

Inequity by Design

Music Streaming Taxonomies as Ruinous Infrastructure

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Despite the prevalence of music streaming for the past fifteen years, we still know very little about the design and architecture of its software infrastructures and their impact on society. Cultural studies scholarship highlights how music streaming platforms (MSPs) can reproduce geographical disadvantages,¹ as well as the differences between overtagged content—often white, male, Western artists—and undertagged genres,² which inevitably leads to higher exposure and revenue for some. However, the role of specific technologies, and the political-economic forces shaping them, has been insufficiently explored. In previous work, I and others have highlighted the contradictions of existing research on algorithmic music recommendation.³ Despite critical algorithm studies of classification in music streaming and algorithmic recommendation,⁴ it is still unclear which taxonomies of music are used by MSPs. Previous research highlights that algorithmic tools are heavily influenced by the corporate culture of each platform and the individual understandings of those who work in these companies.⁵ Employees' influence in categorizing and marketing music is also confirmed by studies that address the role of human editorial curation.⁶ Moreover, streaming platforms have not adopted established notions of diversity or the common good used by public service media.⁷ The top-down model that has come to represent music streaming calls for further investigation of the ways these taxonomies are produced, distributed, and infrastructurally crystallized.

SOFTWARE AND INFRASTRUCTURES: A FRAMEWORK FOR STREAMING INDUSTRY RESEARCH

Approaching software and coding technologies as pieces of music streaming infrastructure builds on previous research calling for attention to systems of internet architecture, to understand how media content is organized and distributed.⁸ I conceptualize taxonomical systems as infrastructure because they are critical elements to the existence and technical functioning of recommender systems and streaming products such as playlists. Considering digital infrastructures beyond “the [physical] stuff you can kick,”⁹ in Lisa Parks’s words, I contribute to software and critical data studies.¹⁰ Paraphrasing Parks, I consider music streaming software infrastructure to be the stuff you can click—or the stuff (specific commands and seed queries) you are expected to type when you want to stream music—meaning the necessary digital building blocks on which routes for music exploration are designed. In paying attention to the “logical infrastructure”¹¹ of MSPs, I demystify the standards and protocols used for music distribution, marketing, and consumption. Also approaching streaming taxonomies from an anthropological notion of digital infrastructure, I concur with Nick Seaver’s understanding of algorithms as sociotechnical structures.¹² I also further problematize the park ranger metaphor uncovered in his ethnography among software developers,¹³ whereby the designers of MSPs see themselves as tour guides in the wilderness of infinite musical choices. With this metaphor, developers present themselves in a kind light as friendly rangers who escort clueless picnic-goers. It obscures, however, developers’ role in creating the maps, routes, trails, and enclosures that users and audiences follow, absolving them of responsibility for what park plots people visit—and therefore which areas produce revenue—as well as how nature is presented to visitors.

Understanding taxonomical software infrastructure as a navigation map or route through the musical wilderness, here I question the existing digital architecture of music streaming to critically evaluate what is available to the public, how it is designed, for whom, and how politico-economic decisions are made. In doing so, I follow the postcolonial cultural economy approach of Anamik Saha,¹⁴ combining a cultural economy approach to media circulation with a postcolonial approach to race and culture. Therefore, this chapter combines an investigation of the political economy of streaming with an analysis of its cultural politics. I investigate what musical taxonomies are currently used by streaming services, along with the kinds of cultural visions and understandings of music cultures inscribed in these taxonomies. With this, I shed light on how musical taxonomies in streaming services might influence music cultures—for instance, by demonstrating that music streaming taxonomies contain encoded Western biases as engineered forms of cultural imperialism.

To examine these issues, I collected empirical material from three sources. First, interface analysis of six music streaming platforms (Spotify, SoundCloud,

Apple Music, Tidal, YouTube Music, and Amazon Music) and critical analysis of the metadata coding standards used to create musical taxonomies in the industry. Second, discourse analysis of PR materials produced and distributed by the aforementioned streaming platforms, as well as industry talk at seven music industry conferences: Music Biz (United States), Music Ally next (United Kingdom), by: Larm (Norway), Reeperbahn and CTM (Germany), and MIDEM (France). Third, interviews with industry stakeholders and, to a lesser extent, researchers and members of public institutions and nonprofit organizations.

INEQUITY IN THE MUSIC INDUSTRIES

The research took place simultaneously with an increase in racial conflict visibility that heavily influenced industry discourse. Between 2020 and 2021, inequity and specifically anti-Black racism was at the forefront of much industry discourse and PR. As the *Music Industry Action Report Card* of the Black Music Coalition¹⁵ points out, many organizations pledged a number of equity initiatives,¹⁶ particularly addressing poor workforce diversity.¹⁷ However, many of these initiatives only produced modest results. Ambitious corporate statements did not match practical action. For instance, YouTube claimed, “We now have an umbrella of work that seeks to address racial justice, equity and inclusion while *embedding that into the fabric of how we operate*. We want to ensure that we’re *dismantling structures and not creating systems that just reproduce bias*.”¹⁸ However, the company’s initiatives focused on racial inclusivity among content creators¹⁹ and did not address the technical fabric of recommendation or catalog. Other companies, such as Apple and Warner Music Group, did not present specific equity strategies or programs. Inequity was also largely absent from the agendas of the biggest music conferences in 2023; only Music Biz had a specific conference track about it, with multiple sessions. Similarly, Music Biz was the only event that had a specific conference track about metadata reform, but this was treated as a revenue and rights management issue distinct from inequity. There are considerable differences between industry PR discourse and the companies’ internal strategies, and industry discourse on racism and equity initiatives lacks any cultural understanding that would lead to a systematic reform of musical taxonomies and streaming metadata. The technical aspects of music distribution are largely absent from these discussions, assuming that access and representation can solve existing racial injustice. As Saha points out, the media industries often focus on getting representation “right.”²⁰ Going beyond industry-co-opted considerations of representation, my interest here is to reanimate scholarly interest in questions of cultural imperialism and global flows of music distribution in the streaming era. In line with Saha and Mel Stanfill,²¹ I focus on the productive power of digital media interfaces in reinforcing specific social logics. The first section of this chapter defines taxonomies and the types of taxonomies I address.

The second section explains the relationship between taxonomies and metadata coding standards in the industry, and how these reproduce inequity. The third section provides further evidence of these practices in curatorial decisions. The last section provides a critical interpretation of these findings.

WHAT'S IN A TAXONOMY?

To understand how content is currently organized by music streaming services, first the notion of taxonomy should be further contextualized. By musical taxonomies, I mean the classification systems of music genre, mood, instruments, and other musical elements that provide the software infrastructure for navigation, product design, distribution, and recommendation in streaming platforms. Each recommender system is thus based on a multiplicity of musical taxonomies. Indeed, the concept of taxonomy cannot be understood as a static, singular one (i.e., *a* taxonomy), but rather as an assemblage of *taxonomies*. Music is also a paradigmatic case of competing taxonomical classifications based on cultural and power differences,²² so the notion of taxonomy carries strong historical and ideological connotations. Originally used in the natural sciences, it has an aura of neutrality, implying that taxonomies are just organized representations of reality. Yet, no classification system can be devoid of ideological value. The concept is also closely related to the classification of the natural world by Western powers during colonial expansion.²³ Comparative musicology and ethnomusicology have often emphasized the taxonomical indexing of music and the search for universality in music,²⁴ as seen in works like the Cantometrics project²⁵ and the Hornbostel-Sachs classification for organology.²⁶ The current use of the concept in music research derives from its applications in computer science.²⁷ However, computer science studies fail to question the mood/activity/genre triad favored by streaming platforms or the Western understandings of those categories. More culturally aware research to measure and classify music based on predefined essential attributes comes from music information retrieval (MIR). However, taxonomical efforts based on Western music descriptors lack the necessary nuance to provide fair recommender systems for all, and much research is still required before these are redesigned with a more international scope.²⁸

More critical perspectives on taxonomy and recommender systems come from media and communication studies. Amelia Besseney²⁹ stresses the importance of folksonomies, understood as users' own classifications of genre and content, as well as the unequal relationship between taxonomy and folksonomy in streaming interfaces, where curated expertise provided by the platforms has gradually become more prominent as these recommender systems became central to monetization strategies over time.³⁰ However, user-generated data may lead to problematic categorizations that reproduce power structures or homogenize diverse music

genres.³¹ Such data might also reflect users' reproduction of certain keywords for their own commercial benefit.³² However, reinforcing the apparent duality of taxonomy versus folksonomy as equivalent to expert versus amateur forms of knowledge would not be helpful. On the contrary, in the next sections I show how the music streaming taxonomies currently used in metadata transactions—presented as scientific efforts of encoding—are often based on folksonomies as well, namely the preexisting folk understandings of music within the platforms themselves, created by workers and stakeholders in the music industry.

Popular music studies often discuss taxonomies by analyzing genre. Since the 1990s, scholarship has dealt with the commercialization and distribution of popular music in an increasingly global market, highlighting the politics of classifying and indexing music from around the world.³³ These studies foreground issues arising from a Western-centric vision of musical discovery and “audio tourism,” particularly prevalent in contested catchall categories such as “world music,” which draws an artificial line between the musical “West” and the “Others.” Seaver has revived this debate by arguing that the classifications used for diverse cultural sounds in recommender systems stem from a Western vision of the designer and listener as placed in the global center of musical knowledge.³⁴ However, this Western-centric sociotechnical practice within streaming industries is by no means a new development. The growth of the recording industry at the beginning of the twentieth century included the creation and consolidation of categories such as “foreign music” and “race music,” conflating cultural stereotypes with the listening communities imagined and marketed.³⁵ Similar developments are apparent in the streaming era.³⁶

Academic research and streaming PR suggest a decline in the centrality of genre. Streaming platforms now focus on categories such as mood and genreless playlists to market their music catalogs.³⁷ However, genre continues to be a crucial element in music streaming success, with hyperpersonalization and curation based on genre in the past few years.³⁸ As Seaver points out, designers of recommender systems pigeonhole listeners into categories, only to later try to revitalize them.³⁹ In September 2023, Spotify introduced “Daylist,” a hyperpersonalized playlist product that provides recommendations to users based on niche mood and microgenre combinations,⁴⁰ drawing on the work of data scientist Glenn McDonald, who was laid off shortly after the product's launch.⁴¹ The logic behind such products is not to abandon genre completely, but to understand genre as a dynamic element, seemingly organized in a nonhierarchical way for recommendation, as well as increasing product differentiation aligned to the platform's marketing campaigns. However, this seems a rather unachievable target for algorithmic coding. The understanding of genre in the centers of power where streaming is designed and developed may be loaded with questionable ideas of otherness and discovery. Problems with streaming diversity and inequity in music streaming

stem from platforms' limited consideration of genre definitions and the critical deployment of taxonomies, whether as a theoretical or a technological concept.

TAXONOMIES AND METADATA

The process of adding catalog to an MSP can be divided in three stages, where taxonomies are applied to the metadata of digital music files. First, metadata creation and collection; second, standardization; and third, editorialization and curation (fig. 12.1). Digital file metadata describe the content of the file and its relationship to other content, in ways that algorithmic systems read for recommendation and discovery. In the current model, a potentially data-rich but disparate, nonstandardized catalog from an artist, record label, distributor, or aggregator is tagged and organized, either manually or via an automated service provider at the creation stage. At the second stage the catalog is made metadata-compliant, and its data simplified following coding standards overseen by the Digital Data Exchange, a nonprofit, industry-funded organization. Lastly, music files are sent to MSPs for curation and editorialization, where new metadata tags are applied to catalog, effectively destandardizing and branding it, but sometimes reinstating its initial data richness. In the case of user-generated content, whether from a self-releasing artist or fan, metadata may remain exactly as rich or poor as in the original upload, and platforms do not always intervene to standardize or optimize it.

Here I argue that the metadata coding standards currently followed by the music industry fall short of any systematic understanding of genre classification or sound analysis, particularly outside the Western canon. Huge disparities exist between how different genres can be categorized and therefore how they underpin editorialization, marketization, and eventually monetization in the recording industry. For example, the current genre list of the Digital Data Exchange⁴² (reproduced in Box 1)—the most widely used set of coding standards for over ten different kinds of metadata in the music industry applied at the second stage of standardization before the catalog is added to MSPs⁴³—has a list of fifty-eight subgenres for the parent label “Rock.” However, it only includes nineteen subgenres for a vast area such as “Latin” (specifically focused on Mexico), and a meager five for “Reggae.”⁴⁴ This reflects the history of this genre list as a piece of Western-centric classification, developed from a previously existing list used by a major record label. This seed list did not include much information about relationships between genres, unlike a treelike library of genres and subgenres or a network-style taxonomy.

The DDEX coding standard also allows for greater granularity when it comes to Western genres. For example, it distinguishes “Classical Music” as a Western genre, “Classical” as a subperiod of Western art music, and classical in terms of structure. However, it only anticipates coding “Hindustani Classical Music” as a subgenre of “Indian Music” or “Pakistani Music.” The genre definitions in the data library that works as a manual for distributors and aggregators also stem from the

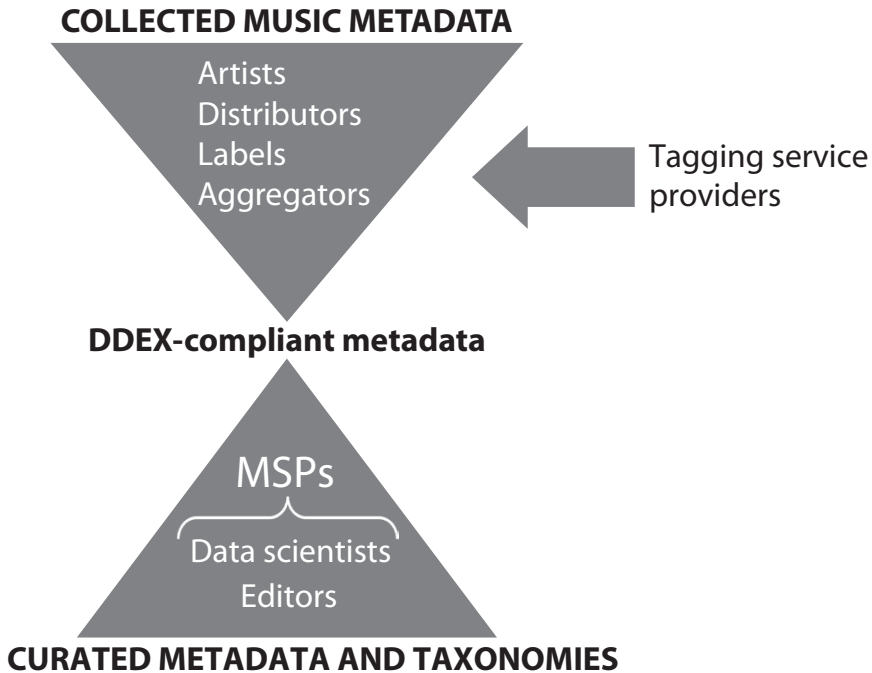


FIGURE 12.1. Three stages of applying musical taxonomies to the metadata of digital music files. Generated by the author.

major label–provided seed list, not following any specific scholarly sources or dictionaries. Asked about these asymmetries (specifically on classifying cha-cha-cha music as “Traditional” and not “Latin”), a DDEX representative responded:

DDEX has to rely on its members to provide the information, and as usual, if you have a certain slant . . . so [record label] is a label which makes most of its money with traditional pop. Well, then, of course, that will be their focus. And the Latin bit. Yes, [record label] has a big Latin set of labels. But that’s less the dance music, more the, the rhythm-and-blues kind of Latin music, I would think. So that’s where their focus is. That means that the . . . especially the classical music, especially the ballroom dance kind of music that doesn’t make a lot of money, therefore it gets less, um . . . attention. Therefore, it will be underdeveloped. Not good, but there you go.⁴⁵

This overreliance on commercial interests contrasts with the treatment of genre or geographical areas in musicological sources such as *The Grove Dictionary of Music and Musicians*.⁴⁶ Moreover, this careless codification of genre in the DDEX standard is even more striking when compared with relatively underresourced efforts, such as the taxonomical maps circulated in fan communities.⁴⁷

BOX 1. DDEX GENRE CODE LIST

<i>Blues</i>	A Genre characterized by a loose narrative lyrical style, use of call-and-response, the blues scale and blue notes, a small set of common chord progressions, and trance-like walking basslines. Originated in African-American communities in the Deep South of the United States in the late 19th century.
<i>ClassicalMusic</i>	Traditional Western art music. Though wide-ranging in sound and style, it is largely characterized by its system of staff notation, and often by its musical complexity.
<i>CountryMusic</i>	A Genre characterized by the use of Guitar and twangy vocals. Instrumentation traditionally includes any of drums, bass, Banjo, Fiddle, Harmonica, ElectricOrgan, or steel guitar, though much modern music makes heavier use of Pop and Rock instrumentation. Originated in the Southern United States in the 1920s and influenced by southern Folk music tradition, including Blues and descendant styles of Scottish, Irish, and English folk traditions.
<i>ElectronicMusic</i>	Music created primarily by electronic Instruments and methods, including manipulation of both digital and circuitry-based forms of audio technology.
<i>Folk</i>	A term that refers both to the traditional folk music of the British Isles and of North America (typically the music of the people, as opposed to ClassicalMusic—the music of royal courts, aristocracy, and the well-to-do) and to modern genres which primarily take influence from those traditions (particularly during and after the 20th century folk music revival).
<i>Gospel</i>	Sung Christian music with roots in traditional Hymns and early African-American spirituals. Often features call and response, and often performed a cappella, with FootStomps and HandClaps for rhythmic accompaniment. Gospel can also feature Piano, Organ, Guitar, drums, and other Instruments.
<i>HipHop</i>	A Genre that typically features rapped vocals (emphasis on rhythm over melody, characteristically verbose compared to other musical styles) over beats. It emerged out of neighborhood block parties as part of a broader hip-hop culture among African-American communities in the Bronx in New York City in the late 1970s.
<i>Jazz</i>	Wide-ranging Genre characterized by the use of swung rhythms, blue notes, polyrhythms, and particularly, extensive improvisation. It incorporates a wide range of influences, from Blues, Ragtime, and ClassicalMusic (particularly that of Impressionist composers such as Debussy), to spirituals and West African cultural and musical traditions. It first emerged as the

	Dixieland style of music among the African-American communities of New Orleans in the late 19th and early 20th centuries. Throughout the 20th century, it developed stylistically across the entire United States, from Kansas City to New York City.
<i>Latin</i>	An umbrella Genre that encompasses most music from Spanish or Portuguese speaking areas of the world.
<i>Pop</i>	Popular music, for lack of a better term. Consists almost entirely of short-to-medium length songs, with heavy use of verse-chorus structures and a strong emphasis on melodicism and catchiness. Has no singular sound—often incorporates the popular sounds of the day (thus pop was synonymous with Rock through the 60s, picked up elements of EDM in the late 2000s/early 2010s, and often features trap beats in the late 2010s).
<i>R'n'B</i>	Originally a marketing term for popular African-American music with a strong beat, R&B has since come to define a few specific styles that are perhaps as much sonic as racial categories. The term has several distinct associated sounds, depending on the era. In the early 50s, R&B described popular Blues, records, and in the mid-50s, the term came to denote Gospel and Soul music, as well as popular styles with elements of electric blues, acoustically similar to contemporary Rock-N-Roll (which itself grew out of early R&B). In the 70s, it largely referred to Soul and Funk, and in the 80s, the term began to refer to a sonic hybrid of earlier R&B, Pop, Soul, Funk, rap, and ElectronicMusic. It has morphed and evolved while maintaining this hybrid identity to the present day, taking on newer production and performance styles as time passes.
<i>Reggae</i>	A Genre that features an offbeat staccato feel, halftime one drop drum grooves, and socially conscious lyrics. Influenced by mid-century American RAndB and Jazz, Jamaican Ska, and traditional Jamaican music such as mento. Emerged in Jamaica, particularly around Kingston, in the late 1960s.
<i>Rock</i>	Song-focused, typically ElectricGuitar-centric and beat-driven Genre that emerged in the 1940s and 50s from Blues, RAndB and CountryMusic. Many variants and styles exist, though most feature at least ElectricGuitar, bass, drums, and a lead singer.
<i>Spoken</i>	Primarily non-musical and focused on the spoken word.
<i>Traditional</i>	Folk and court music traditions outside of North America and the British Isles.
<i>UserDefined</i>	A Type of an Entity which is defined by a sender of a Ddex-Message in a manner acceptable to its recipient.
<i>WorldMusic</i>	A fusion of various western popular music Genres with different global Folk music styles.

Other details of the DDEX standards are also worth mentioning. For example, the current coding standard uses English script and is not optimized for the inclusion of special characters such as an umlaut or a tilde (ä, ö, ü, ñ, etc.), let alone the use of languages other than English. Although multiple alternative names can be input for an artist depending on the region, this creates disparities in the way files are traced and therefore monetized. In practice, the only way to resolve these genre and language problems is manually inputting user-generated metadata.

A further example of this Western-centric approach to music tagging comes from the taxonomy list of Musiio,⁴⁸ an MIR and AI-based automated metadata tagging provider for important industry players such as SoundCloud (now its parent owner) and Sony, often used at the first metadata stage. Musiio's eighty-four-item taxonomy map (reproduced in Box 2) is simplified to such an extent that it hardly provides any granular data for complex musical territories such as "Indian" (at the time of writing, a single genre tag trained on Bollywood music),⁴⁹ and it only identifies fourteen different instruments, all of them based on Western musical terminology.

An employee of a tagging service provider explained that technical developments typically respond to the needs of their industry clients while trying to remain independent of any specific MSP (rather than copying their taxonomies).⁵⁰ For example, as most clients are expanding into India and Latin America, tagging services are likely to increase granularity for those targets. Confirming Jeremy Wade Morris's analysis of Pandora,⁵¹ what is considered "exotic" or secondary in technical development depends on a Western- and English-centric perspective. While automated systems such as Musiio (SoundCloud) and Echo Nest (Spotify) may analyze inherent elements of a song such as rhythm, decisions about what to add, when, and how much these factors should carry in business decisions are ultimately human choices. In other words, metadata and taxonomy development follow the business culture of the tech industry, whereby underdeveloped products are launched in the consumer market for live testing, and then progressively modified following market trends. In comparison, public institutions like the British Library use more rigorous metadata standards, employing an established genre list adopted from the US Library of Congress.⁵² However, public institutions focus more on digitizing historical recordings than cataloging new musical trends, and thus their taxonomies may not always be transferable to streaming services. Another contrasting example from a private business comes from the Nigerian start-up Josplay, a contextual and editorial metadata company that provides metadata services for application developers.⁵³ Josplay is currently developing an open-source African Music Library that aims to target this gap in the market with more granular metadata maps for the African continent. However, placing private businesses in charge of generating this metadata does not seem to be a sustainable, long-term solution.

BOX 2. MUSIIO TAXONOMY MAP

GENRE		
Afrobeat	Alternative Hip Hop	Smooth R&B
Afropop	Trap	Alternative R&B
Classic Blues	Pop Rap	Dance R&B
Blues Rock	UK Grime	Reggae
Classical Instruments	Indian	Dub
Classical Vocals	Indie Rock	Dancehall
Classic Country	Indietronica	Rock & Roll
Bluegrass	Industrial	Classic Rock
Country Pop & Rock	Swing	Hard Rock
Disco	Bebop	J Rock
Adult Contemporary	Jazz Fusion	Alternative Rock
Smooth & Vocal Jazz	Salsa	Early Soul
Downtempo	Reggaeton	Neo Soul
Ambient	Latin Pop	INSTRUMENT
Synthwave	Classic Metal	Banjo
House	Heavy Metal	Bass
EDM	Thrash Metal	Beats
Techno	Nu Metal	Brass
Trance	Metalcore	Drums
Breakbeat	Death Metal	Guitar
Drum & Bass	Mandopop	Keys
Dubstep	J Pop	Percussion
Hardcore	Pop Rock	Piano
Folk	80s Pop	Strings
Funk	Electro Pop	Synth
Gospel	Contemporary Pop	Trumpet
Old School Hip Hop	Punk Rock	Violin
	Ska Punk	Woodwind

Similar trends exist in other domains of taxonomical management, such as quality control. Taxonomical review and updating at DDEX are managed by its members and stakeholders—144 institutions, including record labels and publishers, unequally distributed around the world, with only a few participating in the technical management group. The DDEX membership fees and the cost of sending staff to meetings excludes many independent record labels and distributors. As of

this writing, only four members are based in Latin America. This also implies that quality control is not managed by a team of music experts as such, besides those recommended by the industry. Relatively small teams also work in companies such as Musiio and Josplay. However, Josplay employs some musicologists and area experts to contribute to quality assurance. Even the British Library, which has in-house curators for each region covered by its catalog, is severely understaffed in this respect. At the 2023 Metadata Summit, DDEX and music industry representatives acknowledged inaccuracies in 5–10 percent of the catalog, mostly in content from indies and self-releasing artists, whom the industry aspires to train or eradicate from the data value chain. However, this seems to be an underestimation, since the British Library admits inaccuracies in about a third of its catalog, particularly in content from major commercial players.⁵⁴ Moreover, if the coding standards are optimized for English-language and Western music genres, the system leaves minor industry players to do the heavy lifting in terms of quality control. Even if the argument for metadata reform is considered solely in terms of monetization, the current system appears to be unfit for purpose. Previous metadata reform trials by Universal and Amazon Music have demonstrated that richer metadata increases music usage.⁵⁵ In short, the industry sees software development as stemming from a center located in Europe or North America and gradually extending to the rest of the world. In light of this encoded taxonomical inequity, I argue that, in the current digital music industry landscape, music metadata can be considered unequal by design, as the value and importance assigned to certain information is preestablished from the initial data input by the developers of the technology and the relative power of the institution involved in the process.

TAXONOMIES AND CURATION

These inequity issues persist in the third stage of the taxonomical indexing process, during the editorial phase. The already Western-centric metadata received by the streaming platforms are further modified and adapted by data scientists working to standardize the content within a specific platform. Moreover, the editorial team may not have input into, or much knowledge of, the preceding process. A senior editor at a major streaming service admitted to not knowing what the DDEX coding standard was, and did not think it relevant.⁵⁶ They gave more importance to the internal “deep metadata” creation provided for them by their tagging provider than the metadata received from artists or distributors when a new track is pitched to curators. If anything, they saw their role as reconciling these two sets of metadata and making sure songs were editorialized correctly to maximize revenue.⁵⁷ Therefore, at any point in the distribution process, the same track file can be classified under at least two distinct taxonomical systems, which here I name metadata taxonomies (during the first stage) and editorial taxonomies (during the third stage). Moreover, the genre and mood mapping of specific

employees, such as Glenn McDonald, may have more influence over the taxonomical systems of streaming platforms than the industry-sanctioned standards or the artists themselves.

MSPs' PR materials highlight the human character of the curatorial and recommendation process to convey expertise and product differentiation.⁵⁸ However, a curation-dependent taxonomical system has further implications. A curator without specific area expertise may tend to group many non-Western musics under the "world music" or "pop" categories or prioritize the organization and display of non-Western musics that reproduce "clickbait orientalism."⁵⁹ For example, Spotify proposes playlists such as "Spanish Tapas Bar," consisting of a mix of flamenco and fusion in multiple languages (including a track titled "Gypsy Flame") or "Tulum Vibes," with an equally mixed bag of genres, languages, and titles like "Salsa Caliente." Asked about curatorial influence on platforms, an informant at Jospay shared that MSPs simply lack expertise for relatively simple editorial tasks, such as writing PR copy that distinguishes Afrobeat as a genre from Afrobeats as a family of genres within a wider cultural network.

Problems with representation existed in the music industry long before the advent of streaming, traditionally dominated by certain powerful groups in terms of class, gender, and nationality. But even if diversity hires and the equity initiatives discussed above made a significant impact, this still leaves aside the lack of accountability in this new gatekeeping system. A considerable number of tasks in the processes remain divided among separate teams and divisions, or are completely subcontracted, with little holistic vision of editorialized products. Curatorial trends also affect representation, currently oscillating between genreless or genre-fluid curation and hyperniche genres.⁶⁰ These editorial practices introduce a significant level of destandardization, but this is ignored in industry conversations about metadata reform. A streaming service informant highlighted the difficulty of reconciling these trends with good metadata practices:

The openness of the audience, especially younger users raised on streaming, they don't see the importance of a lot of the genre labels. . . . So some of these kinds of arbitrary orders are coming down, which I think is a really good thing. . . . Challenging from a metadata perspective, though . . . and I think in a lot of ways the metadata systems have always been very niche. . . . Gracenote, they have the top level, and then each layer down becomes like a root system of ever-expanding subgenres. I think across the industry, we're leaning more into those subgenres. I don't know if that's good necessarily.⁶¹

There are also significant contradictions in approaching user-generated content as a problem to solve by training DIY artists, while simultaneously absorbing and monetizing user playlists, despite their inclusion of problematic folksonomies. In the Spotify case highlighted by the Anti-Defamation League,⁶² a fashwave playlist was simply absorbed from a user account, effectively monetizing fascist content

and prompting the question of who the target audience is. Asked about such extremist instances, a streaming informant admitted:

It's dangerous. It's really not good. . . . There's a lot of those that [are] floating around and . . . there's new ones created all the time. There's really not a huge amount of oversight. . . . It's just trusting these systems and saying that people will understand that it's just the system creating this. But I don't think that's the case. . . . There should be a team that's reviewing this, a QA team. . . . It's just the scale is so huge. . . . They shouldn't be . . . promoting this music. I think it's one thing for them to exist. I think it's another thing for them to be actively serving them to users.⁶³

However, I do not wish to reinforce the distinction between expert versus user-generated content. As Morris highlights, such a reductive dichotomy ignores the fact that algorithms and recommendation engines are fundamentally human in their construction and execution, and as this section shows, a combination of human and machine-coded factors is at the root of this engineered inequity. Despite the difficulty of observing these slants and omissions in action, examining the interface provides rich clues about the practical consequences of these flawed sociotechnical systems and human decisions behind them. For example, Spotify, which seems to have a penchant for inappropriate copy, suggests a playlist for “Sahara” under the tagline “The hottest music from the hottest desert” with a cover image from desert blues band Tinariwen, whose song “Toumast Tinch” appears in the list. Yet the tagline seems wholly misguided for a political song protesting the Mali government. Similarly, Tidal’s “Geography for Beginners” section includes country-specific playlists for Scotland, Wales, and Ireland, but not one for England, which seems to be taken as the default position of the listener. In the same way that music marketing in the past was designed for a white listener in the West to explore “world music,”⁶⁴ these lists are created with a white, English-speaking audience in mind, encouraging exploration of other, more or less exotic content—whereas a specific Western geography is not subject to this kind of exploration.

In light of this evidence, the overall picture of taxonomical indexing and recommender systems is not positive. The current system lacks a systematic understanding of taxonomy, let alone genre or organology, and those involved in it often lack the expertise to manage it, with little understanding of the roles of other stakeholders. A great deal of the decision-making to date has been improvised as the technology developed, with responsibility placed on machinic entities such as algorithms, or, at best, the workers at both ends of the process, such as artists and curators. My contention here is that the combined effects of (a) the lack of a systematic metadata infrastructure, (b) the lack of diversity in the music industry workforce in general, and streaming in particular, and (c) the use of folksonomies and social data produce forms of inequity that are encoded in streaming recommendations from the start. Streaming taxonomies “platform

racism”⁶⁵ in music, creating, distributing, reproducing, and amplifying existing social inequities.

STREAMING TAXONOMIES AS RUINOUS INFRASTRUCTURES

Spotify’s first TV advertisement in the United States in 2013 specifically correlated the platform’s existence with positive social impact. However, it did so from a Western-centric perspective. An intense young masculine voice poetically stated:

Why can a song change the world? Because music is a force for good, for change, for whatever. . . . It lives inside us, because we were all conceived to a 4/4 beat.⁶⁶

Two years later, Tidal’s launch focused on discourse around social justice and fair revenues for artists. The campaign foregrounded Black US artists with the mottos “Tidal for all” and “Tidal puts the power back into the artist’s hands.” Artist and co-owner Alicia Keys spoke of it as “a moment that will forever change the course of music history.”⁶⁷

In *The Promise of Infrastructures*, Hanna Appel, Nikhil Anand, and Akhil Gupta⁶⁸ approach technological infrastructure from an anthropological perspective, where human discourse and material structures are intertwined in the production of cultural objects. They posit that

the material and political lives of infrastructure frequently undermine narratives of technological or social progress, drawing attention instead to the shifting terrain of modernity, distribution, inclusion, and exclusion in most of the world. . . . New infrastructures are promises made in the present about our future. Insofar as they are so often incomplete—of materials not yet fully moving to deliver their potential—they appear as ruins of a promise.⁶⁹

In this chapter, I have followed the same approach and analyzed streaming taxonomies as the result of discourse about streaming classification and curation and the software infrastructures available to encode those projected musical values. In doing so, I argue for understanding music streaming taxonomies as ruinous infrastructures. Here, ruination does not mean decadence but, rather, a state of in-betweenness between what it promises and what is delivered. The promises made on behalf of these infrastructures evoke normative notions of common good, access, inclusion, and equality. Yet these infrastructures are not designed to deliver these potentials. MSPs developed as an enclosure of the generative possibilities of earlier principles of internet architecture, offering a both-and solution for music consumption in the digital era.⁷⁰ This model would satisfy rightsholders and record labels while simultaneously enhancing audiences’ experiences of music online by providing access to vast catalogs of music. Indeed, the word “promise” implies that a technological system is the aftereffect of expectation; it cannot be

theorized or understood outside of the political orders that predate it and bring it into existence.”⁷¹ I have evaluated the taxonomical realities delivered by platforms to compare them with the promises of recommendation and discovery. In doing so, I show that musical taxonomies and recommender products are digital infrastructures that “show the making and management of difference—class, race, gender, religion, and beyond—in the technics and politics of everyday life.”⁷² That is, streaming infrastructures such as taxonomies are forms of governance of the politics of music, but also forms of politics in themselves.

This focus on streaming infrastructures such as taxonomies is crucial for understanding the formation of audiences and publics, because “publics can be gathered or forestalled by the materials of infrastructure”⁷³ themselves. If, in the words of Jeremy Wade Morris, “the legitimacy of infomediaries, in the rhetoric of those who create and employ them, is based both on the cultural knowledge of those creating the databases and algorithms, but also on the size and scope of the databases and the efficacy of the algorithms themselves,”⁷⁴ at this stage of development, the role of musical taxonomies and MSPs as intermediaries of music experience has to be firmly questioned. This is not to return to tired arguments about human versus machine production of culture. Ultimately, all products of machines are also products of human design and intervention, and music curation has always been produced through the interaction between humans and some kind of music technology. However, from an audience studies perspective, it is crucial to pay attention to the structural elements shaping music consumption, in ways that assign political responsibility to the humans that design digital infrastructure. Instead of further encouraging the implementation of beta products for general consumption, as is common in computer science, a critical social science perspective should lead the development and design of technological infrastructures. Taxonomical development is a kind of generative technology in the sense that it creates the categories and classifications for recommendation and discovery of music, and as such, it is culture- and world-making. Streaming taxonomies, despite their partial invisibility, are thus sociotechnical political orders structured around particular ideas of race and culture. These taxonomies are implemented on and absorbed by society and should be approached with cultural and politically informed perspectives. Instead of considering recommender systems as an expert-only framework and decrying the consequences of their design, we should question why they are designed this way in the first place.

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