Spotify and the democratisation of music

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Abstract

The corporate rhetoric of streaming platforms often assumes a tight link between their scale-making ambitions on the one hand and the creative interests of musicians on the other. In practice, most musicians recognise that claims of musical 'democratisation' are deeply flawed. The creative ambivalence this produces is an understudied pillar in scholarship on digital music platforms and suggests that these systems can be more creatively constrictive than empowering. Based on ethnographic research among Spotify engineers, record labels and musicians, this article explores how music recommendation systems become inculcated with a corporate rhetoric of 'scalability' and considers, following Anna Tsing, how this impacts musical creativity further down the value chain. I argue that the 'creative ambivalence' that these technologies produce should be more fully understood as woven into a complex web of social relations and corporate interests than prevailing claims of technological objectivity and 'democratisation' suggest.

Introduction

Our mission is to unlock the potential of human creativity by giving a million creative artists the opportunity to live off their art and billions of fans the opportunity to enjoy and be inspired by it . . . We're working to democratize the industry and connect all of us, across the world, in a shared culture that expands our horizons. (Daniel Ek, co-founder and CEO of Spotify, February 2018.[1])

The global music industry finds itself in a crucial transitional moment in which algorithmic and artificial intelligence (AI) technologies are developing apace. While Spotify's algorithms are already reshaping how music is valued in monetary terms, advances in AI are raising wider questions about the role of human creativity itself. Increasing numbers of scholars across the disciplinary spectrum agree that the way these technologies are configured and deployed in the immediate term – by established companies such as Apple, Spotify and Amazon, as well as by innovative

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[1] Daniel Ek announced this mission statement in a letter, in 2018, to potential investors ahead of their floatation on the New York Stock Exchange. The full statement and filing to the United States Securities and Exchange Commission can be viewed here: https://www.sec.gov/Archives/edgar/data/1639920/000119312518063434/d494294df1.htm#rom494294_14 (last accessed 4 July 2020).

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tech startups – will transform and shape the profession of musician over the next few decades.[2]

As our opening quote shows, corporate rhetoric often assumes there is a tight link between the scale-making ambitions of music streaming platforms on the one hand and the creative empowerment of musicians on the other.[3] Corporate interests and creative interests, in this view, are closely aligned. In practice, however, this link is much looser and more diffuse than emerging literature suggests. Most artists recognise that claims of 'democratisation' made by these streaming platforms are deeply flawed and that the unequal power dynamics of the old music industry persist.[4] Instead, gaming of Spotify's song recommender system is widespread as artists and record labels vie to make their music 'algorithmically attractive' and 'Spotify friendly'. The creative ambivalence this produces is often overlooked in scholarship on recommender systems and suggests that algorithms can be more creatively constrictive than empowering.

Based on ethnographic research among Spotify engineers, record labels and musicians between 2012 and 2019, this article shows how algorithmic recommender systems become inculcated with the corporate rhetoric of 'scalability' and considers, following Anna Tsing (2012, 2013), how this impacts musical creativity further down the value chain. I begin by outlining the methods and approaches used, before examining current literature on recommender systems, scalability and what I describe as 'creative ambivalence'. The two main ethnographic chapters then follow recommender systems as they flow outwards from Spotify 'downstream' to local sites of musical creativity. Through these ethnographic vignettes, we shall see that:

(1) For corporations, linking scalability to creativity and democratisation serves to legitimise their position within a globalised network of power and control.
(2) For software engineers, it institutes a belief that their work benefits the greater good.
(3) For musicians and record labels, its manipulation offers potential access to large audiences and financial reward for their labour.

Creativity is thus strategically deployed by musicians and record labels in ways that undermine the corporate philosophy that purports to nurture it. Yet recognising the limits of recommender systems, as so much scholarship on them does, is not enough to unsettle their influence on musical cultures. As this article shows, critical narratives more often produce engagement than activism.

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[2] Computer science has often optimistically viewed algorithmic recommendation, for example, as leading towards a 'democratization of innovation' (McAfee and Brynjolfsson 2017) that will 'redefine humanity' (Oliveira 2017). More sociologically minded studies, however, have fretted over whether the blurring of lines between humans and machines means that, rather than empowering creativity, our behaviour is 'becoming data' (Cheney-Lippold 2017), a precious commodity to be harvested in an age of surveillance capitalism (Zuboff 2019; see also Srnicek 2017). Music studies has also seen a drift towards these economic- and computer science-led narratives, echoing similar anxieties and hopes. Artificial intelligence, for example, is alternatively understood as a technology that will allow the mysteries of music to be to be 'solved' through computational power (Fiebrink 2019; Sturm 2018) or as heralding a new era of creative automation, with potentially dark consequences for musicians and listeners (Drott 2018b; Katz 2004).

[3] As of April 2019, YouTube's mission statement is 'to give everyone a voice and to show them the world', while Apple co-founder Steve Jobs famously declared that their mission was 'to make a contribution to the world by making tools for the mind that advance humankind'.

[4] By 'old music industry' I refer to the pre-file sharing era and the rise of digital streaming platforms.

Methods and approach

Data for this paper comes from three research sites. The first is an ethnography conducted among engineers at Spotify and in music technology startups in London between 2017 and 2019. This involved attending research summits and conferences, meeting with engineers over coffee, attending startup networking events and working within various London music technology incubators, such as Tileyard and Ministry of Sound.[5] The second relates to my own experience as the founder of a music technology platform, also based in London, between 2014 and 2018. In addition to overseeing the development of our own algorithmic recommender system – which matched artists with promoters and music venues – my role included managing and directing the work of the company's data engineers and coders. It also brought me into close and regular contact with high-level music executives across the music sector, including at major record labels, publishers and distributors. Developing relationships with C-level executives at these organisations over several years provided a window onto how record labels were adapting to an age of digital streaming and how this shaped relationships with artists. Finally, the third source of data relates to my experience as a musician. Since 2012, I have played and recorded with a UK indie-folk band that has had three Top-20 albums. The band, which formed in 2009 – the year after Spotify's launch – was active during a period in which new digital technologies were having a profound impact on how music was being created, distributed and consumed. As musicians, we were finely attuned to the effect this changing industry landscape had on how we and other artists both made music and derived a living from it.

These three research sites overlap in both time and context. Throughout my time in the industry – as a founder and musician – my training in ethnomusicology has meant that I have kept a careful record of my observations and interactions with other musicians, startup founders and engineers, and industry executives. I have kept a regular fieldnote diary and held semi-structured interviews with those at all levels of the London music ecosystem. I have also kept a record of extensive email correspondence, investor meetings, business partnerships and management reports.[6] My methodological approach, then, is a novel one, mixing auto-ethnography with 'actual' ethnography while synthesising my experiences as a musician, businessperson and researcher. It was, in many respects, a privileged position that allowed me to sit at various tables, from board rooms to rehearsal rooms. These are places not always easily accessible to ethnographically minded researchers and they offered me a unique perspective onto how corporate interest and creative interest collide, interact and diverge.

Scale-making and creative ambivalence

Spending time in the industry brought to light an increasing gap developing between the pace of algorithmic and AI innovation and how these technologies are understood and experienced on the ground and in academic scholarship. Recent contributions to the musicology of algorithms posit that song recommendation systems are

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[5] Here I follow Nick Seaver's methodological observations in his article on ethnographic approaches to algorithmic systems (2017).
[6] The names of musicians and employees have been anonymised in this paper.

increasingly shaping musical tastes by directing users towards certain choices and away from others (Taylor 2014; Eriksson *et al.* 2019; Drott 2018a). In the wider canonical literature, the users of these systems are often treated as uncritical consumers, not only blithely following the recommendations they are given, but also naively giving up their behavioural data to be commodified and sold to advertisers (Jannach 2011; Cohn 2019; Zuboff 2019; Drott 2018b). Recommendation systems are seen in this sense to create what John Cheney-Lippold has described as 'feedback loops' (2017), systems that lean towards certain identities and social categorisations while marginalising others. Anthropologists have likened this technological determinism to 'herding', 'nudging' and 'captivating' user attention, suggesting that boundaries between humans and machines are becoming increasingly blurred (Seaver 2017, 2019; Kockelman 2013; Kitchin 2014). Recommender systems have even come to be regarded as 'magical' in their capacity to 'transform our thoughts into action' (Finn 2017; see also Mayer-Schönberger and Cukier 2013), with such omniscience leading them to be understood as though conveying 'the word of God' (Gillespie 2014).

Such biblical scale of influence finds its echo in the kind of benevolent corporate-speak with which I began this article. Scattered across this literature, however, are hints that scale-making technologies have an unexpected impact on creative processes (Gal 2016). As Anna Tsing has argued, within the corporate world 'scale' has become a 'verb that requires precision; to scale well is to develop the quality called *scalability*, that is, the ability to expand – and expand and expand – without rethinking the basic elements' (2012, p. 505). By presenting song suggestions as life-like, music recommender systems attempt to align corporations more closely with the creativity of musicians on the one hand with the kind of 'cultural memories' (Beaster-Jones 2011, p. 353) that make their music meaningful to fans on the other. In order to render this complex diversity scalable, however, there must also be a flattening out of how musical taste is understood, by the necessity of quantifying and categorising it. Indeed, for Tsing, 'scalability banishes meaningful diversity, that is, diversity that might change things' (2015, p. 38). For Timothy Taylor, the 'commodification of taste' (2014) that ensues points to an uneven contest between the values of economic rationality (Gal 2015, p. 232) on the one hand and more Maussian ideas of non-economic reciprocal exchange on the other (see also Silverstein 2016). As this dynamic becomes distributed globally through a combination of new technologies and free market economics, urgent questions remain about the potential impact of amplifying pre-existing social biases and power dynamics on musical lives around the globe (see also Van Couvering 2010; Shankar and Cavanaugh 2012, p. 358).

And yet the actual link between scale-making technologies and creativity remains under-studied.[7] Gilles Deleuze, for example, cast doubt on the oft-touted affective power of new technologies, even while recognising their capacity to incorporate and reproduce social relations: 'Types of machines are easily matched with each type of society – not that machines are *determining*, but because they express those social forms capable of generating and using them' (1992, p. 6, emphasis added).[8] While many scholars of algorithms view recommender systems as examples

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[7] A notable exception here is Walter Rammert's work that explores the relationship between new technologies and the creation of novelty. In particular, along with Hutter *et al.* (2015), Rammert theorises society and technology as being intertwined through what they describe as 'reflexive novelty' that is realised through 'heterogeneous distribution'.

[8] For a critical appraisal of the 'social power of algorithms', see Beer (2013).

par excellence of this kind of machine (which Deleuze relates to a 'modern control society'; see Drott 2018a), ethnomusicologists have long shown that globalising processes brought about by new technologies do not necessarily lead to the kind of 'cultural grey-out' (Lomax 1980) prophesised by early critics. Instead, musicians usually respond creatively to new technologies in ways that are non-linear and complex (Stokes 2004; Solis 2017; Shelemay 1991; Zemp 1996).

Examining this literature, it seems high time for an emotional turn in the study of music recommender systems. Given such disciplinary division over whether these technologies are here to liberate or control us, it is perhaps not surprising that a culture of ambivalence around scale-making technologies and their impact on creativity has developed.[9] Most studies have remarked upon this ambivalence only in passing, seeing it as a rational response to more deeply entrenched – even irresistible – power structures. However, in the following analysis I seek to bring this ambivalence into focus and consider its effects more systematically. I suggest that 'creative ambivalence' is not epiphenomenal to scale-making projects. Instead, the engagement it produces is foundational in sustaining digital music streaming culture and the technology that underpins it.

Case study 1: Spotify's recommender system

In May 2019 I was invited to attend Spotify's annual research summit. That year the summit was held in London, in a hidden archway under a bridge on the banks of the River Thames. I had been invited by one of their data scientists, James, an engineer who had been working on their recommendation system since Spotify's acquisition of Echo Nest, a data analytics platform, in 2014. The venue's external walls were decorated with gas flames, which licked upwards either side of the entrance. The door itself was guarded by two imposing doormen and a young, smartly dressed woman with a clipboard. Velvet ropes guided a queue of people down Embankment, a busy road separating the venue from the river. It was broad daylight on a late Monday afternoon in May. Passers-by and office workers regarded us with curiosity – the scene looked and felt more like an exclusive celebrity nightclub than a technology conference. My credentials were checked against the guestlist, security patted me down and I was admitted. Inside, glamorously dressed assistants ushered me to an area where I could pick up a complimentary tote bag containing a Spotify-branded pad, pen, water bottle and, inexplicably, a blow-up beach ball. Inside it was dark: the walls, fixtures and fittings were draped in black cloth and the only colours were the glow of the bar along one side and the luminous corporate green of Spotify.

James greeted me with a bottle of beer and we headed into the main hall. We had been corresponding over Skype and email the previous few months, discussing music, streaming and the recommender systems he worked on.[10] Inside the hall were some 200 engineers and computer scientists huddled in small groups, drinking beer while struggling to make themselves heard above the music. James explained to me

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[9] I am less interested, in this paper, in trying to redefine 'creativity' as I am in identifying how people within algorithmic regimes are talking and thinking about creativity. For a critical discussion on creativity within music studies, see Toynbee (2012 [2003]).

[10] James normally resided in North America, hence our correspondence over video calls and emails.

that engineers at Spotify get two weeks off every year to attend research conferences. Events such as these were rare moments when Spotify's engineering teams from around the world got to meet each other physically. As we moved through the crowd, James introduced me to various colleagues and friends before we settled down to watch the keynote addresses.

Prior to the research summit, I had worked with many engineers like James across London's music startup ecosystem. My own startup had employed four front- and back-end engineers, and, through a combination of cultivating business partnerships and working in a shared office, I came to develop relationships with other engineers working for emerging and established companies in the music technology sector. At the technological heart of many of these companies were recommendation systems: ours recommended artists to venues and promoters; elsewhere musicians were recommended to wedding planners, gigs were recommended to fans, teachers to aspiring musicians, songs to users. Before returning to the research summit it is worth briefly outlining some of the core computational techniques used in these recommender systems, as they have a bearing on our later discussion. These techniques include: (a) collaborative filtering; (b) natural language processing (NLP); and (c) audio analysis.[11]

(1) *Collaborative filtering* models analyse the way individual users interact with a software platform and then compare this against the behaviour of other users. Such models are based on measurable metrics that are observed and recorded through implicit feedback such as skip rate (how often and at what point a song is skipped), stream count (how many times a song has been played), saved to playlist (whether users have saved a song), whether users visit an artist's page after hearing a song, whether users share a song with others, and so on. All these metrics are compared against other songs and other users' behaviour in order to assess how each will respond to any given song or artist recommendation.[12]

(2) *Natural language processing* models analyse and organise large volumes of written text.[13] This technique analyses text in websites and blogs for artist and song names that can then be evaluated against, for example, key adjectives (good/bad/pioneering/new/ emerging/veteran, etc.). Natural language processing can also be used to recognise similarities and differences between artists, through the propensity of music critics to describe artists through comparison with others. These results can then be sorted and combined with collaborative filtering to determine any given song or artist's overall ranking and where these sit in comparison with one another.

(3) *Audio analysis* models, also widely known as MIR (music information retrieval), use techniques such as signal processing to analyse raw audio files. This technique, which can be used to inform convolutional neural networks (similar to facial recognition software), analyses digital audio waveforms in order to determine, inter alia, time signature, key signature, tempo and dynamics. Doing so allows recommendation systems to automatically identify fundamental similarities and differences between songs and index them against the kind of human behavioural patterns identified through collaborative filtering. Analysing raw audio in this way has given rise to novel ways of organising music, such as using tempo and key signatures to curate playlists that are thematically categorised around moods and activities such as 'Happy', 'Romance' and 'Jogging', as well as political movements such as 'Black Lives Matter'.[14]

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[11] These key techniques were also set out by two of the architects behind Spotify's recommender systems, Chris Johnson and Edward Newett (2015), during a presentation at the DataEngConf symposium in New York City. See also Newett (2017).

[12] For a more on collaborative filtering, see Goldberg *et al.* (1992).

[13] For a more focused overview on the uses of Natural Language Processing in music, see Oramas *et al.* (2018).

[14] Tarleton Gillespie (2014) has described this process as creating 'calculated publics', in which the desires, meanings and values of the end user are absorbed by algorithms and then reflected back on

In Spotify's view, and indeed that of many of the startups I worked with, when users search for and listen to music they are providing a measurable set of inputs from which musical tastes and desires can be extrapolated.[15] This user behaviour is recorded, compared and evaluated against that of other users, then sorted into metadata and used to calculate every song and artist's degree of relevance to each individual. There is a precision to this quantifying of musical taste.[16] Song and related artist recommendations are made possible at such a scale because they can be calculated through the comparison of millions of data points within an organised database. These computational techniques, when combined, allow recommendation systems to solve a number of problems inherent in suggesting music to its users: how, for example, to recommend songs with only a few stream counts alongside those with millions; how to recommend songs to a brand-new user (the so-called 'cold start' problem);[17] how to recognise normal patterns of behaviour against anomalies; and, crucially, how to establish a level of trust between the user and the algorithm doing the recommending.

Back inside the hall, James explained to me how he understood the purpose of all this calculation. 'Imagine you're in a band. You're totally new and you've just made this album of weird music. Well, what if we knew that there were people in Outer Mongolia who liked *exactly this kind of music*? What we're doing is making sure these fans discover your music'. James's sentiments had a familiar ring to them. Later in the letter to investors with which I began this article, Spotify's founder, Daniel Ek, wrote:

With access to unprecedented amounts of data and insights, we're building audiences for every kind of artist at every level of fame and exposing fans to a universe of songs. In this new world, music has no borders. Spotify enables someone in Miami to discover sounds from Madrid. It links immigrants in Boston to songs back home in Bangkok.[18]

This optimistic world-building narrative echoed that of many others I had conversed with and interviewed in corporate board rooms and engineering events over the previous few years; environments in which belief in the power of technology to connect people with what they desire runs deep. One founder of an AI music platform in London, for example, would often tell me that his mission was to 'empower musicians' and 'lower the barriers to creativity', even while his product was aimed primarily at selling automated compositions to advertisers, and, in doing so, cutting out the musical middleman. An almost utopian benevolence would run through the

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both individual and collective scales. However, as Cheney-Lippold (2017) has argued, algorithmic identities do not always correspond with how we understand ourselves in the wider world in terms of race, gender and sexuality. Indeed, Maria Eriksson and her colleagues at the University of Stockholm have suggested that algorithmic music playlists, especially those curated and categorised around moods and activities such as 'happy', 'good vibes' and 'sleep', but also racial, ethnic and political categories such as 'Arab', 'Desi' and 'Black history is now', point to 'the ways in which Spotify's packaging of music comprises elements of gendered consumerism, individualism, and psychologism' (Eriksson *et al.* 2019, p. 128).

[15] See, for example, Zhang *et al.* (2013).

[16] Indeed, Norton Wise has referred to this quantification of culture as 'an explosion of everyday precision' (1995, pp. 352–53).

[17] For more on how developers of algorithmic recommender systems approach the 'cold start' problem, see Seaver (2019).

[18] Daniel Ek, 'Registration statement', United States Securities and Exchange Commission, 28 February 2018, p. 93.

way in which these technologies were described by both company founders and engineers. Recommendation systems came to take on even anthropomorphic dimensions. For example, during the keynote presentation at the research summit, Spotify's Head of Research, Mounia Lalmas, impressed upon the audience that 'our mission is to match fans and artists in a *personal* and relevant way' (emphasis added). Spotify's mission, in other words, was to position their technology as a voice of authority in such a way that would align them with other positions in society that have traditionally held the role of recommending music: a friend, radio DJ or music critic. They wanted their algorithmic recommendations to feel 'personal and relevant' because, in their view, human recommenders such as friends, DJs and critics are imbued with authority and social status; they are sources of trust.[19]

What struck me most in all these interactions with engineers, computer scientists and industry executives was their absolute faith in the technology they were building, a deeply rooted belief that it will ultimately be a force for good. I was often surprised by the candidness with which engineers spoke about the technologies they built, a candidness that was evidently born out of their faith in technology. Indeed, if we are to believe Spotify's own corporate-speak, their goal is to make being a musician a viable career: a platform that can instantly and objectively connect artists' music with individual fans and audiences wherever they are in the world, however new or old, niche or mainstream. This perspective was common across digital music culture in London throughout this period: a utopian aspiration achievable through technological objectivity, or what Theodore Porter (1995) famously described as a 'trust in numbers'. The engineers and executives I worked with were at their most comfortable when talking about their technologies in ways that were in-line with the central tenets of global capitalism: an altruism guided by financial pressures and/or incentives; the desire to quantify; the essential comparability of musics; the focus on efficiency; a confidence that there is no social need that engineering cannot provide for; and the absolute belief that there is a happy convergence between corporate interest and creative interest. However, as we shall now see, this confidence did not necessarily correlate with how this technology was experienced by musicians on the ground.

Case study 2: record labels and musicians

In mid-summer 2017, I sat in a boardroom at Sony Music to discuss a potential data-sharing partnership with my startup. Over the previous three years I had had similar meetings at other major labels and publishers, including Universal Music, Warner Music and Kobalt: organisations where the hiring of specialists in data analytics was becoming increasingly common.[20] These meetings were primarily focused on

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[19] There is anecdotal evidence that this anthropomorphic ambition has met with some success. In the back of our own tour bus, our bassist would regularly play music from his phone as we travelled between gigs. Nordic throat singing would follow pop band Clean Bandit. Everyone would nod along to these seemingly incongruous choices, curious about what would be played next. However, he was not choosing the music but playing his own algorithmically determined playlist, 'Discover Weekly'. 'I love it', he said, 'it knows me so well'.

[20] An example of such a position was advertised by Sony Music in 2016. The job description highlighted the increasing role of streaming data analytics in their overall corporate strategy: 'The role will be responsible for driving strategy for playlisting across key streaming partners. The role will lead a rigorous analytical process to better understand playlisting performance and will collaborate with label

artist data. Executives wanted to know how my startup could provide data that would help them 'grow their market share'. The meetings would begin with pleasantries and abstract conversations about up-and-coming artists in London before quite quickly turning to cold, hard numbers. During the meeting in 2017, Jason, the executive I was there to meet, was especially preoccupied with his artists' Spotify analytics. We had worked together on live shows for his roster over the previous two years. He was one of a growing number of employees at Sony whose job was focused exclusively on 'playlisting', that is, ensuring Sony's artists were featured on Spotify's popular algorithmically determined playlists, such as 'Discover Weekly' and 'Daily Mix'. Major record labels, he explained, were 'obsessed' with playlisting and saw it as the primary method to ensure their artists reached larger audiences and thereby increased Sony's share of royalty revenue from Spotify.

Jason's job was representative of a wider trend within the industry. Global record labels and industry trade bodies have been quick to latch onto the potential of streaming technologies to access new markets. Each year, the International Federation of the Phonograph Industry (IFPI) releases its annual report on the 'state of the global recording industry'.[21] Since at least 2015, the headline story has been the rise of digital streaming. In its 2017 report, for example, the IFPI encouraged its members to 'Focus on China: China's phenomenal potential unlocked by streaming', or, if not China, why not 'Focus on Africa: An Emerging Opportunity' (2017, pp. 28–32). The following year, China was once again presented as 'A Market of Opportunity at Home and Abroad' (2018).

The question of who stood to gain from this opportunity was left in little doubt in these reports. Martin Mills, Chairman of Beggars Group (who represent a number of artists featured in the reports), is quoted declaring that, 'Streaming continues to open up new markets for our artists that just weren't there before for us – Russia, Mexico, Brazil. In some cases, it is creating a recorded music market where there simply wasn't one' (IFPI 2017, p. 21). Adam Granite of Sony Music Entertainment then went on to say, 'I think what really excites us is the fact that we've not really turned on the emerging markets when it comes to paid streaming, and when you start to do the math, when you start to look at those countries with mass populations, that's very exciting' (IFPI 2017, p. 32).

The language of opportunity, of unlocking potential and of 'turning on' emerging markets is, in many respects, remarkably familiar and is part of a much longer history of globalisation and music. The 'scale-making' narrative that surrounds music streaming platforms produces familiar echoes of resource extraction and the establishment of centres of economic power between the first world and (variously) the third world, the new world, the west and the rest, or, as it is often referred to these days, the Global North and the Global South. There are historical parallels here, too, with the early development of the Western music industry. It was, after all, in 1902, that Fred Gaisberg set out to India from Europe aboard the *SS Coromandel* as a representative of the newly formed Gramophone Company with a

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management and territory sales and digital teams in order to drive a unified playlisting strategy for Sony Music. The role will manage a dedicated analyst.'

[21] For a critical overview of the IFPI and its bearing on the global music industry, see Dave Laing (1990, 1997, 2012 [2003]).

mission to 'open up new markets, establish agencies, and acquire a catalogue of native records' (Gaisberg 1948, p. 48, quoted in Grownow 1981).

Spotify and other streaming platforms such as YouTube and Apple Music are driving the latest iteration of this movement. In their 2018 quarterly financial report to the New York Stock Exchange, for example, Spotify announced that they had now scaled their operations to 78 countries, following the launch of its service in thirteen Middle Eastern and North African states. In 2019 Spotify expanded their service to India. Its recommender system was at the heart of this expansion: 'With many Indians speaking several local languages, Spotify's music recommendation engine can now be tuned to Hindi, Punjabi, Tamil and Telugu. Indian users can select their preferred language(s) to receive tailored Daily Mix, Home, Radio, Search results and recommendations'.[22] In addition to this focus on languages, Spotify created a new user-tier – 'Spotify Free' – offering smartphone users 'total control' through unrestricted access to its catalogue of music.[23]

Back in the boardroom at Sony, Jason explained how Spotify's analytics would tell him about these new markets. He was able to see exactly where his artists' audiences were located, demographic information such as age and gender, the times and days songs were being played, how many followers each artist had, how many playlists they featured on, even the moment at which fans skipped from one song to the next. This last point was crucial. It was an open secret at record labels in London that Spotify would only register a royalty payment for a song after it had been streamed for at least 30 seconds: known within Spotify as the 'success' criterion.[24] By analysing this data, Jason believed he could make his artists more 'Spotify friendly'. In other words, Jason's job as a Director of Playlisting, was to game the system.[25] This was achieved not only through the careful selection of 'optimal' release dates for new music, but also through the creative manipulation of the music itself. If he could make his artists' music more 'hooky' in the first 30 seconds, and keep fans listening beyond this period, then not only would Spotify recognise it as a 'successful' stream, but the chances of being chosen by Spotify's algorithm for playlisting, via the techniques outlined above, would also increase. More streams would result in a bigger market share for Sony, thereby increasing the company's overall revenue.

Working for Sony was in many respects Jason's dream job. In an industry famously opaque in its hiring and difficult to break into, Jason had worked hard, starting as an intern before working his way to playlisting. Like many of his colleagues, Jason was attracted to the industry because of his passion for music and the perceived glamour that working within a record label would bring. He cared about new indie music and played in a band himself as a singer and guitarist. We often went to gigs together around London, watching young bands as they supported more established artists at small venues across the city. It was at gigs such as these that Jason would express doubt about the work he did at Sony. After one gig, I asked him what he thought about the support act and whether they might, at some point, be signed to Sony. Jason frowned and took a sip of his beer. 'The issue', he

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[22] For more, see https://investors.spotify.com/financials/press-release-details/2019/Spotify-Launches-in-India/default.aspx (26 February 2019).

[23] For more on music, value and commodification in India, see Beaster-Jones (2016).

[24] This criterion was regularly discussed during presentations at developer conferences I attended.

[25] I had almost identical discussions with A&R managers across the road at Warner Music and Universal Music, where getting their artists onto playlists was the only game in town.

explained, 'is that I come to nights like this and I see how much amazing music there is. I love the rawness, its energy. At Sony we'd just put them through the machine'. I made a mental note and asked him what he meant the following day over text message. 'Basically, all those weird [musical] intros last night, they would be too long, they'd have to go. We would want to cut them short, maybe introduce the hook earlier. We get these really cool young bands and turn them into something else. It's fucking depressing'.[26]

This gaming of the system, however, was not always uniform. Later that summer, for example, I sat with the saxophonist and singer-songwriter Laura M. Laura is a critically acclaimed DIY artist, which means that she is an independent musician and not signed to a label in the same way as those described by Jason.[27] Instead, Laura utilises a range of technologies so that she can independently perform the functions of recording studio, record label and publisher. The main software technologies she uses to do this are Apple's Logic Pro X (to record); Soundcloud (to publicly test musical ideas and gather feedback); Ableton Live (to perform live); Spotify, Apple Music, YouTube Music, etc. (to distribute); and Facebook, Instagram and Twitter (to promote). Through using these widely available and (relatively) inexpensive technologies, Laura is in many respects free from the kind of creative pressures found in record labels described above. Indeed, her DIY approach is often what scholars refer to when discussing the democratisation that new music technologies have brought about.[28] Yet these same technologies still affect how Laura thinks about creativity in similar, if perhaps more subtle, ways to artists signed to record labels.

A saxophonist, singer-songwriter and producer, Laura's music could loosely be described as a mixture of jazz, electronic and R'n'B. Based in London, her creative process is grounded in the South London environment she grew up in. She uses a wide range of music production technology to produce complexly layered soundscapes, consisting of sampled saxophone loops with added effects, such as reverb and delay. For Laura, the texture of these musical layers is an articulation of the built environment she lives in, and her emotional relationship to it over time. Laura is particularly interested in how these offline experiences interacted with her online musical worlds.

Looking at her Spotify analytics page, for example, we were presented with a list of 'similar artists', along with various metrics relating to her music. According to Spotify, one of her songs had been streamed 167,168 times, while another had accumulated 6,135,800 streams. 'What does this even mean?', Laura exclaimed. Both songs, and the related artists displayed, were similar in musical style yet were understood by Laura as relating to different emotional experiences and meanings. She was unsettled by the way the recommender system served to foreground some of her songs over others without really understanding how or why. Laura was able to see which of her songs had been playlisted by Spotify's algorithm, yet she had not tried to game the system in the same way as Jason at Sony. Instead, she was sceptical about the algorithm's rationale. While being playlisted increased her financial remuneration, it did not necessarily correlate with how Laura valued

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[26] Personal communication, 2017.
[27] Her work has been played regularly on national mainstream and jazz radio stations, such as BBC 6 Music, BBC Radios 1 and 2 and Jazz FM. She also performs regularly live and has toured extensively around the UK and Europe, both as a headline act and as support.
[28] For a critical study of the political economy of DIY musicianship, see Andy Bennett (2018).

her own music. 'I would rather one person listened to my music and it helped them get through a difficult time', she told me, 'than a million people listen to it because it got on some Starbucks playlist'.

Agile and responsive to new and changing production technologies, Laura was also anxious about the opaque means by which her music was disseminated via streaming media. She had had contrasting creative experiences on other streaming platforms. For example, Laura was particularly strategic in her use of SoundCloud vis-à-vis Spotify. Whereas she felt little control over how Spotify's algorithms recommended and categorised her music, in the case of SoundCloud, she deliberately curated her public profile so as to present a constricted view of her music catalogue. She would, for example, move music between 'private' and 'public' access settings to manage her flow of content according to what music she was currently working on. In contrast to Spotify, SoundCloud was seen as a tool to test new musical ideas. Her private SoundCloud account also offered a timeline of her progress as a musician. Laura showed me her earliest posts on SoundCloud, now long-since hidden from public view. These early recordings were comparatively rudimentary, representing her first forays into music production software and streaming platforms. And yet Laura would listen back to these early recordings, made just three years previously, as a reminder of how far she had come musically and artistically. They were, in many respects, valued as an emotional resource, rather than an economic one.

Looking again at her Spotify analytics, Laura was torn between her creative impulses on the one hand and the financial incentives of playlisting on the other. While it was not clear to Laura why one particular song was algorithmically chosen over another, it did provoke her to ask a question of herself: 'Should I be writing more music like the one that got the most streams? I don't know'. For Laura, the analytics provided by Spotify to 'empower' musicians concealed subjective truths as much as they revealed objective listening habits. Indeed, for Laura, these two facets were tied together through a question of musical value. Her catalogue of music, hosted on SoundCloud, was valuable as an emotional record of how she responded at different times to her environment and her experiences therein. Yet while Laura used SoundCloud to develop her musical ideas, Spotify was seen more pragmatically as a platform to generate economic value: 'It pays my rent', she told me, 'and if not Spotify then who else?'

It may be clear by now that Laura's principal attitude towards Spotify was one of ambivalence. Indeed, as with Jason, far from being objective measures, the data presented by Spotify was instead deeply imbued with emotions and interpretive narratives. These two case studies suggest that new digital technologies do not always produce the empowering effect on creativity that founders and software engineers at streaming platforms often assume. Instead, the way musicians and labels position themselves creatively towards recommender systems is varied and complex. Musicians – whether independent artists or those signed to a record label – are not absorbed wholly into the democratising world-view of streaming platforms: they think about creativity strategically in response to these algorithmic regimes in a variety of context-dependent ways. The evidence presented here suggests that artists and record label executives look at paid streaming technology as better than the free-for-all online piracy that preceded it, but they do not necessarily believe that it represents a democratisation of music, nor do they necessarily trust the numbers they are presented with.

Theorising creative ambivalence

Against the corporate marriage of scalability with musical democratisation, this article suggests that creativity should be more fully understood as woven into a complex web of personal interests and social relations. As we have seen, creative ambivalence constitutes an important strategy when dealing with a system that is fundamentally opaque yet increasingly hegemonic. To recap, creative ambivalence produces different outcomes at different levels of the London music ecosystem:

(1) For corporations, linking creativity to scalability serves to legitimise their position within a globalised network of power and control.
(2) For engineers, it institutes a belief that their work benefits the greater good.
(3) For musicians and labels, its deployment offers potential access to large audiences and financial reward for their labour.

Focusing on creative ambivalence allows us to track the means by which artists and labels respond to the growing dominance of digital streaming platforms. It shows that corporate rhetoric does not need to be believed in order to secure its effect. Moreover, the assumption that these new digital technologies democratise music obscures the social processes and economic imperatives behind their construction and subsequent use. Instead, creative ambivalence shows that the influence of digital streaming platforms on musicians' lives is at once more fragile and more powerful. Spotify's rhetoric may somewhat cynically link corporate interest with creative interest, but this conveys little of the actual relationship between its technology and the creativity of musicians.

The evidence presented here suggests that the link between scale and creativity does not just exist in the rhetorical sense but also permeates how engineers approach the technology they build. The use of creativity not only as a marketing ploy to attract artists to the platform but also as means to justify scale-making processes points to what the anthropologist Paul Kockelman (2006, p. 78) identifies elsewhere as a shift from the 'material commodity', as it was classically understood by Marx, to what he describes as 'immaterial commodities', such as emotions, beliefs, identities, and so on. In this view, 'non-objects' such as creativity are increasingly marketed by corporations along the same lines, and to the same ends, as material objects. Shanker and Cavanaugh identify this objectification as a key facet in the technologies of global capitalism, representing an 'externalization and materialization of meaning and value' (2012, p. 356).

The music recommendation systems that allow for such global scaling, I suggest, work along similar theoretical lines, although with unintended consequences. Through the computational techniques described above, qualitative individual user behaviour is recorded, quantified and compared against the collective behaviour of other users on the platform. If users respond to the music being suggested in ways that correspond with what the algorithm understands as a 'successful' recommendation (i.e that it has been played for more than 30 seconds), then this subjective response is reinforced as an objective marker, and the algorithm is 'rewarded' for making a 'good' recommendation. (Indeed, the part of the recommender system responsible for this feedback loop is actually called the 'reward function'.) The more accurate or life-like the recommendation, the more likely it is that users will remain 'trapped' on the platform, thereby increasing Spotify's overall subscriber

base (Seaver 2019). As we have seen, record labels then compete for their share of royalties from this subscriber base through rigorous analysis of data provided by these same platforms. The gaming of recommender systems that follows has its own creative impact on new music within these labels, although not necessarily in the democratised way that engineers and executives within Spotify perhaps expect.

Musicians (or 'creators' as they are now often called in the tech world) interact creatively with these platforms in ways specific their own financial and social interests. This creativity is not necessarily tied to corporate interest in the ways that companies like Spotify would have us believe. As so much of the literature on recommender systems shows, the scale-making effect brought about by these technologies makes digital streaming platforms powerful tools to share and shape musical consumption and production. However, as this article shows, those who use these platforms have complex and creatively ambivalent attitudes towards metrics and the possibilities presented to them by recommendation systems.

One could perhaps counterargue that Spotify's access to user data, coupled with its vast catalogues of music, qualify its recommendations as more accurate on both an individual and, increasingly, a global scale, and does so in a way that more human-centred forms of recommendation cannot. Given the increasing prevalence of algorithmic recommendation systems to deliver content, it also seems to be the case that sentimentality around 'the human element' of recommendation is, for the moment at least, of secondary concern to many people. It should also be said that other people whose business it is to recommend music, such as radio DJs and 'tastemakers' more broadly, are not above economic concerns and pressures.[29] Spotify is on one level a logical progression of this kind of role. It may be a technology company, but it still understands that the strongest form of recommendation is a human one: a friend or respected DJ saying, 'Hey you should listen to this, it's great'.

And yet that is also perhaps the point. The individual approaches and styles of radio DJs and tastemakers present a plurality of competing motivations which have informed musical creativity over the years in myriad ways. Yet it is this plurality that becomes flattened-out when music recommendation is increasingly the business of only a handful of companies, especially those whose business it is to achieve total market domination. A variety of motivations behind recommending music become one. The coupling of music's creative and social values to an economic bottom line has a history of producing uneven means of economic distribution that has given rise to serious questions about the ethics of globalising technologies.[30] It is also at odds with how people might otherwise share and value music.

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[29] The development of new technologies has always shaped how music is recorded and disseminated (Taylor 2016; Chanan 1995; Sterne 2003, 2012; Katz 2004; Benjamin 1936 [2008]), with listeners accessing the product of musical activity through the radio, phonograph, TV, CDs and, most recently, the Internet. Each of these technologies in its own way represented a shift in the way music was disseminated and consumed; each step involved a renegotiation of the human–machine relationship.

[30] For music, see for example the World Music debate of the 1980s and 1990s. More recently, and broadly, see the fallout around Cambridge Analytica and also Facebook's perceived complicity in the genocide of the Rohingya in Myanmar for examples of how these debates play out in the politics of social media.

Conclusion

In many respects, this discussion can be viewed as part of a much broader critique of capitalism and technology that spans the history of recorded music.[31] What, then, has changed with the rise of music streaming platforms? Reflecting on the increasing mechanisation of factories in the nineteenth-century, Marx suggested that new forms of technology not only increased production and reduced costs (a virtue, incidentally, at the heart of 'scalable' startup culture), but were also the 'means of enslaving, exploiting and impoverishing the labourer' (1906 [1867]). This dynamic, between mechanical reproduction and labourer, is one that has kept sociologists and anthropologists exercised for many years. Marxian scholars have repeatedly recognised that mechanisation and automation are not simply about increasing profit and productivity, but also carry deeply rooted social effects.[32] As the algorithms of Spotify and YouTube become ever more 'global' in their reach, there is now an urgent need to better understand what happens to musical practices and creativity in large and increasingly important parts of the world, such as South America, South Asia and East Asia, that are frequently overlooked by a more Western-centred music industry.

Who will be Spotify's editor as it expands across the globe? How will recommender systems, written in tech-centres like San Francisco, London and Stockholm, shape musical lives in the Global South? At the heart of these questions lie not only complex theoretical issues, but deeper philosophical concerns about how algorithms and AI – such as Facebook's News Feed, Google Search and Amazon's Alexa – are increasingly mediating our social and political lives, shaping our moral and ethical choices in the process.

And yet, the questions I hear computer scientists and data engineers put to each other in music technology companies more often appear much simpler: 'Why do people share music? Why do they do what they do?' These are, of course, the kinds of questions ethnomusicologists have been exploring for decades; questions we know to be infinitely more complex than they sound. It is incumbent upon us to contribute to these conversations while also educating engineers and corporations on the longer history of globalisation and its impact on local cultures. As we identify the ways in which the algorithms of streaming platforms shape digital music culture, we too must start paying more attention to how they are experienced and understood by musicians and listeners in a much wider range of socio-economic contexts.

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[31] Musicologists and ethnomusicologists have shown that there have always been mediators – human and machine – between the producers of music and audiences (see Taylor 2014; Beaster-Jones 2011, 2016; Sterne 2012; Negus 1999). Taylor's (2014) essay on new technologies and the commodification of musical taste, for example, called attention to the growing role of algorithms in re-shaping forms of economic and exchange value (see also Lash 2002), particularly in early versions of recommendation systems found in streaming/social networks such as MySpace and iTunes (Beaumont 2008; Hayes 2008; Lupton 2006).

[32] See Braverman (1974) *Labour and Monopoly Capital: The Degradation of Work in the Twentieth Century.*

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