A META STUDY OF USER-CENTRIC DISTRIBUTION FOR MUSIC STREAMING

Rasmus Rex Pedersen
Assistant Professor, PhD
Roskilde University

Contents

Executive Summary

This report presents a comparative analysis of existing studies of user-centric distribution (UCD) and discusses the advantages and disadvantages of the user-centric model compared to the current pro rata model.

Four studies have made empirical research on the effects of user-centric distribution, and the main findings from these studies are:

- The record label share is largely the same in the two models.
- The most recent studies in Finland and France suggest that the user-centric model would be a benefit for creators outside the extreme top, however, earlier research in Norway and Denmark to some point contradicts this and points to gains for top and mid-level creators
- A switch to user-centric distribution might benefit local creators.
- The effects of switching to a user-centric model vary significantly between individual creators. Within each segment, there will be some who win from a switch and some who lose out.
- Other demographic characteristics such as age might be significant factors because the current pro rata model rewards high quantity listening. One study found that 18-25 year-olds account for 19% of the users, but generate 24% of the royalties. However, there is a need for more data in order to evaluate the effects in this area.

From a theoretical perspective, the report's main findings are:

- In the pro rata model, there is a disconnect between the business model and royalty distribution model for subscription-based streaming services: royalties are paid out per-stream, even though users pay a flat subscription, which results in a cross-subsidization from the low-streaming user to the heavy-streaming user.
- The comparison of the two models should include both economic considerations and considerations of the intangible value of equity and transparency in the calculation of added value.
- The economic considerations include 1) the economic change due to change in distribution model (which can be either positive or negative for the individual artist) and 2) the decrease in distributable income that is due to the increased administration costs of implementing and running a user-centric model.
- User-centric distribution would not prevent all types of stream fraud, but it would remove the direct financial benefit of the simplest examples.

The report furthermore discusses different aspects that need consideration before implementing a new distribution model.

The report concludes that from a purely economic perspective, the user-centric model will have varying effects for individual creators across segments and that the uniting argument for switching to a user-centric model might be that it increases equity, which should, however, be weighed against the decrease in efficiency and transparency.
Importantly, the distribution model must be implemented at the level of the individual streaming service tier. Therefore, a decision to switch models must be reached in consensus among the stakeholders of the music industry.

1. Introduction

The objective of this meta study is to gather and discuss knowledge from existing studies of User-Centric Distribution (UCD) and, on this basis, analyze the existing knowledge about the effects of a potential introduction of UCD, and the underlying conditions for introducing UCD. This will form the basis for a comparative analysis of the current Pro Rata and potential User-Centric distribution models, with the aim of discussing advantages and disadvantages of the two models – including an assessment of which dimensions to weigh against each other in a potential decision about switching to UCD, as well as a discussion of uncertainties in the existing knowledge base.

First, the report will summarize the main findings of existing empirical research that compares pro rata and user-centric distribution. This includes three publicly available reports analyzing concrete data from streaming services in Norway, Denmark, and Finland. In addition to this, the report also includes main findings from internal research from Deezer, reported by Music Ally.
Second, drawing on theoretically based research papers, the report will compare the two models in terms of their potential for equity, efficiency, fraud, and transparency.

Third, the report will discuss issues that need to be considered before a potential switch to user-centric distribution. This includes discussions of how to handle data, and how a potential decision about shifting models can be made.

2. Principles for Distribution of Revenue from Streaming

This chapter lays out the basic principles for allocation revenue from interactive music streaming services. It should be noted that the actual allocation, as regulated by contracts between digital service providers (streaming services) and licensors (rights holders) are more complex than this. For example, the report does not take into account how any advances or minimum guarantees are handled, and it treats allocation of royalties at the level of an 'artist' or a 'track', even though there are typically multiple rights holders behind each artist and track. This is a choice that reduces complexity in order to provide a better understanding of the effects of the different principles for royalty distribution.

2.1 Pro Rata

The current model for distributing music streaming revenues is a pro rata revenue share model. The basic principle of the pro rata model is that the net licensing revenue after administration costs of a streaming service is allocated to the tracks according to each track's share of total streams. This is done separately for each price tier of the streaming service. The pro rata model can be illustrated as a hypothetical streaming service with only two subscribers and two tracks:

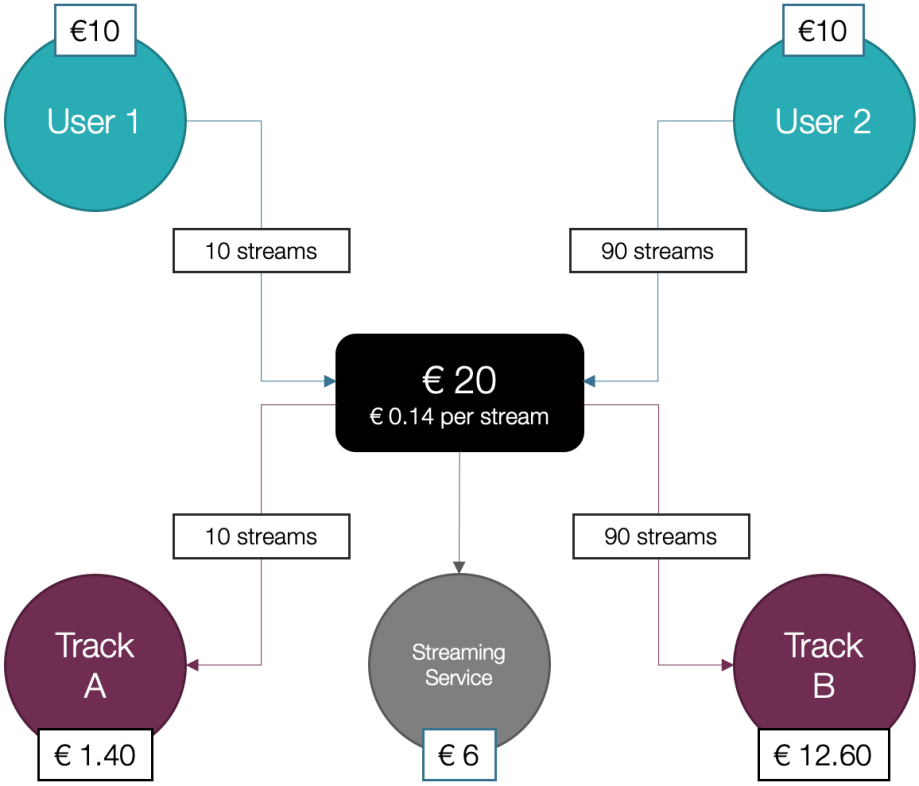

Figure 1: Illustration of the principle behind the Pro Rata model[1]

The pro rata model works as a shared pool model, where all revenue from one price tier is pooled. The streaming service takes approximately 30% to cover overhead costs, and the remaining revenue is then allocated to specific tracks according to their share of total streams. This leads to a cross-subsidization where casual users help finance the consumption of heavy users.
In the illustration above, the net revenue from each subscriber is €10. User 1 streams Track A 10 times and User 2 streams Track B 90 times. Even though the two users generate the same revenue for the service, the track that User 2 streams gets a much higher payout.

As a formula, the pro rata model can be expressed like this:

$$R_a = \frac{S_a}{T} \times R_t$$

Where
R_a = revenue for track a
S_a = streams of track a
T = Total number of streams
R_t = Net total licensing revenue

[1] The illustration is based on a similar illustration at https://www.deezer.com/ucps

2.2 User Centric Distribution

The User-Centric Distribution model represents an alternative to the Pro Rata model. In this model, the revenue is distributed so that it takes account of the different listening practices of individual listeners. The formula for the user-centric model can be illustrated as in figure 2:

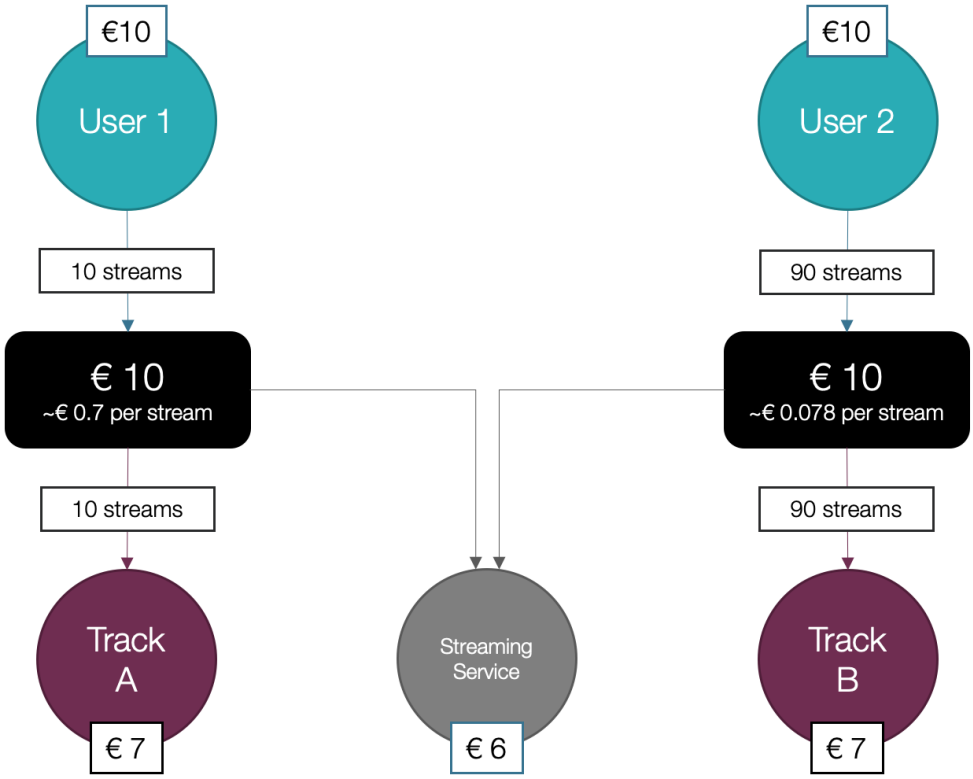

Figure 2: Illustration of the principle behind the User-Centric model[2]

This illustration takes the same example as in figure 1, but with the user-centric model, there is no shared pool. Instead, money paid by one user – after a deduction of 30% to cover overhead costs – is allocated exclusively to the tracks that the user listens to. This means that the value of a single stream will vary depending on how many streams the user has. Furthermore, there is no cross-subsidization in this model.

As a formula, the model can be expressed like this:

$$R_a = \sum_{i=1}^{n} \frac{S_i}{T_i} \times R_i$$

[2] The illustration is based on a similar illustration at https://www.deezer.com/ucps

Where
n = the total number of users
R_a = revenue for track a
S_i = user i's streams of track a
T_i = user i's total number of streams
R_i = Net licensing revenue from user i

3. Empirical Comparisons of Pro Rata and UCD

3.1 Norway: WiMP 2014

The first analysis of the UCD model was published in March 2014 by Arnt Maasø. The report is based on listening patterns for all users of WiMP in Norway in August 2013 and August 2012 (Maasø 2014). Maasø's report outlines the conceptual difference between the pro rata model and the user-centric model as being mainly about how it treats the revenue from the individual subscriber. On this basis, the user-centric model is compared to the model from the era of physical sales because each user's contribution goes to the artists this user is listening to, without being affected by the streaming patterns of other users.

The Norwegian report analyses the consequences of UCD primarily for labels, artists, and local share. The analysis of the consequences for labels provides a perspective that is unique to this report. The report finds that the major labels had a market share of 76% under a pro rata model and that a shift from pro rata to UCD would only result in a shift in market share to 75%, which from a research perspective is seen as a statistically insignificant shift. As seen in figure 3, the differences between the two models are small for all labels, and there is no obvious pattern in the effects between major and independent labels.

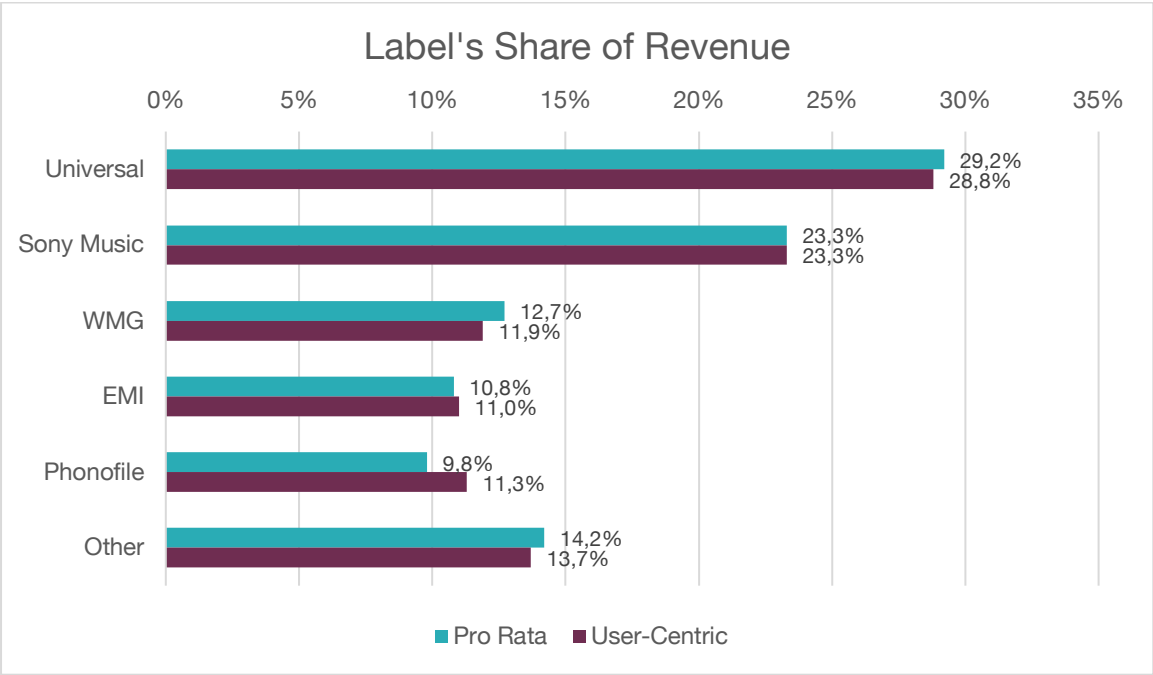

Figure 3: Label's share of revenue based on data from WiMP in Norway, August 2013
Source: Maasø 2014, 6

From an artist perspective, the report analyses all of the approximately 200,000 artists streamed in August 2013. Out of these, the top 5,000 (approximately the top 2.5%) account for 89.2% of all streams under the pro rata model, compared to 89.7% of all streams under the UCD model. This means that in a user-centric model, the very small 'long tail' artists on average would receive a little bit less, whereas the top and medium artists on average would receive a little bit more (see figure 4. Comparing data from 2012 and 2013, the study concludes that there are small fluctuations in the effects for different artist tiers, but that the variations are small.

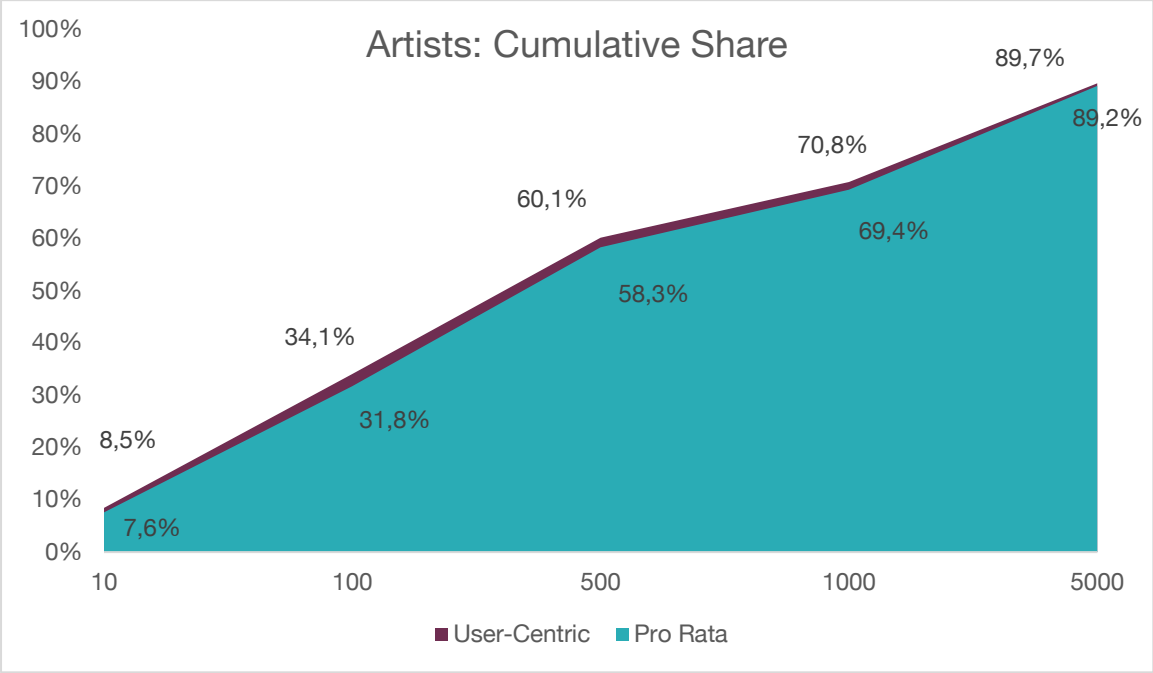

Figure 4: Cumulative revenue share of artists based on data from WiMP in Norway, August 2013
Source: Maasø 2014, 6

Focusing specifically on the revenue share for domestic artists (based on a manual tagging of the country of origin of the artists) among the top 5,000 artists, Maasø's study shows that domestic artists would benefit from a user-centric distribution. Among the top 5,000 artists, Norwegian artists' share of revenue would increase from 22.5% using the pro rata model to 25.4% using UCD (see figure 5).

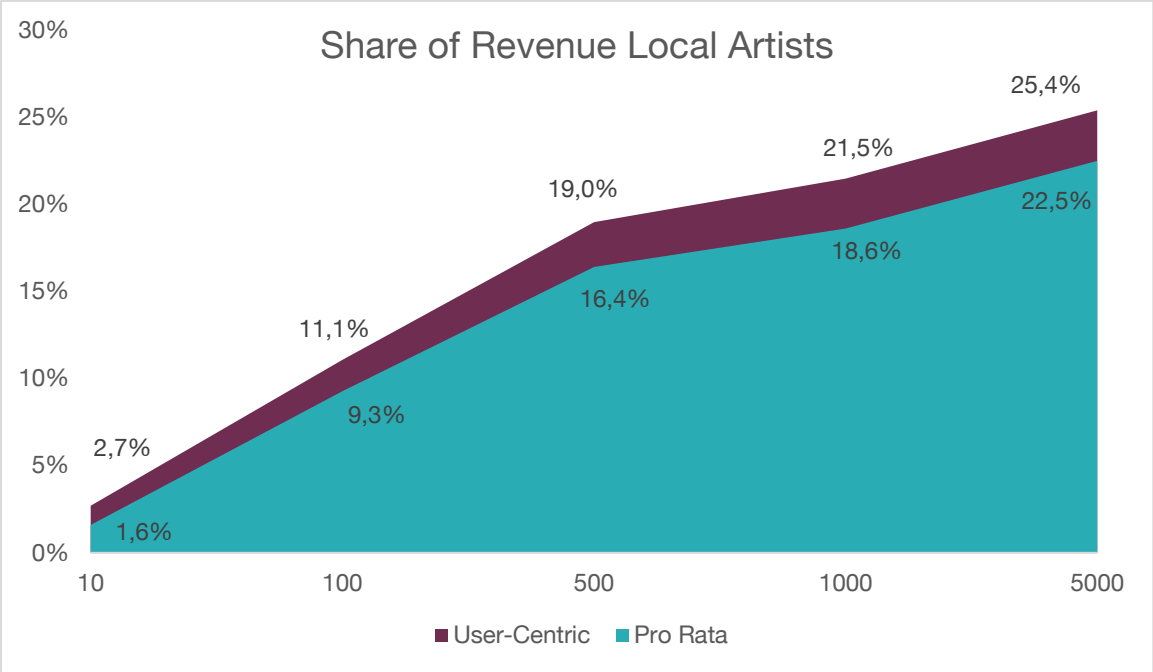

Figure 5: Cumulative revenue share of local artists based on data from WiMP in Norway, August 2013
Source: Maasø 2014, 7

3.2 Denmark: WiMP 2014

A second report on the UCD model was published in Denmark in May 2014 (the author of the Danish study is also the author of this meta study). Like Maasø's report, the Danish study is based on domestic data from WiMP from August 2013. The analysis in the Danish report focuses on the artist perspective and adapts some focus points from Maasø's report in order to make the results comparable.

Like in the Norwegian study, the Danish study shows only a very small difference between the two models in terms of the share of revenue that goes to the very small 'long tail' artists outside the top 5,000. In contrast to the Norwegian findings, the Danish suggest that these artists account for 91.2% with the pro rata model and 91.1% with UCD. The Danish study also analyzes the differences between the two models among the artists in the top 5,000 and finds that UCD would benefit primarily the top 100 artists. As can be seen in figure 6, the graphs of the cumulated share close in on each other between 100 and 5,000, and because the graph is cumulated, this means that the artists in these segments would benefit from a pro rata model (Pedersen 2014).

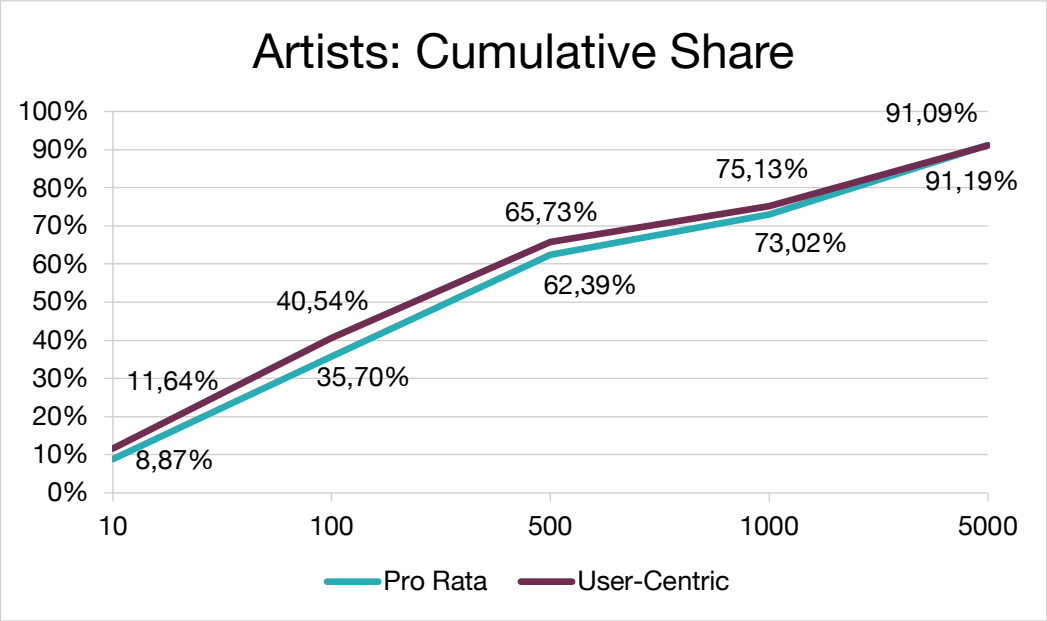

Figure 6: Cumulative revenue share based on data from WiMP in Denmark, August 2013
Source: Pedersen 2014, 7

The Danish report also focuses on the revenue share for domestic artists among the top 5,000 based on manual tagging of the artists' country of origin. Like the Norwegian study, this shows that domestic artists among the top 5,000 would see an increased revenue share with a change in distribution principle from 30.8% using the pro rata model to 33.9% using the user-centric model (see figure 7).

The increase would primarily benefit Danish artists in the top 500, who would see a relative increase of 12.5% using UCD. Artists between 500 and 1,000 would see a very small increase, and artists between 1,000 and 5,000 would see a very small decrease using UCD.

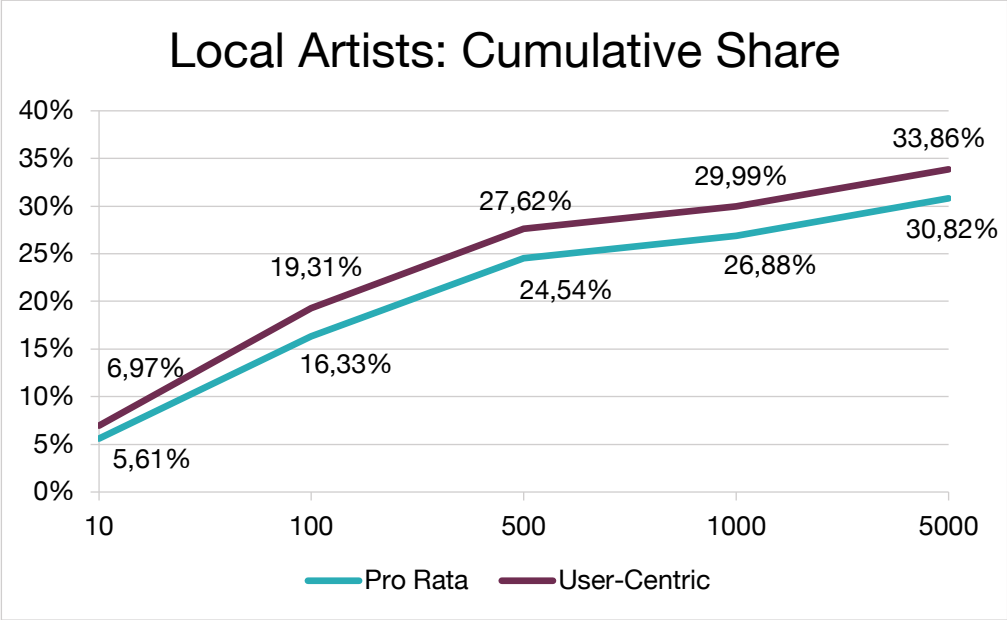

Figure 7: Cumulative revenue share of domestic artists based on data from WiMP in Denmark, August 2013
Source: Pedersen 2014, 8

Both the Norwegian and Danish reports compare the pro rata and user-centric models using averages for each segment of artists. It is, however, important to note that the actual implications vary from artist to artist within each segment. The Danish study included data on this that was not published in the initial report but has relevant information for this meta study and is therefore included here.

Because the consequences vary from artist to artist, it might be relevant to ask about the proportion of artists that would benefit from UCD. Here, the Danish study finds that only 28.8% of the top 5,000 artists would benefit from UCD, whereas the remaining 71.2% would be better off with the current pro rata model. The only segments where a majority of artists would benefit from UCD are the top 50 of all artists, and the top 100 of Danish artists (see figures 8 and 9).

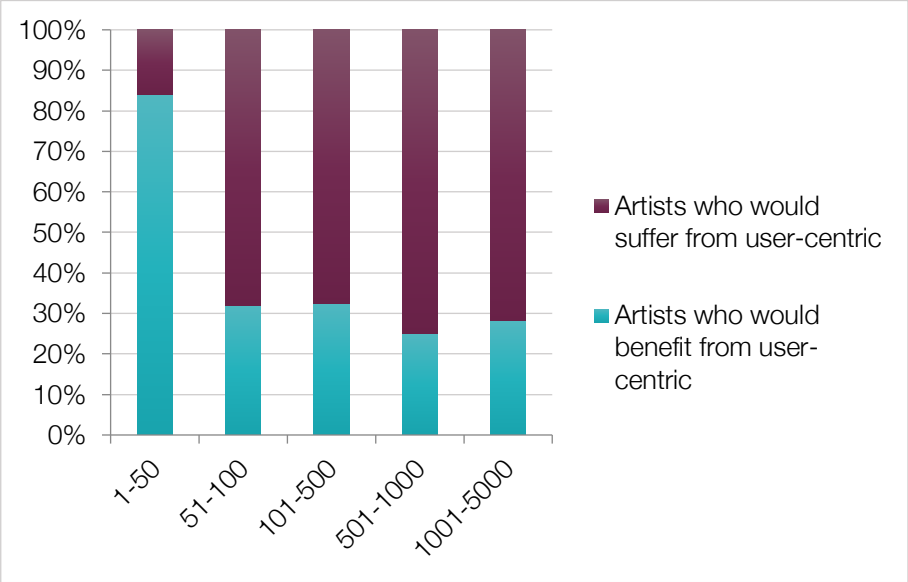

Figure 8: Proportion of artists that benefit from UCD, data from WiMP Denmark August 2013

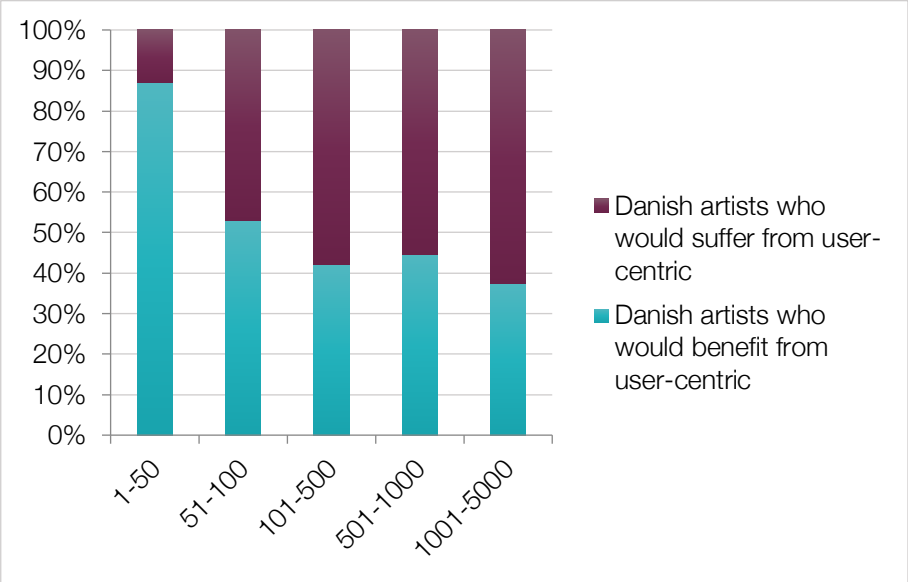

Figure 9: Proportion of Danish artists that benefit from UCD, data from WiMP Denmark August 2013

3.3 Finland: Spotify 2017

The most recent report comparing pro rata and UCD is the Finnish study *Pro Rata and User Centric Distribution Models: A Comparative Study* written by Jari Muikku, and published in November 2017. The report includes statistical analysis by Dr. Pradeep Durgam of Aalto University and is based on all streams by Spotify Premium subscribers in Finland in March 2016, which amounted to more than eight million streams.
This report uses a different method than the two other reports and takes a random sample of 10,000 tracks to represent the whole material. This sample included tracks from 4,493 individual artists and 22,496 streams, listened by 8,051 user IDs (Muikku 2017).

The statistical analysis uses a Pearson Two-Tailed Correlation Analysis method that shows a high correlation between the stream counts of individual artists and the revenue difference between the pro rata and user-centric models. This indicates that user-centric revenue for tracks with a smaller number of streams gets bigger as the total number of streams per user gets smaller (Muikku 2017, 8).

Muikku divides artists into three tiers, and compare the two models for each of the tiers:

- The *top-tier* artists that have 100+ streams in March 2016. This group constitutes approximately 0.4% of the sample
- The *mid-tier* artists that have between 10-99 streams in March 2016. This group constitutes approximately 9.6% of the sample
- The basic-tier artists that have between 1-9 streams in March 2016. This group constitutes approximately 90% of the sample

The study finds that the revenue share for top-tier artists is 9.9% under the pro rata model, which would decrease to 5.6% under UCD. In this sense, the current pro rata model is found to favor the top-tier artists. The results for the mid-tier and basic-tier artists are more mixed. Some artists in these tiers would get more, and some would get less using the user-centric model. However, on average, these tiers would benefit from a user-centric model.

Muikku's study has not done statistical comparisons of the impact for domestic artists but observes that there does not seem to be any difference between domestic and international artists.

Of the three existing studies comparing pro rata and user-centric distribution models, the Finnish study has the most recent dataset. Furthermore, this dataset is provided by Spotify, which is the most popular subscription DSP for music streaming. In this sense, the Finnish report probably has a more reliable dataset than the Norwegian and Danish reports that use data from an earlier period, where music streaming was still in an early phase, and from WiMP, which was not the leading streaming service of those countries at the time.
However, there are questions of validity about the Finnish study. In music streaming, the most popular artists account for an extremely high share of all streams, and using a random sample to represent the whole dataset means that there is a risk of leaving out the very few most popular artists

that account for a majority of streams. In Muikku's report, having just 100+ streams qualify an artist to be part of the 0.4% artists in the top-tier, which seems to suggest that the threshold for being a top-tier artist has been set too low. The report does not directly address this issue, so it remains unclear whether the main finding in this report – that the current pro rata model favors the most popular artists, whereas UCD would benefit mid-tier and basic-tier artists – can be explained by the sampling method used, and if it also holds for the very few extremely popular artists.

3.4 France: Deezer 2018

The French streaming service has been a notable proponent of UCD. In 2017 they started exploring the opportunity to shift to a user-centric distribution model. There is no official or publicly available report on Deezer's research about the consequences of such a shift. Findings from the internal research were supposed to have been presented at a panel at Tallinn Music Week in March 2020 but was postponed due to the COVID-19 crisis. However, some results of such internal research have surfaced previously, for example in a press briefing in 2019, which is here relayed based on the reporting by Stuart Dredge of musically.com.

One of the main points of the presentation focused on the age bias under the pro rata model, where "18-25 year-olds account for 19% of the users, but generate 24% of the royalties" (Dredge 2019). This addresses the cross-subsidization that happens in the pro rata model, which favors the preferred tracks of heavy listeners at the expense of the preferred tracks of more casual listeners. This tendency could lead to an age bias because on average young people tend to spend more time listening to music than older people.

The presentation also showed that "while the top 10 artists on its service might see a drop of slightly over 10% in their royalties under UCPS, the rest of the top 100 would only see an average dip of just over 3%, with sub single-per-cent declines for artists within the top 10,000, and gains for artists lower down" (Dredge 2019).

From a genre perspective, the presentation showed a complex picture of redistribution. The research suggests that local pop, classical, jazz, and region-specific genres like sertanejo in Brazil or schlager in Germany would benefit from a user-centric model at the expense of genres like hip-hop, R&B, and EDM.

From a label perspective, the Deezer research indicates that they would come out of a potential shift 'largely neutral'. They would lose on some front-line artists but make up for that through gains for some back catalog.

Based on Deezer's presentation, Stuart Dredge of Music Ally emphasizes that these findings are generalizations and that within any of the tiers mentioned above, there will be some artists that gain from the user-centric model, and some that lose out.
Deezer's chief content and strategy officer Alexander Holland was interviewed by Musically.com and also focuses on the fact that the effects for any given artist might change over time. He tells musically.com that "… if you take people who do hip-hop, if they're hit by UCPS now, they may

actually make their money back in the long term, when the people who listen to them are in their forties" (Dredge 2019).

3.5 Summary: What We Know About the Effects of UCD

As the four reports reviewed here show, there are still uncertainties about the effects of a shift from pro rata to user-centric distribution. The early research based on data from WiMP in Norway and Denmark suggests that the effect of a shift would be relatively small and that the artists that would benefit are generally the top and mid-level artists. In contrast to this, the more recent reports from Finland and France suggest that UCD on average would benefit artists outside the extreme top.
All four reports address the consequences for local/domestic artists. The Finnish report has not done a statistical analysis but estimates that there is little difference between the two models. In the other three reports, the statistical analyses indicate that UCD would benefit local artists.
The Norwegian report finds that from a record company perspective, the difference between the two models is insignificant, and this is supported by the reporting from Deezer in France.

The reports primarily compare the models based on artist popularity, but it should be noted that other demographic factors like age might be more relevant parameters in examining the effects. The reporting from Deezer shows that because young users listen to more music, the music they listen to might benefit from the pro rata model.
The reports analyze the models based on averages for different artist segments. However, they also emphasize that the results can vary significantly for the individual artists within these segments.

Finally, the reports all present variations of the argument that the user-centric model can be perceived as more fair because it creates a more direct link between the money the user pays and the money the artist receives because the net revenue from a user's subscription is allocated exclusively among the tracks they actually listen to. This aspect will be elaborated in the next chapter.

4. Theoretical Comparisons of Pro Rata and UCD

On the official site introducing the user-centric model, the streaming service Deezer claims that the user-centric model is fairer than the pro rata model, and defines fairness as[3]:

1) Reducing unfair revenue gaps that come from applying old ways of thinking to digital music
2) Supporting local creators and niche genres
3) Promoting a diverse and vibrant music landscape
4) Fighting fraud

The claim that UCD will benefit local creators is substantiated empirically by the Norwegian and Danish research described earlier in this report. The claim that UCD can promote a diverse and

[3] https://www.deezer.com/ucps

vibrant music scene is very vague, and will therefore not be treated further here. The first and last claims about fighting fraud and increasing fairness will be explored theoretically in this chapter.

4.1 What is a Fair Way of Paying for Streaming?

The answer to the question of what constitutes a fair distribution of streaming royalties depends first on how one understands the business model of a streaming service.
Proponents of UCD often argue that there is a disconnect in the pro rata model between the business model and royalty distribution model for subscription-based streaming services: royalties are paid out per-stream, even though users pay a flat subscription, which results in a cross-subsidization from the low-streaming user to the heavy-streaming user (Dimont 2018, 678).
However, it could also be argued that the value proposition of a streaming subscription is that it offers access to its full catalog of music for a flat rate. Page and Safir evoke an analogy to gym pricing and argue that even if a member of a gym only uses only a few of the gym's machines, access to a wide range of apparatus still contributes to the value (Page and Safir 2018).

It is also worth noting that these considerations apply only to subscription-based streaming services. Services that make their money through advertising rely on a different business model. Here the streaming service in principle earns money per-stream because they expose the user to more advertising the more tracks that listener streams. This adds an extra layer of complexity for a service like Spotify, which offers both a 'free' ad-funded tier and a 'premium' subscription tier.

4.2 Equity and Efficiency of the Two Models

Equity is a main factor in the comparison of the Pro Rata and User-Centric models. However, the balancing of equity and efficiency is integral to the ways CMOs allocate licensing revenue.
In their paper from 2018 *Money in, money out: Lessons from CMOs in allocating and distributing licensing revenue*, Will Page and David Safir argue that CMOs generally have to choose between distributing more revenue less equitably or less revenue more equitably (Page and Safir 2018, 25).

As noted above, the perceived fairness of UCD is pointed out as one of the primary arguments for this model. Page and Safir discuss this as equity and analyze it as potentially adding value for both listeners and artists. They express the added value for listeners under UCD as (Page and Safir 2018, 28):

Added Value [Listener] = T + E
Where: T is the value of transparency and E is the value of equity.

This added value may be either positive or negative, depending on how the listener value transparency of knowing approximately how much the artist will be paid per stream (which is achieved under the pro rata model) relative to the equity of having the listener's subscription allocated to the artists they listen to. Importantly, Page and Safir also note that many listeners might be indifferent.

The added value for artists of UCD can be expressed as (Page & Safir 2018, p. 29):

Added Value [Artiste] = P(d) - P(c) + T + E
Where P(d) is the change in payment due to change in distribution model,
P(c) is the change in payment due to decrease in net distributable revenue,
T is the value of transparency, and E is the value of equity.

The argument here is that the model should include economic considerations along with considerations of the intangible value of equity and transparency in the calculation of added value from the artist perspective. The economic considerations include both the economic change due to change in distribution model (which can be either positive or negative for the individual artist) and the decrease in distributable income that is due to the increased administration costs of transitioning to and maintaining systems that can process the increased amounts of data needed to account for each individual subscriber in UCD.

Page and Safir argue that from an economic standpoint, the tipping point where a shift to UCD would be beneficial is dependent on the size of the increase in administration costs, expressed as:

Tipping Point = where Old Payment ÷ New Payment < New Distributable %

Based on the findings in Muikku's report (2017), they calculate this tipping point for the average artist outside the top 0.4% in the Finnish study to be 4.64% (Page and Safir 2018, 29). This means that if the additional cost of the UCD is above 4.64%, then there would be no financial gain for the average artist. Neither in the top-tier nor the other tiers. As Page and Safir note, it is questionable if it is meaningful to consider the average, given that the model would have a positive impact for some, and negative for others.

4.3 Stream Fraud

Music streaming services have seen some scandals involving stream fraud – also sometimes referred to as 'fake streams'. In February 2018, Music Business Worldwide uncovered the story, that Bulgarian scammers had purchased more than 1,000 Spotify Premium accounts, and used them to play tracks (owned by the scammers) on a loop. Music Business Worldwide estimated that the scammers generated about $1 million from their royalties[4]. In general, the issue of stream fraud has been increasingly concerning for labels and musicians[5].

The term 'stream fraud' covers different types of attempts to increase the stream count of specific tracks –to gain either better chart positions or financial benefits. From a financial perspective, the scam exploits the pro rata model. The scammers can influence the market share of particular tracks by streaming them again and again, and because the pro rata model is based on a shared pool of

[4] https://www.musicbusinessworldwide.com/spotify-still-pays-artists-out-of-one-big-pot-should-the-company-change-its-policy/

[5] https://www.rollingstone.com/music/music-features/fake-streams-indie-labels-spotify-tidal-846641/

revenue, this can generate payouts far beyond the cost of the subscriptions used for streaming the tracks.
User-centric distribution would not prevent scammers from inflating stream counts (e.g. for better chart positions) or hacking existing users' accounts, but it would remove the direct financial benefit of the simple type of stream fraud used in the Bulgarian case, because under the user-centric model the individual subscriber's money is not part of a shared pool, and therefore the payout from one user's streams can never exceed the price of that user's subscription.

4.4 Transparency

The music business has seen increasing calls for transparency over recent years. Digital music consumption leads to more precise and detailed data about how music is being used, and industry actors are increasingly demanding transparency about these data and into the processes and policies behind the allocation of licensing revenue.
The demand for transparency has been fueled by scandals like when Norwegian newspaper *Dagens Næringsliv* in 2018 exposed the story that TIDAL allegedly deliberately manipulated the streaming numbers of specific releases from Beyoncé and Kanye West[6].

The license agreements between streaming services and rights holders typically grant the licensor auditing rights. However, exercising these rights can very costly due to the large amounts of data that need to be processed. In addition to this, the business intelligence that data provides is of significant economic and strategic value to streaming services.

There is an inherent conflict between the streaming services' treatment of data as a proprietary value and rights holders' interest in transparency. Currently, rights holders only have very limited transparency into the basis of royalty collection, but because the pro rata model provides relative stability in the royalty paid for a stream from a specific streaming service tier, rights holders have at least a vague notion of how much they should get paid, based on the number of times they have been streamed. Under a user-centric model, the value of a stream depends on the listening pattern of every single user and is therefore much more unpredictable. In this sense, user-centric distribution makes it even harder to provide transparency into the basis of royalty calculations.

5. Implementation of a User-Centric Distribution Model

Implementing a user-centric distribution model is contingent on streaming data on a subscriber level. Currently, streaming services do not supply data that can be connected to any particular subscription or user ID. Rightsholders typically get aggregated data. A royalty statement provides rights holders with detailed information about every time their tracks have been streamed. The data that rights holders are provided might include information about streaming service and the specific tier of that streaming service, geography, user demographics (age, gender), the device and operating system used, and the source of the stream (artist page, playlist, chart, etc.). However, these data are

[6] https://www.dn.no/staticprojects/special/2018/05/09/0600/dokumentar/strommekuppet/

presented in aggregate, and the rights holders do not have access to information the individual users that stream their music.
This is not because user-level data is not available. Streaming services already use user-level data for targeted advertising and personalized recommendations, and it can safely be assumed that, from a purely technical standpoint, streaming services already have the data available to distribute royalties according to a user-centric model (Dimont 2018, 696).

However, the implementation of UCD is contingent on developing solutions to several issues about data handling. For example:

- Who processes data at the subscriber level?
- How is data delivered to CMOs, publishers, record companies, etc.?
- How to provide transparency for creators (e.g. in the form of royalty statements)?
- What are the increased costs and how are they paid?

These questions will be addressed in the following sections.

5.2 Data Processing

The first question reveals the issue that arises from the fact that the value of a streaming service is not only tied to its ability to sell subscriptions or advertising, but also in its knowledge about its users and their preferences and behaviors. From this perspective, it can be argued that streaming services will be hesitant to provide others with access to the data that represent a core value for them. Streaming services already have the data, and would need to process it in order to pay out royalties to licensors. The licensors would have an interest in knowing the basis for the calculation of their payout. Primarily because the data are necessary for distributing royalties on to the individual creators, but also because it would increase transparency into the basis of the payouts.

5.3 Data Delivery

This opens for the question about how data is delivered to CMOs, publishers, record companies, etc. The data could be delivered in bulk to the individual licensor, who could then make their own calculations and royalty statements. This, however, would be unlikely because it would give individual licensors insights in streaming logs of individual users, and thereby also insights into data that streaming services treat as proprietary, and potentially also data about competitors.
A possible solution to this would be for the streaming services to provide processed data that can then be used to calculate royalties and provide royalty statements. One way of doing this is by using the measure of so-called 'Dedicated Listeners', which was introduced by WiMP as the basis for the Danish study of UCD mentioned in chapter 3.2.
The term 'Dedicated Listener' denotes the equivalent of one subscriber's (listener's) full amount of streams during the period (Pedersen 2014, 5). The 'dedicated listeners' of a track can be calculated as:

$$\sum_{i=1}^{n} \frac{S_i}{T_i}$$

Where
n = the total number of users
S_i = user i's numbers of streams of the track
T_i = user i's total number of streams

The number of dedicated listeners can be used to calculate the revenue for a track by grouping subscribers into different price tiers, and then multiplying the track's dedicated listeners with the net licensing revenue per subscriber for each price tier.

5.4 Transparency for Creators

In terms of transparency, this approach would enable streaming services to deliver data to CMOs, publishers, record companies, etc. in a way that would enable these entities to allocate money to the individual creators without having access to user-level data. It would also provide the basis for a royalty statement for individual creators, where the number of dedicated listeners could provide a link between the stream count and the royalty payout.
However, the individual creator would not, as it is the current pro rata system, be able to compare stream counts and payouts with colleagues to get a rough estimate if royalties were calculated correctly.

5.5 Cost of Data Processing

A transition to UCD would increase the volume of data that needs to be processed in order to allocate money to rights holders. This leads to two central questions: what are the increased costs? And who will pay for the increased costs?

As argued by Page and Safir (see chapter 4.2 of this report), the increased cost of UCD is an important factor in determining the added value of the model and when balancing equity and efficiency of revenue distribution. There are no public systematic estimates of the cost of developing and implementing the technologic systems needed to handle the increased data processing, and the few publicly available estimates are vague and mutually conflicting. On a press conference, representatives from Deezer have said that the solution is already in place and that it should not demand significant investments[7]. On the other hand, Page and Safir (2018) argue that the 'tipping point' is relatively low (4.64%), and seem to imply that that the increased costs of UCD might exceed this, when they write that "Even where the 99.6% stand to receive a bigger slice of the distribution pie under user-centric, the pie may itself have shrunk insofar as there are significant financial costs to adopting and implementing user-centric (as against pro rata) distribution" (Page and Safir 2018, 28).

[7] http://www.musikindustrin.se/2019/09/17/johansson-om-user-centric-soundbetter-youtube-mm/

5.6 Operating Parallel Systems

As noted earlier, it should be noted that the considerations about the advantages and disadvantages of user-centric distribution take account of streaming services based on paid subscriptions. The user-centric model makes sense for paid subscriptions because it aligns the way revenue is generated and allocated. However, for ad-supported streaming services, the pro rata model creates better alignment between how revenue is generated and allocated. When revenue is generated by advertising, the value of a particular user increases when the user spends more time listening.
The consequence of this is that in order to achieve alignment, streaming services that operate both paid and ad-supported tiers need to operate two parallel allocation systems too. This likely would increase the complexity and costs of the data infrastructure.

6. Who Can Decide to Implement User-Centric Distribution?

After considering the pros and cons of the user-centric and pro rata models it is worth also considering who can actually make the decision about which model to follow.
To do this, we must remember that both models are revenue share models, which means that there is no fixed price per stream. In both models, royalties are calculated based on market share. The difference between the models is how market share is understood – as a share of each subscription or as a share of the shared pool. The consequence of this is, that royalties to all rights holders on a particular streaming service tier must be allocated according to the same model, as it is impossible to share revenue according to two different principles at the same time.

This has two important implications for the decision-making process:
1) The model must be implemented at the level of the streaming service (DSP). It is fully possible for different streaming services to have different distribution models – and one streaming service can in principle have multiple models for different subscription tiers – but each streaming service tier can only have one distribution model.
2) Every licensor of a particular streaming service tier must use the same model. No single CMO, publisher, record company, or creator can implement user-centric distribution alone.

It is therefore not possible to implement a change in distribution model without the support from all stakeholders.

7. Conclusion

Comparing the pro rata and user-centric distribution models is a complex task. It pits popularity against diversity, equity against efficiency, and introduces considerations of e.g. fairness, transparency, and data handling.
This report has shown that the effect of switching is not crystal clear. The most recent research suggests that the model would be a benefit for artists outside the extreme top, however, earlier research contradicts this, and points to gains for top and mid-level artists. The existing research agrees that the results can vary significantly for the individual artists within each segment.

The existing research also shows that a switch to UCD might benefit local artists, and that record companies would emerge relatively neutral from a switch.
The decision of what distribution model to use should also consider the intangible value created under the user-centric model by reducing cross-subsidization between low streaming users and high streaming users, fighting streaming fraud, and reducing inequity between how value is created and how revenue is distributed.

However, a switch to user-centric distribution also comes with added costs. The primary cost is connected to the increased amount of data that needs to be processed under the user-centric model. There are also added costs connected to operating parallel systems, as well as less tangible costs of reduced transparency. These costs must be weighed against the advantages of the model when comparing the pro rata and user-centric models.
From a purely economic perspective, the user-centric model will have varying effects for individual creators across segments. This means that the uniting argument for switching to a user-centric model might be that it increases equity, which should, however, be weighed against the decrease in efficiency and transparency.

Importantly, the distribution model must be implemented at the level of the individual streaming service tier. Therefore, a decision to switch models must be reached in consensus among the stakeholders of the music industry.

8. Literature

Dimont, Joseph. 2018. "Royalty Inequity: Why Music Streaming Services Should Switch to a per-Subscriber Model." *Hastings Law Journal* 69 (2): 675–700.

Dredge, Stuart. 2019. "Deezer Steps up Its Efforts to Introduce User- Centric Payments." *Musically.Com*. https://musically.com/2019/09/11/deezer-steps-up-its-efforts-to-introduce-user-centric-payments/.

Maasø, Arnt. 2014. *User-Centric Settlement for Music Streaming*. http://www.hf.uio.no/imv/forskning/prosjekter/skyogscene/publikasjoner/usercentric-cloudsandconcerts-report.pdf.

Muikku, Jari. 2017. *Pro Rata and User Centric Distribution Models: A Comparative Study*. http://www.muusikkojenliitto.fi/wp-content/uploads/2018/02/UC_report_FINAL-2018.pdf.

Page, Will, and David Safir. 2018. *Money in , Money out : Lessons from CMOs in Allocating and Distributing Licensing Revenue*. http://serci.org/congress_documents/2018/money_in_money_out.pdf.

Pedersen, Rasmus Rex. 2014. *Music Streaming In Denmark: An Analysis of Listening Patterns and the Consequences of a per User Settlement Model Based on Streaming Data from WiMP*. http://www.koda.dk/fileadmin/user_upload/docs/Analysis_Music-Streaming-In-Denmark_2014.pdf.