musique (CNM) has been commissioned by the Ministry of Culture to carry out a study into the impact of online music platforms switching to a new royalty distribution system called a User-Centric Payment System (UCPS).





The CNM first conducted an initial interview stage with a variety of digital music industry stakeholders in France, followed by an in-depth analysis of the online music platforms' different royalty distribution model calculation methods. This enabled the CNM, with support from Deloitte, to develop a common methodology that allows the various participating music streaming platforms to perform a comparable analysis.

The methodology outlined below is designed to explain in detail the data, data processing and necessary analysis for studying the impact of switching to the UCPS on the music streaming industry. The participating music platforms will execute this methodology on their respective music catalogues. The results produced will be analysed and compared by Deloitte, and will result in a conclusion on the impact of switching to the UCPS.

2. Scope

2.1 Scope definitions

As part of this study lead by the CNM, data will be processed and analysed covering the following scopes:

 <p>Type of user scope: paying subscribers <i>Only paying subscribers will be considered in the study. Freemium users are disregarded.</i></p>	 <p>Time-related scope: 2019 calendar year <i>In order to compensate for seasonal or circumstantial behaviour, the study will be carried out over a period of 12 consecutive months.</i></p>
 <p>Geographic scope: subscribers in France <i>In order to assess the overall impact, the study will be conducted on all French consumption (no sampling) and include content from all countries.</i></p>	 <p>Music scope: the whole catalogue <i>The study covers the whole music catalogue (specific to each platform, excluding podcasts) to ensure the impact can be assessed overall.</i></p>

2.2 Analysis approach

In order to carry out an analysis, multi-layered calculations over different time periods are required. These will be carried out on a monthly basis. Secondly, they will be aggregated over the total duration of the study, i.e. 12 months.

The common methodology integrates the notions of *numeris* and *temporis* values for the two models compared (the current pro-rata model and the user-centric model):

- The *numeris* approach counts the individual number of streams (a listening time of 180 seconds corresponds to one stream). It is the most commonly used approach and is currently used by the large majority of online music platforms;
- The *temporis* approach counts streams according to their duration (in this instance, a listening time of 180 seconds corresponds to 180 seconds of listening time). This approach came up multiple times during our interviews carried out before the common methodology was devised. As such, it was deemed that this approach should be integrated into the common methodology. Some music industry actors pushed for the inclusion of this model, however there remains very little research in the area.

For this study, there will be a special focus on the *numeris* approach as it best corresponds to the model most commonly used today. However, examining the *temporis* approach remains important (subject to feasibility), in a foresight approach.

3. Limitations

The section presents the outline of the common methodology as well as its limitations. A lack of shared common definitions or nomenclature for certain complex notions implies choices and trade-offs were required to establish a common methodology.

Type of users

Freemium users are excluded from this study (this offer allows ad-supported streaming on an online music service, thus subscriptions are financed by advertising). This decision stems from discussions with industry stakeholders. The current pro-rata model is coherent with the freemium offer as advertising revenue is proportional and dependant on user consumption. Therefore, it is not necessary to evaluate the impact of the UCPS on this scope.

However, all paying subscribers - including multi-user subscriptions (i.e. family pack, duo) - are integrated into the scope of this study. For the latter, the user-centric approach will be applied in the same way for each user, and thus the subscription fees will be split equally amongst active users. Therefore, the UCPS calculation is exactly the same for each user, regardless of their subscription type.

Identifying the rights-holder

The common methodology is executed using data from online music platforms. The rights-holder is identified according to a code identifying the authorised distributor of the rights to a track. This user name enables the distributor to be identified, and not the producer, writer, composer or publisher. Furthermore, this special feature prevents the producer behind the contractual relationship with the supplier, or even independent labels distributed by the major labels, from being identified. Platforms are well aware of this issue however no workaround is possible to date.

Country of production

In the common methodology, a track's country of production is an essential parameter which enables the visibility and exposure of French-produced songs to be measured, amongst other things. The country of production is identified using the country code listed with the ISRC for every recording. The ISRC code identifies the registered country in which a song was recorded. Despite the limitations (e.g. a new ISRC code issued when the producer changes) inherent in the use of the ISRC code in identifying the country of production, it is the most reliable, commonly used and widely available form of information available to date.

Track release data

A track's release data can be used to distinguish new releases (frontline) from tracks that are part of the back catalogue. In theory, this piece of information is unchanging. However, in practice, a track's release date on a streaming platform may correspond to the date first historically released, the date first released on a specific streaming platform, or the release date of a compilation which the song features on, etc. It is the distributor who declares this piece of information and it is difficult to correct. Within the framework of the common methodology, when a track's first release date is missing, the date the track in question was first released on the streaming platform will be applied. As such, in this study, some tracks will be categorised as new (release date less than 18 months ago) while their release date is in fact earlier than the threshold defined for this category. Streaming platforms are well aware of this approximation, and no other more reliable solution has been developed to date.

Language in which a song is sung

The language in which a song is sung is a very important piece of information for monitoring the progress of and understanding the exposure of French-speaking content. However, there is no shared classification or exhaustive metadata for this piece of information (language in which song is sung, track's lyrics...) and data is currently extracted on an experimental basis by a small number of actors in the music industry. The ISRC code for the country of production cannot be used to determine the language in which a song is sung. As a consequence, the common methodology will not carry out an analysis based on the information concerning the language in which a song is sung.

Track music genres

Music genres are subjective notions for which there are no shared definitions used by the entire music industry to date. Nonetheless, this piece of information is vital for studying the impact of switching to UCPS on music diversity. In the absence

of common definitions and an up-to-date list, the music genres used in the common methodology are those used by streaming platforms. In this study, genre classifications are specific to each platform. Consequently, comparisons between information based on music genre cannot be made between platforms.

This constraint means a methodological choice has to be made when accounting for genres. Take the following example: track 1 (pop), track 2 (pop, rock), track 3 (pop, rock, pop rock); the genres will be recorded as follows: 50% pop (3/6) 33% rock (2/6) and 17% pop rock (1/6).

Opening dialogue on indicators for monitoring musical diversity exposure and visibility will lead to common definitions which could subsequently enhance this common methodology.

An artist's main music genre

In order to determine musical diversity promotion within the top-ranked artists, the common methodology resorts to assigning one and only music genre to each artist. Assigning the main music genre is determined from the genre which is most assigned to the artist's tracks. Although this method of identification remains imprecise and reductive, to date it is the most suitable estimation.

Artists by nationality

Diversity amongst the top-ranked artists can be measured in various different ways. One way could be to look at the different artist nationalities represented in the different tiers. However, this information is not always communicated to platforms and is relatively difficult to verify. Consequently, artist nationality will not be taken into consideration for this study.

Forecasts

Results obtained will have been compiled from archive data. It would be necessary to evaluate the impact on the French market over the years to come by predicting on streaming consumption and streaming behaviour based on economic growth data from mature markets. However, this would be a huge undertaking and imply extended delays. Such forecasts could provide an estimate of the time needed to recover from losses linked to adopting the UCPS.

4. Data

Several business objects and parameters will be used in the different processes. The tables below summarise the list of data which will be necessary for carrying out an analysis. Details on definitions and calculation methods are outlined in section 5.

The data presented in this section and outlined in section 5 form the bare essentials for carrying out the analysis as described in sections 7 and 8.

4.1 Data on users

Data	Type	Description
User name	untreated, attributed	User name associated with user, created when opening an account.
Age	untreated, declared	User's age, declared by the user.
Gender	untreated, declared	User's gender
Subscription type	untreated, attributed	Subscription chosen by user (e.g.: solo, family, student...).
Number of users linked to subscription	untreated, attributed	Number of users linked to the subscription type.
Subscription fee	untreated, attributed	Cost (including VAT) of user's subscription package.
Age category	calculated	User's age category based on what age they declare.
Account activity	calculated	Binary indicator which helps define whether the user is active or not over the assessed period.
Number of streams	calculated	The number of streams lasting more than 30 consecutive seconds.
Consumer behaviour type	calculated	Type of consumer behaviour calculated based on user's consumption (<i>heavy user, mid user, low user, inactive user</i>).
Streaming diversity - number of artists streamed	calculated	The number of separate artists listened to over the assessed period.
Streaming diversity – number of genres	calculated	The number of separate music genres listened to over the assessed period.
Total streaming duration	calculated	The total duration of all the user's streams.

4.1 Data on streams

Data	Type	Description
Stream identifier	untreated, attributed	Unique identifier associated with the stream when generated by the user.

User name	untreated	User name of the user behind the stream.
Track identifier	untreated	Unique identifier of the track that has been streamed.
Artist identifier	untreated	Unique identifier of the artist responsible for the track that has been streamed.
Rights-holder identifier	untreated	Unique identifier of the rights-holder behind the track that has been streamed.
Date streamed	untreated	Calendar day on which stream was made.
Stream duration	untreated	Stream duration in seconds.
Streaming source	untreated	Recommended or self-chosen stream.
MCPS numeris value	calculated	Value extracted from MCPS based on number of streams.
UCPS numeris value	calculated	Value extracted from UCPS based on number of streams.
MCPS temporis value	calculated	Value extracted from MCPS based on number of streams.
UCPS temporis value	calculated	Value extracted from UCPS based on number of streams.

4.2 Data on artists

Data	Type	Description
Artist identifier	untreated, attributed	Unique identifier associated with and which identifies the artist.
Main music genre	calculated	Music genre corresponding to the main music genre of tracks by the artist.
Number of unique listeners	calculated	Number of listeners who listened to the artist at least once during the assessed period.
Total number of streams	calculated	Number of streams of all tracks by the artist over the assessed period.
MCPS numeris value	calculated	Sum of MCPS <i>numeris</i> value for all streams linked to the artist.
UCPS numeris value	calculated	Sum of UCPS <i>numeris</i> value for all streams linked to the artist.
MCPS temporis value	calculated	Sum of MCPS <i>numeris</i> value for all streams linked to the artist.
UCPS temporis value	calculated	Sum of UCPS <i>numeris</i> value for all streams linked to the artist.

4.3 Data on rights-holders

Data	Type	Description
Rights-holder identifier	untreated, attributed	Unique identifier associated with and which identifies the rights-holder.
Type of rights-holder	calculated	Distinction between major and independent rights-holders.
MCPS numeris value	calculated	Sum of MCPS <i>numeris</i> value for all streams linked to the rights-holder.

UCPS numeris value	calculated	Sum of UCPS <i>numeris</i> value for all streams linked to the rights-holder.
MCPS temporis value	calculated	Sum of MCPS <i>numeris</i> value for all streams linked to the rights-holder.
UCPS temporis value	calculated	Sum of UCPS <i>numeris</i> value for all streams linked to the rights-holder.

4.4 Data on tracks

Data	Type	Description
Track identifier	untreated, attributed	Unique identifier linked to track when integrated into the platform's catalogue.
Artist identifier	untreated, attributed	Unique identifier of the artist performing the track.
Rights-holder identifier	untreated, attributed	Unique identifier of the rights-holder of the track.
ISRC code	untreated	Code from the International Standard Recording Code system.
Country of production	untreated	Country in which the song was produced.
Release date	untreated, attributed	Release date on the platform.
Track age category	calculated	Distinction between new releases and back catalogue.
Music genre	calculated	Music genres linked to the track.
Number of streams	calculated	The number of times the track was streamed by listeners during the assessed period.
Number of unique listeners	calculated	Number of unique listeners that streamed the track during the assessed period.
MCPS <i>numeris</i> value	calculated	Sum of MCPS <i>numeris</i> value for all streams linked to the track.
UCPS <i>numeris</i> value	calculated	Sum of UCPS <i>numeris</i> value for all streams linked to the track.
MCPS <i>temporis</i> value	calculated	Sum of MCPS <i>numeris</i> value for all streams linked to the track.
UCPS <i>temporis</i> value	calculated	Sum of UCPS <i>numeris</i> value for all streams linked to the track.

5. Parameter definitions

Section 5 details the definitions and calculation methods of the data presented in section 4. The data must be calculated on a monthly basis over the study's total time scope (12 months).

5.1 User parameters

5.1.1 User – User name

Definition: The User's user name is a unique identifier and guarantees to identify the User and their music consumption (or rather, the number of streams generated by the User).

The user name may exist in different forms, but must comply with the rule of uniqueness.

5.1.2 User – Age

Definition: The User's age is declared by the User when they create their account or can be updated *a posteriori*. The age value is numerical but can also not be defined.

5.1.3 User – Gender

Definition: The User's gender is the gender declared by the User when they create their account. The gender can be male, female, non-binary or unspecified.

5.1.4 User – Subscription type

Definition: The subscription type corresponds to the description of the service offer to which the User has subscribed. Each subscription type has different parameters, including the subscription fee. If there are sub-offers (or services), these will be grouped together within usual generic categories (standard, duo, family, student, discovery, etc.).

5.1.5 User – Number of users linked to a subscription

Definition: Number of User(s) sharing the subscription. Parameter necessary in the specific case of group offers (e.g.: family account that can have up to six sub-accounts.).

5.1.6 User – Subscription fee

Definition: The User's subscription fee corresponds to the price (including VAT) paid by the User to access the online music service.

5.1.7 User – Age category

Definition: A User's age category is defined as follows:

- any User who has declared their age as between 0 and 17 years old belongs to the "0-17" age category;
- any User who has declared their age as between 18 and 25 years old belongs to the "18-25" age category;
- any User who has declared their age as between 26 and 35 years old belongs to the "26-35" age category;
- any User who has declared their age as between 36 and 45 years old belongs to the "36-45" age category;
- any User who has declared their age as between 46 and 55 years old belongs to the "46-55" age category;
- any User who has declared their age as between 56 and 65 years old belongs to the "56-65" age category;
- any User who has declared their age as 66 years old or more belongs to the "66+" age category;
- any User who has not declared their age belongs to the "n/a" age category.

5.1.8 User – Account activity

Definition: The activity indicator defines whether the User is considered as active or not for the month assessed:

- if the User has not streamed any music for more than 30 seconds in the month they are considered as **inactive**;
- otherwise, the User is considered as **active**.

If the data used includes only active Users as defined above and only streams that last more than 30 seconds, the activity indicator is not necessary.

5.1.9 User – Number of streams

Definition: The number of streams made by a User represents the number of times the User listened to a track for a duration of more than 30 consecutive seconds.

5.1.10 User – Consumer behaviour type

Definition: A User's consumption behaviour type is defined based on different tiers of the number of monthly streams per User. Identifying the 1st and 3rd quartile of the number of monthly streams per User enables the following segments to be defined:

- **heavy user:**
3rd quartile value
< Number of streams generated by User X
- **mid user**
1st Quartile value
< Number of streams generated by User X
< 3rd quartile value
- **low user**
Number of streams generated by User X
< 1st quartile value
- **inactive user**
Number of streams generated by User X = 0

The User segments definitions are based on tiers defined relatively according to general consumption, this ensures that current consumption and any possible change is persistently defined mathematically.

N.B.: User segments are demarcated by statistical levels depending on consumption. Adopting this definition ensures that user segmentation is defined precisely and mathematically, and will be constantly re-evaluated in relation to overall consumption.

5.1.11 User – Streaming diversity – number of artists streamed

Definition: Streaming diversity in terms of the number of artists streamed is defined as the number of distinct artists listened to over the assessed period.

$$User\ X's\ streaming\ diversity\ (artists) = \sum distinct\ artists\ streamed$$

5.1.12 User – Streaming diversity – number of music genres

Definition: Streaming diversity in terms of the number of artists streamed is defined as the number of distinct music genres listened to over the assessed period.

$$User\ X's\ streaming\ diversity\ (music\ genres) = \sum distinct\ music\ genres\ streamed$$

5.1.13 User – Total streaming duration

Definition: The total streaming duration is defined as the sum of the duration of all streams lasting more than 30 seconds.

$$User\ X's\ total\ streaming\ duration = \sum_{User\ X's\ streams}^n Duration\ of\ streams$$

5.2 Stream parameters

5.2.1 Stream – Stream identifier

Definition: A stream's identifier is unique and guarantees to identify each stream.

The identifier may exist in different forms, but must comply with the rule of uniqueness.

5.2.2 Stream – User name

Definition: The user name of the User behind the stream.

5.2.3 Stream – Track identifier

Definition: The unique identifier of a track which has been listened to.

5.2.4 Stream – Artist identifier

Definition: Unique identifier of the artist responsible for the track that has been streamed.

5.2.5 Stream – Rights-holder identifier

Definition: Unique identifier of the rights-holder who holds the copyright to the track that has been streamed.

5.2.6 Stream – Date streamed

Definition: The date streamed corresponds to the date (day, month, year) in which the stream was made.

5.2.7 Stream – Stream duration

Definition: Stream duration corresponds to the duration in seconds of the time spent by the User listening to the track in question.

5.2.8 Stream – Streaming source

Definition: The source of the stream corresponds to the way in which the stream was made. The stream can either be self-chosen by the User, or recommended by the platform.

5.2.9 Stream – MCPS numeris value

Definition: The MCPS *numeris* value for a stream is defined in section 6.1.

5.2.10 Stream – UCPS numeris value

Definition: The UCPS *numeris* value for a stream is defined in section 6.2.

5.2.11 Stream – MCPS temporis value

Definition: The MCPS *temporis* value for a stream is defined in section 6.3.

5.2.12 Stream – UCPS temporis value

Definition: The UCPS *temporis* value for a stream is defined in section 6.4.

5.3 Artist parameters

5.3.1 Artist – Artist identifier

Definition: An artist's identifier is unique and guarantees the identification of the artist and their tracks. The identifier may exist in different forms, but must comply with the rule of uniqueness.

5.3.2 Artist – Main music genre

Definition: The artist's music genre corresponds to the main music genre of all streamed tracks by the artist.

Recording data: The associated musical genre(s) are identified for each track that has been streamed for at least 30 consecutive seconds over the period. Amongst these tracks, the most represented genre constitutes the artist's main music genre.

5.3.3 Artist – Number of unique listeners

Definition: The number of unique listeners corresponds to the sum of listeners who listened to one of the artist's tracks at least once.

5.3.4 Artist – Total number of streams

Definition: An artist's total number of streams is defined as the total number of streams of all tracks by the artist over the assessed period. One stream equates to a listening time of 30 continuous seconds made by one User.

5.3.5 Artist – MCPS *numeris* value

Definition: The *numeris* value assigned to an artist, calculated from the Market-Centric Payment System, is calculated as the sum of all MCPS *numeris* values for streams (cf. 5.2.9) linked to the artist.

5.3.6 Artist – UCPS *numeris* value

Definition: The *numeris* value assigned to an artist, calculated from the User-Centric Payment System, is calculated as the sum of all UCPS *numeris* values for streams (cf. 5.2.10) linked to the artist.

5.3.7 Artist - MCPS *temporis* value

Definition: The *temporis* value assigned to an artist, calculated from the Market-Centric Payment System, is calculated as the sum of all MCPS *temporis* values for streams (cf. 5.2.11) linked to the artist.

5.3.8 Artist - UCPS *temporis* value

Definition The *temporis* value assigned to an artist, calculated from the User-Centric Payment System, is calculated as the sum of all UCPS *temporis* values for streams (cf. 5.2.12) linked to the artist.

5.4 Rights-holders parameters

5.4.1 Rights-holder – Identifier

Definition: A rights-holder identifier is unique and guarantees the identification of the rights-holder (in the case of this study: the distributor) and their music tracks. The identifier may exist in different forms, but must comply with the rule of uniqueness.

5.4.2 Rights-holder – Type of rights-holder

Definition: The type of rights-holder refers to the distinction between the group of five predominant rights-holders and the other rights-holders as distributors. Thus each beneficiary will be defined in a binary way (1 = yes, 0 = no), as to whether or not they belong to this group.

5.4.3 Rights-holder – MCPS *numeris* value

Definition: The *numeris* value assigned to a rights-holder, calculated from the Market-Centric Payment System, is calculated as the sum of all MCPS *numeris* values for streams (cf. 5.2.9) linked to the rights-holder.

5.4.4 Rights-holder – UCPS *numeris* value

Definition: The *numeris* value assigned to a rights-holder, calculated from the User-Centric Payment System, is calculated as the sum of all UCPS *numeris* values for streams (cf. 5.2.10) linked to the rights-holder.

5.4.5 Rights-holder - MCPS *temporis* value

Definition: The *temporis* value assigned to a rights-holder, calculated from the Market-Centric Payment System, is calculated at the sum of all MCPS *temporis* values for streams (cf. 5.2.11) linked to the rights-holder.

5.4.6 Rights-holder - UCPS *temporis* value

Definition: The *temporis* value assigned to a rights-holder, calculated from the User-Centric Payment System, is calculated at the sum of all UCPS *temporis* values for streams (cf. 5.2.12) linked to the rights-holder.

5.5 Track parameter

5.5.1 Track – Track identifier

Definition: A track identifier is unique and guarantees the identification of the track and each associate stream. The identifier may exist in different forms, but must comply with the rule of uniqueness.

5.5.2 Track – Artist identifier

Definition: The artist identifier of a track corresponds to the identifier of the artist who performs the song. For multi-artist tracks:

- if the track is an artist collaboration, the main artist is identified as the one who publishes the track on their album;
- if the track features two major artists on a track that does not feature on an album (e.g.: a single), the main artist is identified as the artist who generated the most streams during the month assessed.

5.5.3 Track – Rights-holder identifier

Definition: The identifier of the rights-holder of the track which corresponds to the authorised distributor who holds the copyrights to the track.

5.5.4 Track – ISRC code

Definition: The ISRC code (International Standard Recording Code) is a code assigned to each recording. It includes information concerning the country of recording and the producer.

5.5.5 Track – Country of production

Definition: A track's country of production is identified via the country code in the ISRC code of the track, equivalent to the country of registration. The country code respects international two-letter nomenclature (ISO 3166-1 alpha-2).

5.5.6 Track – Release date

Definition: A track's release date corresponds to the date on which the track was released on the online music platform.

5.5.7 Track – Track age category

Definition: The purpose of dividing the age of a track into segments is to identify new releases (frontline) and tracks that are part of the back catalogue. If the track was released in the last 18 months from the month in which data processing was carried out, then the track is considered to be new. Beyond these 18 months, the track is considered to belong to the back catalogue.

5.5.8 Track – Music genre

Definition: A track's music genre corresponds to one or more musical aesthetics to which the track is attached. The definition and classification of genres is specific to each platform (see section 3). If a track is not qualified or qualifiable, then it should be assigned the category "unknown genre" (an impact analysis will not be feasible on this category).

Recording data: One or more music genres can be assigned to a track. When recording tracks by music genre, the track is counted for each music genre it is assigned to.

5.5.9 Track – Number of streams

Definition: The number of streams for a track is defined as the total number of times a track was streamed by Users during the assessed period.

5.5.10 Track – Number of unique listeners

Definition: The number of unique listeners for a track is defined as the total sum of unique listeners who have listened to the track at least once over the assessed period.

5.5.11 Track – MCPS *numeris* value

Definition: The *numeris* value assigned to tracks, calculated from the Market-Centric Payment System, is calculated as the sum of all MCPS *numeris* values for streams (cf. 5.2.9) linked to the track.

5.5.12 Track – UCPS *numeris* value

Definition: The *numeris* value assigned to tracks, calculated from the User-Centric Payment System, is calculated as the sum of all UCPS *numeris* values for streams (cf. 5.2.10) linked to the track.

5.5.13 Track - MCPS *temporis* value

Definition: The *temporis* value assigned to tracks, calculated from the Market-Centric Payment System, is calculated as the sum of all MCPS *temporis* values for streams (cf. 5.2.11) linked to the track.

5.5.14 Track - UCPS *temporis* value

Definition: The *temporis* value assigned to tracks, calculated from the User-Centric Payment System, is calculated as the sum of all UCPS *temporis* values for streams (cf. 5.2.12) linked to the track.

6. Distribution models

In order to analyse the different distribution models, they must be compared against the same standard: the market share. Breaking down royalty distribution by calculating market share means the impact of different models can be evaluated according to a common and comparable measure between models.

The market share allocated to tracks, artists or rights-holders will be calculated using streaming platforms' streaming data, by calculating the royalty distribution for each stream (one stream equates to a listening time of at least 30 consecutive seconds) according to the definition of the distribution model (and its own specific parameters which govern royalty distribution).

Thus a comparable measure (the market share) will be calculated from consumption data (which is independent of the models) by calculating the value distribution of each stream according to the parameters of each model assessed. This will ensure a sound comparison of models (MCPS *numeris* vs UCPS *numeris*, MCPS *temporis* vs UCPS *temporis*).

NB: In value distribution, the definition of "value" is specific to each model and is not synonymous with remuneration. Remuneration evolution for a track, artist or rights-holder will be detected via the evolution of value distribution.

6.1 MCPS *numeris* value

Under the Market-Centric Payment System *numeris* model, remuneration is calculated as the total number of streams for a track divided by the total number of streams, which is then multiplied by the total amount of royalties generated by the platform (1).

$$MCPS \text{ numeris remuneration for track } A = \frac{\text{total n}^\circ \text{ of streams for track } A}{\text{total n}^\circ \text{ streams}} * \text{total amount of revenue}$$

Under the MCPS *numeris* model, revenue per stream is the same for all streams, thus all streams have the same worth. It is calculated as the total amount of royalties generated by the platform over the assessed period, divided by the total number of streams.

$$MCPS \text{ numeris remuneration per stream} = \frac{\text{total amount of revenue}}{\text{total n}^\circ \text{ of streams}}$$

Therefore, the **MCPS *numeris* value** for one stream is the same for all streams. It can be defined as a unit value, assigning the **value of 1 for each stream made**.

$$MCPS \text{ numeris value for one stream} = 1$$

6.2 UCPS *numeris* value

Under the UCPS *numeris* model, remuneration per track is calculated as the sum of royalties allocated by streams made for the track in question. User-allocated royalties are calculated as the user's total number of streams for a track divided by the user's total number of streams, the result of which is then multiplied by the amount of royalties generated by the user.

$$UCPS \text{ numeris remuneration for track } A = \sum_{X \in \text{users}} \frac{\text{user } X\text{'s total n}^\circ \text{ of streams for track } A}{\text{user } X\text{'s total n}^\circ \text{ of streams}} * \text{amount of revenue generated by user } X$$

With the UCPS *numeris* model, the payout per stream is user-specific. It is calculated by dividing the revenue generated by the user by the user's total number of streams.

Thus, the **UCPS *numeris* value** for one stream depends on the user's activity and the user-generated revenue. It can be defined as a **unitary value (one) for each stream, divided by the user's total number of streams over the given period, divided by the revenue generated by the user.**

$$UCPS\ numeris\ value\ for\ one\ stream = \frac{1}{\frac{user\ X's\ total\ number\ of\ streams}{revenue\ generated\ by\ user\ X}}$$

NB: In the case whereby the user has not used the service over the given period, and thus their total number of streams is zero, royalties cannot be distributed according to the user's streaming behaviour. In this case, the revenue generated by the user is distributed equally amongst other users with the same type of subscription.

6.3 MCPS *temporis* value

The MCPS *temporis* value takes into account the duration of a stream for royalty distribution. Remuneration per track is calculated as the sum of the duration of streams for a track divided by the total sum of the duration of all streams. This amount is then multiplied by the total amount of royalties generated by the platform.

$$MCPS\ temporis\ remuneration\ for\ track\ A = \frac{sum\ of\ the\ duration\ of\ streams\ of\ track\ A}{sum\ of\ the\ duration\ of\ all\ streams} * total\ amount\ of\ revenue$$

With the MCPS *temporis* model, the payout per stream depends on the duration of streams made. It is calculated as the stream duration divided by the total sum of the duration of all streams, which is then multiplied by the total amount of royalties generated by the platform over the assessed period.

$$MCPS\ temporis\ remuneration\ per\ stream = \frac{stream\ duration}{total\ sum\ of\ the\ duration\ of\ all\ streams} * total\ amount\ of\ revenue$$

Thus, the **MCPS *temporis* value** for one stream depends only on its duration. This means it can be calculated by the **duration of a stream in seconds.**

$$MCPS\ temporis\ value\ for\ one\ stream = stream\ duration$$

6.4 UCPS *temporis* value

Under the UCPS *temporis* model, remuneration per track is calculated as the sum of royalties allocated by streams made for the track in question. User-allocated royalties are calculated as the total duration of streams for a track divided by the user's total duration of all streams, the result of which is multiplied by the amount revenue generated by the user.

$$UCPS\ temporis\ remuneration\ for\ track\ A = \sum_{X \in users} \frac{user\ X's\ total\ duration\ of\ streams\ of\ track\ A}{user\ X's\ total\ duration\ of\ all\ streams} * amount\ of\ revenue\ generated\ by\ user\ X$$

With the UCPS *temporis* model, the payout per stream is user-specific and depends on the duration of each stream. It is calculated by the amount of revenue generated by the user divided by the user's total number of streams.

UCPS temporis remuneration per stream per user X

$$= \frac{\text{user X's total duration of streams of track A}}{\text{user X's total duration of all streams}} * \text{amount of revenue generated by user X}$$

Thus, the **UCPS *temporis* value** for one stream depends on the duration of the user's streams and the user-generated revenue. For each stream, it can be calculated as **the stream duration divided by the user's total duration of streams over the given period, the result of which is divided by the amount of royalties generated by the user.**

$$\text{UCPS temporis value for one stream} = \frac{\text{stream duration}}{\frac{\text{user X's total duration of streams}}{\text{amount of revenue generated by the user}}}$$

NB: In the case whereby the user has not used the service over the given period, revenue generated by the user is distributed equally amongst other users with the same type of subscription.

7. Descriptive data analysis

To support and reinforce the assessment of the impact of switching to a UCPS, a descriptive analysis of the data used for this study is necessary. The indicators and statistics will be calculated for each month as well as on all data within the scope of the study, and will be used to complete the results analysis.

7.1 Indicators

Number of active unique users (via user name, cf. 5.1.1)

Number of distinct streams (via stream identifier, cf. 5.2.1)

Number of distinct artists (via artist identifier, cf. 5.3.1)

Number of distinct rights-holders (via rights-holder identifier, cf. 5.4.1)

Number of distinct music tracks (via track identifier, cf. 5.5.1)

Number and list of countries of production (via the country of production code, cf. 5.5.5)

Number and list of distinct music genres (via the list of music genres, cf. 5.5.7)

7.2 Distributions

Distribution is expressed as an absolute value (number) as well as a relative value (percentage).

7.2.1 Users

Distribution of users by genre (via user name and genre, cf. 5.1.1 and 5.1.3)

Distribution of users by subscription type (via user name and subscription type, cf. 5.1.1 and 5.1.4)

Distribution of users by age category (via user name and age category, cf. 5.1.1 and 5.1.7)

Distribution of users by consumer behaviour type (via user name and consumer behaviour segment cf. 5.1.1 and 5.1.10)

Distribution of users by consumer behaviour type by age category (via user name, age category and consumer behaviour segment, cf. 5.1.1, 5.1.7 and 5.1.10)

Sum of users' subscription fees per consumer behaviour segment (via user name, subscription fee and consumer behaviour segment, cf. 5.1.1, 5.1.6 and 5.1.10)

7.2.2 Artists

Distribution of artists by main music genre (via artist identifier and main music genre, cf. 5.3.1 and 5.3.2)

7.2.3 Rights-holders

Distribution of rights-holders by type (via rights-holder identifier and type of rights-holder, cf. 5.4.1 and 5.4.2)

7.2.4 Tracks

Distribution of tracks by country of production (via track identifier and country of production, cf. 5.5.1 and 5.5.5)

Distribution of tracks by track age category (via track identifier and track age category, cf. 5.5.1 and 5.5.7)

Distribution of tracks by music genre (via track identifier and music genre, cf. 5.5.1 and 5.5.8)

Distribution of tracks by rights-holder (via track identifier and rights-holder identifier, cf. 5.5.1 and 5.5.3)

7.2.5 Streams

Distribution of streams by age category (via stream identifier and age category, cf. 5.2.1 and 5.1.6)

Distribution of streams by subscription type (via stream identifier and subscription type, cf. 5.2.1 and 5.1.3)

Distribution of streams by consumer behaviour type (via stream identifier and consumer behaviour type cf. 5.2.1 and 5.1.9)

Distribution of streams by country of production (via stream identifier and country of recording cf. 5.2.1 and 5.5.5)

Distribution of streams by track age category (via stream identifier and track age category, cf. 5.2.1 and 5.5.7)

Distribution of streams by music genre (via stream identifier and music genre, cf. 5.2.1 and 5.5.8)

Distribution of streams by track tier group (via stream identifier and track identifier, cf. 5.2.1 and 5.2.3)

- According to the number of streams; Top 1 to Top 10, Top 11 to Top 100, Top 101 to Top 1,000, Top 1,001 to Top 10,000, Top 10,001 to Top 100,000, Top 100,001 to Top 1,000,000, Top 1,000,001 up to the last-ranked track.

Distribution of streams by artist tier group (via stream identifier and artist identifier, cf. 5.2.1 and 5.2.4)

- According to the number of streams; Top 1 to Top 10, Top 11 to Top 100, Top 101 to Top 1,000, Top 1,001 to Top 10,000, Top 10,001 up to the last-ranked track.

Distribution of streams by type of rights-holder (via stream identifier and music genre, cf. 5.2.1 and 5.2.5)

Distribution of streams by streaming source (via stream identifier and streaming source, cf. 5.2.1 and 5.2.8)

8. Analysis of the impact of switching to the UCPS

All data required for the analysis has been calculated beforehand (cf. section 3 and 4). Any new calculations required for an analysis or graph is done as and when.

Each analysis described below will be carried out every month during of the scope of the study. Subsequently, once the analysis has been delivered, the results will be aggregated over the entire study (12 months) so as to draw overall conclusions.

8.1 Value distribution

8.1.1 Value distribution according to different groups

The value distribution analysis is performed by comparing the absolute difference (in percentage point) and the relative difference (in percentage) of market shares between the MCPS and UCPS models (*numeris* and *temporis*) for the following categories:

- The type of rights-holder
- A track's country of production
- Track age category

8.1.2 Value distribution within rankings

The absolute difference (in percentage point) and the relative difference (in percentage) of market shares between the MCPS and UCPS models (for *numeris* and *temporis* values) will be calculated according to the following groups:

- For tracks, from the number of streams:
 - Top 1 to Top 10
 - Top 11 to Top 100
 - Top 101 to Top 1,000
 - Top 1,001 to Top 10,000
 - Top 10,001 to Top 100,000
 - Top 100,001 to Top 1,000,000
 - Top 1,000,001 to the last ranked.
- For artists, from the number of streams:
 - Top 1 to Top 10
 - Top 11 to Top 100
 - Top 101 to Top 1,000
 - Top 1,001 to Top 10,000
 - Top 10,001 to the last ranked.
- For rights-holders, from the number of streams:
 - Top 1 to Top 3
 - Top 4 to Top 5
 - Top 6 to Top 50
 - Top 51 to the last ranked.

The aim of this analysis is to assess the change in value distribution within the pyramid ranking systems.

8.1.3 Concentration index

A concentration index will be calculated for the different market share measurements (*numeris* and *temporis*) of the MCPS and UCPS models for the top 100 rights-holders. This concentration index is equal to the sum of the squares of the rights-holders' market shares:

$$\text{Concentration index} = \sum_{i=1}^n p d m_i^2$$

By comparing the indices between the two models, we can define whether the market is relatively more or less concentrated when the UCPS is adopted.

8.1.4 Value concentration by users

Assessing the value concentration amongst users involves assessing a large number of users and the value they represent. To do this, the absolute (in percentage points) and relative (in percentage) differences in market shares between the MCPS and UCPS (*numeris* and *temporis*) are assessed for the following categories:

- User age group
- Subscription type
- User gender
- Consumer behaviour type

Continuous (non-categorical) parameters are analysed in a similar way. In this case, the analysis is carried out on parameters analysed by decile. These parameters are:

- The total number of all users' streams
- Streaming diversity in terms of the number of artists listened to by users.
- Streaming diversity in terms of the number of music genres listened to by users.

8.2 Supporting diversity

8.2.1 Promoting music genres

Music genre promotion shall be assessed by comparing the absolute difference (in percentage point) and the relative difference (in percentage) of market shares between the MCPS and UCPS (*numeris* and *temporis*) for:

- An artist's main music genre
- Track music genres

The analysis shall be done on the whole catalogue included within the scope of the study.

8.2.2 Exposure according to the ranking method

For artists, assessing exposure within rankings will be carried out by comparing the representativeness of each artist's main music genre according to the following categories:

- Ranking according to number of streams per artist:
 - Top 1 to Top 10
 - Top 11 to Top 100
 - Top 101 to Top 1,000
 - Top 1,001 to Top 10,000
 - Top 10,001 to the last-ranked

For tracks, assessing exposure within rankings will be carried out by comparing the representativeness of each track's music genre and country of production according to the following categories:

- Ranking according to number of streams per track:
 - Top 1 to Top 10
 - Top 11 to Top 100
 - Top 101 to Top 1,000

- Top 1,001 to Top 10,000
- Top 10,001 to Top 100,000
- Top 100,001 to Top 1,000,000
- Top 1,000,001 to the last-ranked.

The differences in distribution between the MCPS and UCPS will determine the difference in exposure between models.

8.3 Fraud & music recommendations

8.3.1 Fraud

An initial approach to assessing the impact of fraud would require fraudulent streaming to be present or integrated in the analysed data. However, in the majority of cases, these types of streams are excluded upstream from the data processing for royalty calculation. As there were no fraudulent data in the analysed database, this impact study cannot be carried out using this approach.

A second approach could be to integrate part of intensive consumption with fraudulent consumption. However, this way of operating remains approximate and naturally presents biases.

In short, as fraudulent techniques are scalable, context-specific (i.e. to the remuneration model used) and are often a step ahead of prevention and detection operations, it is very difficult to assess how robust the models are regarding all types of fraud that currently exist and that will exist quantitatively without being based on assumptions or incorporating bias.

Consequently, analysis in this area will remain qualitative.

8.3.2 Music recommendations

It seems necessary to assess the impact of switching to the UCPS on the type of streaming i.e. self-chosen streaming and streaming chosen by the platforms' music recommendation algorithms.

Exact definitions of the two categories are required for analysis to take place and, to date, no specific description is the subject of a definition shared by all music industry stakeholders.

Furthermore, recommendation algorithms are context specific (i.e. remuneration model, consumption methods, etc.) and will constantly evolve over time according to new applications and new recommendation techniques.

Therefore, the subject shall be approached qualitatively, apart from the descriptive analysis as mentioned in section 7.2.5 (distribution of streams by streaming source) which will remain specific to each of the platforms.



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