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AI Challenges in the Era of Music Streaming: an analysis from the perspective of creative artists and performers

Retos de la IA en la era del streaming musical: un análisis desde la perspectiva de las personas creadoras

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Abstract

This paper addresses the challenges posed by Artificial Intelligence (AI) in the music industry from the perspective of the sustainability of the business models involved in the creation of value in streaming platforms, and considering the perception of composers-lyricists and performers, understood as key players in the value creation process. To this end, the authors resorted to a state-of-the-art delimitation based on recent literature and updated reports, and to a semi-structured questionnaire applied to a qualitatively representative international sample of creators and performers, both professional and amateur. This approach, albeit preliminary, shows that AI contributes to intensifying some of the problems highlighted in the consolidation of the streaming platform model, in particular with regard to its two major sustainability challenges: the shift of value from creation to technology and the increasing homogeneity of its inventory, with impacts in cultural diversity and creativity. It also highlights that generative AI concentrates its impact on the creation and consumption stages of the value chain, affecting the scope and possibilities of the value creation of musicians, composers, and performers and of music users' experience. The perception of creators combines uncertainty and pessimism, characterising technological innovations as accelerating the dysfunctions of the streaming platform model and resulting in devaluation of the artistic profession and creative

Resumen

Este artículo aborda los retos que supone la Inteligencia Artificial (IA) en la industria musical desde la perspectiva de la sostenibilidad de los modelos de negocio que gestionan la creación de valor en la industria y su relación con la percepción de los compositores/letristas y los artistas intérpretes o ejecutantes, entendidos como actores clave en el proceso de creación de valor. Para ello, se ha partido de una delimitación del estado de la cuestión sobre la base de la literatura reciente y de informes actualizados, y se ha aplicado un cuestionario semiestructurado a una muestra internacional cualitativamente representativa de creadores e intérpretes, tanto profesionales como amateurs. Esta aproximación, aunque preliminar, permite constatar que la IA contribuye a intensificar algunas de las problemáticas puestas de manifiesto en la consolidación del modelo de las plataformas de streaming, en particular respecto a sus dos grandes desafíos de sostenibilidad: el desplazamiento del valor de la creación a la tecnología y la homogeneidad creciente de su inventario, con implicaciones para la diversidad cultural y la creatividad. También se pone de manifiesto que la IA generativa concentra su impacto en las fases de creación y consumo de la cadena de valor, afectando a los ámbitos y posibilidades de creación de valor de los músicos, compositores e intérpretes y de las experiencias de uso y consumo de música. La percepción de las personas creadoras conjuga

activity. Possible solutions include the regulation of AI application frameworks, and the establishment of procedures or indicators to facilitate users' ability to choose between "artificial creativity" and "natural creativity".

Keywords

artificial intelligence; music streaming platforms; songwriters, performers; artists; session musicians

incertidumbre y pesimismo, caracterizando las innovaciones tecnológicas como acelerantes de las disfunciones del modelo de las plataformas de streaming y resultando en la devaluación de la profesión artística y de la actividad creadora. Entre las posibles soluciones se destacan la regulación de los marcos de aplicación de la IA y el establecimiento de procedimientos o indicadores que faciliten la capacidad de elección por parte de los usuarios entre "creatividad artificial" y "creatividad natural".

Palabras clave

inteligencia artificial; plataformas de streaming musical; compositores, intérpretes; artistas; ejecutantes; músicos de sesión

1. Introduction

"The lack of fairness in the streaming world is a real threat to the future of the next generation of creators. And AI will undoubtedly shape our industry in the future" (Ulvaeus, 2023). With this summary in the form of a diagnosis of the present and anticipation of the future, the President of CISAC, the International Confederation of Societies of Authors and Composers, concluded his address to the General Assembly in June 2023. Earlier, Björn Ulvaeus, who in addition to his institutional role at CISAC was one of the founding members of the music group ABBA, had highlighted the three priority issues that the creative industries should address in order to create a more favourable and fairer environment for young creators to develop their talent. Two of them – the poor quality of music track metadata at source⁽¹⁾ and the imbalances and lack of transparency regarding the remuneration of streaming creators vis-à-vis platforms and rights holders – point to issues that have long been discussed since the emergence of streaming and subscription models as the industry's solution to the threat of piracy (Hesmondhalgh, 2021; Rose, 2023). The third – the impact of artificial intelligence (AI) on the lives of creators and the creative industries as a whole – has undoubtedly marked the year 2023, as highlighted by the Hollywood writers' and actors' strike during the second half of the year (Cranz, 2023) or the successive copyright infringement lawsuits filed by the developers of major generative AI models (González Pascual, 2024; Marcus & Southen, 2024).

The ensuing debate has generated diverse and often conflicting views (Sawyer, 2023). On the one hand, those who believe that generative AI will expand human creative people's creative potential by democratising the ability to create music and expanding what it means to perform a work, as well as the possible business models available to professional artists and musicians (Mayfield & Aswad, 2023; Romo, 2023; Tencer, 2024a). On the other hand, those who consider the use of such tools to be a threat – or even the end – of human creativity, as well as using as a basis business models that do not respect legal frameworks related to copyright and/or self-image rights (NMPA, 2023).

Despite what it may seem, the relationship between AI and the music industry is not entirely new. Increasingly critical to the creation and monetisation of content, AI has played a key role in the value proposition of music streaming platforms since their inception. AI is at the core of the personalisation and content management capabilities that are at the heart of the value proposition of streaming platforms (Arenal et al., 2022). In practice, AI in music streaming represents a shift from the core value of creation to the technology that underpins a model whose implementation has been repeatedly questioned (Butler, 2021; Castle & Feijoo, 2021).

The challenges posed by the growth of AI are, to a large extent, an amplified version of the main current problems of the music industry, such as the incomplete accreditation of the creative persons involved in a work and the resulting problems in rights management (European Grouping of Societies of Authors and Composers, GESAC, 2023; UK Intellectual Property Office, 2023); the incentive system of platforms (Meyn et al, 2023) leading to the proliferation of illegal and/or unethical activities – such as fraudulent

Arenal, A., Armuña, C., Aguado, J. M., Ramos, S., & Feijóo, C. (2024). Retos de la IA en la era del streaming musical: un análisis desde la perspectiva de las personas creadoras [AI Challenges in the Era of Music Streaming: an analysis from the perspective of creative artists and performers]. *Revista Mediterránea de Comunicación/Mediterranean Journal of Communication*, 15(2), e26929. <https://www.doi.org/10.14198/MEDCOM.26929>

streams, impersonation, substitution of music content for sound content, etc. (Cook, 2023; Leight, 2023a, 2023c; Stassen, 2023b) or the need to reinvent the moderation and content recommendation policies of the platforms themselves (Brøvig-Hanssen & Jones, 2021; Gillespie, 2018; Yang, 2022).

The emergence of generative AI also seems to introduce new issues – but also new possibilities – especially in the areas of content creation and consumption and intellectual property rights: from the debate over mass access to content for the training of Large Language Models (LLM) to the question of intellectual property of AI-generated derivative works.

In this context, companies developing AI-based tools are rushing to make the transition before new regulations come into force in order to further improve their training models with protected content. Streaming platforms, record companies and publishers are reaching their first bilateral agreements on the use of AI-generated content (David, 2023; Mohan, 2023) and establishing on-demand moderation rules (Rutherford, 2023). This approach replicates the negotiations arising from the current streaming distribution scheme, the results of which is a model of widely contested sustainability (Arditi, 2019; Arenal et al., 2022; Renard & Milt, 2023).

As then, the analysis of scenarios and solutions seems to neglect the perspective of the creators of the music industry (DCMS, 2023), as well as the prevention or correction of market dysfunctions or their impact on cultural diversity (UNESCO, 2023), as denounced by some musicians' collectives (Council of Music Makers, 2024). Although some studies and reports in the diagnostic phase include them (FTC, 2023), market practices leave little room for a joint strategic approach of the different sectors and actors involved in the search for solutions.

On the other hand, apart from a few incipient commercial studies by the industry (Pirate Staff, 2023), there is hardly any knowledge on the degree of training and/or adoption required by the use of this type of tool in the creative process, nor a systematic approach to the opportunities and threats perceived in the future by the people involved in the process of music creation, performance and production.

Consequently, although there is a widespread perception of the importance of the impact of AI (and, in particular, of generative AI) on the music industry, there is still no clear overview of the specific implications of AI from the perspective of the different actors involved in the industry, especially in its segments most closely linked to society and culture (creators and users).

In this sense, the focus on the sustainability of business models and the innovations that determine them (specifically, in this case, generative AI and the application of AI as the basis of the value proposition of streaming platforms) seems to us to be particularly important. In line with the debate of the last decade (Bilan et al., 2020; Schaltegger et al., 2015; Shakeel et al., 2020), linked to the concept of social innovation (Pel et al., 2020; van Wijk et al., 2018), the idea of sustainability transcends both the limits of its environmental circumscription and the traditional scheme of economic profitability and functional optimisation usually associated with technology-based innovation (Edwards-Schachter & Wallace, 2017; Godin & Gaglio, 2019). The question of the impact of AI on the music industry is, therefore, a question of the sustainability of such innovation in the coexistence and co-evolution of the actors that make up the music ecosystem.

On this basis and given the specific interest of the content creation sector in the context of streaming distribution in terms of business model sustainability, this article seeks to shed light on the processes and challenges of AI in the music industry from the perspective of composers/lyricists, performers and/or session musicians, both in terms of their knowledge and degree of acceptance in the dynamics of creative activity itself, as well as the challenges posed by the music industry's own processes in the streaming era (distribution, commercialisation) and their traceability (intellectual property management, mechanisms to guarantee the reliability and authenticity of content). We start with a review of the state of the art in terms of the latest developments and trends in AI in the industry from the perspective of the music streaming value chain. In order to obtain preliminary access to the basic structure of creators' perceptions in the context of music streaming, a semi-structured survey was developed with a qualitatively relevant international sample of 43 creators and performers, both professional and amateur, including leading representatives of different styles and functional fields of music (composers, lyricists, performers, etc.).

2. Artificial Intelligence and the music industry: background and challenges in the streaming distribution model

The commercial launch of ChatGPT on 30 November 2022 was a milestone for the adoption, use and potential of AI tools in virtually all industries and aspect of human life. In particular, the public debate around the creative industries in 2023 was dominated by conversations about generative AI. While the use of such tools is not new (Avdeeff, 2019; Dredge, 2021), the qualitative leap in their effectiveness

has placed them at the centre of interest in the creative industries (Anantrasirichai & Bull, 2022). In the specific case of the music industry, the first major media event occurred in April 2022, when an artist using the pseudonym ghostwriter went viral with the release of a song using AI-simulated voices of Drake and The Weeknd, two of the most prominent figures in the music scene that year (Sato & Lawler, 2023). It is a relevant case because it brings into play some of the big open questions surrounding the use of AI in the creative process of any creative industry: what authorship means, when a work is creative, whether it is possible to train AI learning models with copyrighted material and under what conditions, and, more generally, what business models would allow for equitable remuneration of participants in the creation, performance and exploitation of a work and their degree of compatibility with shared social and cultural values.

With regard to the use of generative AI in the creation of content, the debate faces two main positions, which, with nuances, can be divided into rights holders (MBW, 2024), who understand that this type of tool modifies, adapts or reproduces pre-existing works to create derivative works, even committing plagiarism (Marcus & Southen, 2024); and developers of this type of tool who understand that they are training or learning to create new works and argue that end users are responsible for any copyright infringement (Marcus & Southen, 2024); and the developers of such tools who see them as training or learning to create works that are new and hold the end user responsible for any copyright infringement (Wes, 2023).

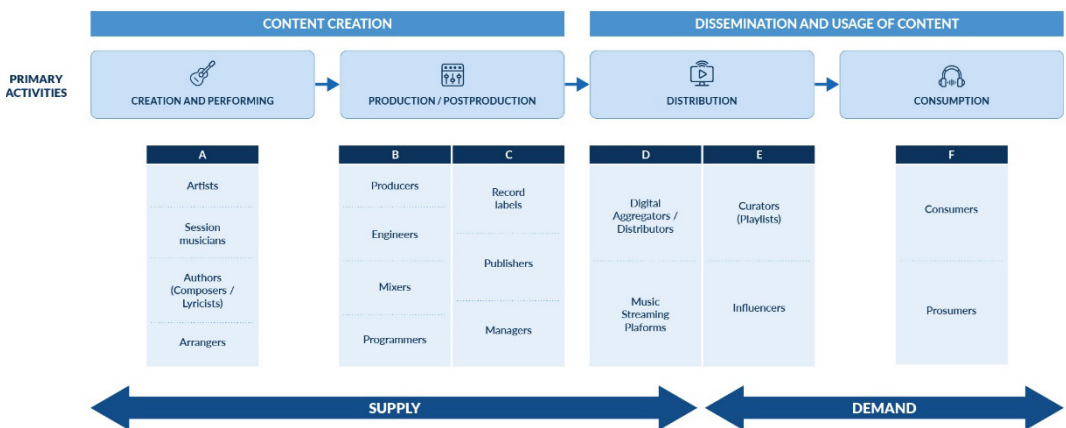
But in parallel to this debate, and while the first legislative proposals are beginning to emerge (Habuka, 2023; Robinson, 2024; Tencer, 2024b), the major record companies are already reaching agreements with streaming and music content distribution platforms to establish a framework that protects their interests (David, 2023; Mohan, 2023), while denouncing some of the companies that have used protected content to train their models, such as Anthropic (Nicolaou, 2023), in line with what has happened in other sectors such as publishing or journalism (Cook, 2024; Mullin, 2023).

Although the most notable cases in 2023 highlight AI's influence on music creation and production/post-production, its potential impact extends across the entire music industry value chain, including the way music is consumed and experienced. Indeed, as noted above, AI already plays a key role in the value proposition of music streaming platforms through content curation and personalisation, so much so that it has become one of the technological foundations of a business model that has been challenged on numerous occasions (Antal et al., 2021; Castle & Feijoo, 2021).

2.1. Value chain of digital music exploitation models: primary activities and key players

In order to understand the impact of AI on the music industry, it is necessary to identify the stages that recorded music goes through from its initial idea to its final consumption, as well as the activities and key players involved in this process, which may be most affected by AI. To this end, based on previous research (Castro-Martínez et al., 2013), the model presented in Figure 3 is proposed, which shows the main activities and key actors in the value chain of digital music exploitation models, defined by the sequence of interrelated stages through which a musical/artistic content goes, from creation and performance, through a production and post-production phase and subsequent distribution, until it reaches the consumer, including the fact that the consumer can play an active role as a creator/transformer of the content and as a distribution channel through recommendation.

Figure 1. Primary activities and key actors of music streaming



Source: own elaboration based on Castro-Martínez et al. (2013).

In each of the phases, the main actors involved are included: (a) performers and authors (composers/lyricists) and arrangers in the initial creation and performance phase; (b) producers and technical profiles (mainly engineers, programmers and mixers) as well as (c) management-related figures (record labels, publishers and managers) in the music production phase that gives rise to the materialisation of the music product; (d) aggregators and digital distributors in charge of uploading music to streaming platforms, as well as (e) playlist curators (human and algorithmic) and influencers (real or virtual) who position the music product on the relevant platforms; and finally (f) consumers who make use of the music content on digital music platforms, such as streaming platforms. These consumers play an increasingly active role in the sphere of creation or production (Bruns, 2013), generating new music content (Thakrar, 2023), for example, by creating accelerated remixes of original songs that in some cases are more successful than the original tracks (Leight, 2023b). Thanks to the use of AI tools, the relevance and number of such contributions can grow significantly, saturating the supply and affecting the discoverability and choice of content (Sato & Lawler, 2023; Soriano, 2023).

The proposed model focuses on the commercialisation of recorded music through streaming platforms, although it would also be valid for other related models such as digital downloads. Other forms of music marketing such as physical sales or live performances are not considered in this version. Likewise, the model could be extended to include other forms of exploitation of recorded music (cinema, audiovisual, video games, ...). In any case, this model of the music streaming value chain considers primary activities, where AI may initially have more influence. An extended model could also include support activities such as operational and legal issues related to the protection of musical creations and performances in terms of intellectual property (metadata, contracts, ...); the arts linked to the post-production of the musical product (song, album); or traditional marketing and promotion (social networks, reviews in online media) in the distribution phase.

2.2. The case of algorithmic streaming curation

A particularly symptomatic aspect of the changes and challenges posed by AI in digital models of music exploitation, and which allows testing the usefulness of the proposed value chain model, is the case of algorithmic curation – based on AI – in the streaming model. Algorithmic curation constitutes a differential element of the streaming distribution model, which in turn determines the most relevant type of consumption in the current music business in terms of revenue. Since the early 2010s, revenues associated with streaming have grown to the point where it has become the dominant commercial channel for recorded music, displacing other business models. By 2023, streaming would exceed 80% of recorded music revenues in all major markets (IFPI, 2023), driving music consumption to unprecedented levels (Stassen, 2024).

Despite its success in industry terms, the economic implications of this model have generated a great deal of controversy, especially with regard to the remuneration of the various players and the use of algorithms for automatic recommendation (Arditi, 2019; Centre National de la Musique, 2021). In a model where supply is not a differentiating factor (the major streaming platforms offer very similar catalogues), curation and recommendation systems have become the core of differentiation between competitors (Born et al., 2021; Morris, 2020). However, these algorithms not only use users' tastes and preferences to make recommendations, but also preferentially include those topics that most benefit the platform's business and have an increasing influence over editorial recommendations made by humans (Carman, 2024).

In addition to being at the heart of the operationalisation of these recommendation systems – and their problematic nature – AI has also contributed to new challenges. The proliferation of AI tools that drastically lower the barriers to the creation of audio content threatens to generate a veritable explosion of content that is difficult to track and of very different quality and nature (Stassen, 2023c), which poses a serious governance problem for platforms and a saturation of supply, with a significant increase in management costs and a progressive loss of market share for the major rights holders. Moreover, the revenue-sharing model in vogue – the so-called pro-rata model – has created a perverse incentive: Since everyone – established artists and AI-generated songs – competes for the common revenue pool of the platforms, it makes a lot of sense to 'invade' the management platform with as many tracks as possible (Cook, 2023; Warner Music Group, 2023). If the weight of AI-generated tracks begins to increase in the balance sheet, the consequences are obvious.

The industry's response to these AI challenges has been swift (Graeme, 2023)^[2]. In short, the popularisation of generative AI has accelerated the rethinking of some of the music industry's distribution and marketing problems through streaming. At the same time, both streaming platforms and record companies are experimenting with AI in their business models, including consumers as generators of new content^[3]. The new AI paradigm has the potential to reshape the relationship between record companies, artists and streaming platforms, including core issues such as redefining who can be an artist and the criteria that will determine which headliners should be paid for the use of their creations on the platforms and

how they should be remunerated. However, despite some isolated industry statements (Raygoza, 2023; Walshe, 2023), the perspective of creators and artists seems to be blurred in the processes shaping the new scenario. And all this is happening, moreover, at a time when the legal framework in the digital market is still under review in different countries, in response to pressures from the clearly disadvantaged position of creators in the dominant model (DCMS, 2021; Galloy & Samain, 2023; Klein, 2023).

3. Objectives

Just as the voice of creators – the true protagonists of value creation in the music industry – has begun to be heard in relation to the non-sustainability of the business model of streaming platforms (Antal et al., 2021; Arenal et al., 2022; Butler, 2021; Castle & Feijoo, 2021), we believe it is crucial that their perspective and vision of the intrusion of AI in music can be taken into account in the processes of redefining the industry model.

Therefore, the aim of this article is to shed light on the perceptions of creators in the process of redefining the streaming music distribution model, triggered by the disruptive impact of AI (and generative AI in particular). The research questions that outline this general objective are:

- How does the development of AI – and in particular generative AI – affect the more social elements and stages of the music streaming value chain (creation and consumption)?
- How does the development of AI – and in particular generative AI – affect the issues and dysfunctions that currently exist in the music streaming platform model?
- How do music creators – composers, lyricists, artists and performers – perceive the role and influence of AI on their position and opportunities within the streaming platform model?
- How and for what purposes do music creators currently use artificial intelligence tools in their creative processes?
- What benefits, problems and difficulties do music creators perceive as being specifically created or exacerbated by AI in their sector, and what solutions do they see for the latter?

As the agreements and contracts between the main actors in the value chain of digital music exploitation models are not publicly available due to confidentiality reasons, a direct economic analysis is, for the time being, impossible. In this sense, as a first approach to the problem that allows, at least, to delimit its dimensions and nature, we propose an approach of a functional and qualitative nature. To this end, we propose, first, to identify the functional problems and challenges of the intrusion of AI (and in particular generative AI) in the landscape of music streaming platforms, based on a definition of the dominant business model and its corresponding value chain, and the subsequent identification of the impact of the disruptive technology in each phase or element of it.

This approach to the state of the question, described in the previous section, allows us to articulate a qualitative approach to the perception of music creators on how AI affects their creative activity, their position and future possibilities in the model of music streaming platforms, and the functional problems that this model has posed over the last decade.

4. Methodology

The proposed analysis combines analysis and modelling from secondary sources with fieldwork to incorporate primary sources, in this case the opinions and experiences of a qualitatively significant sample of creative individuals (composers/lyricists, artists, performers), both professional and non-professional, to analyse their perceptions of the impact of AI on the music industry and its relationship to the sustainability of the current model.

As a first step, the state of the art on the current development of AI solutions in the music industry within the music streaming value chain was reviewed. Subsequently, primary data collection has been carried out from a qualitatively representative sample of composers/ lyricists, performers and/or performers (session musicians). The aim of this phase has been to obtain information about their views on the impact of AI on the music industry; their perception of their potential adoption or non-adoption of AI tools in their creative and professional activity, as well as their corresponding motivations; and, finally, their degree of knowledge about the current and future integration of AI in the distribution of music by streaming. For this purpose, a semi-structured questionnaire has been developed that offers a compromise between the possibility of addressing different profiles of interviewed composers, artists and musicians while covering the same dimensions of data collection (Noor, 2008).

4.1. Questionnaire and data collection

The questionnaire has been designed to allow for comparability of responses considering that the profile of the composers, performers and session musicians in the target sample is not homogeneous. For this

reason, the approach is a semi-structured questionnaire combining open, multiple-choice and closed answers to allow comparability, collect more detailed information and discover new evidence, taking into account important aspects pointed out by each of the interviewees.

The questionnaire includes 33 questions distributed in the following five blocks: (1) general questions for the categorisation of the participants; (2) questions on the relationship of the artist/performer/composer with streaming; (3) questions on the current use of AI tools; (4) questions on the future use of AI tools; and (5) questions on privacy. The full questionnaire is available in the annex to this article, in both English and Spanish versions in order to include international composers, artists and performers.

The information has been collected between 29 November 2023 and 10 January 2024. Responses to open-ended questions are displayed verbatim, in Spanish or English, depending on the language chosen by each participant. The participation of composers/lyricists, performers and performers in the research as well as all responses to the questionnaire have been treated as confidential by default. Therefore, unless express permission was given during the completion of the questionnaire, both the identity of the participants and the answers have been anonymised.

4.2 Description of the sample and the analysis

Prior to the distribution of the questionnaire, the authors designed a taxonomy of seven categories of creators according to their main roles [4] (authors – composers/ lyricists –, performers and/or performing artists) and three more to represent their level of professional development according to the percentage of their total income represented by their musical activity (professional, semi-professional, amateur). Specifically, professional artists are those who earn more than 75% of their total income from their musical activity; semi-professional artists are those who earn approximately 50% of their total income from their musical activity; and non-professional artists are those who earn less than 25% of their total income from their musical activity.

In addition, the selection of possible candidates to form part of the sample has taken into account two additional criteria to guarantee the qualitative relevance of the results. On the one hand, a geographical criterion, so that there would be representation of artists from different origins and who carry out their activity in different countries in order to incorporate responses that include different cultural sensitivities. On the other hand, a criterion related to musical styles/genres in order to balance possible biases related to each one's own experience and practices in artistic creation (as there are styles or genres that are more prone to the use of technology in the creative phases). For the selection of the most common musical genres, the categories of the specialised website Allmusic.com were considered. Given the difficulty of limiting music to specific genres and the constant evolution of these, in addition to the standard options (Grein, 2024), the possibility has been included for participants to define the genre in which they see themselves represented or to choose as many genres as they consider necessary according to their artistic career. In the opinion and professional experience of the researchers in charge of this article, this categorisation makes it possible to obtain qualitatively significant data on the various casuistries sought in the analysis.

The composers/lyricists, performers and/or performing artists in the sample have been selected mainly from the contacts available in the music industry, both direct contacts and thanks to the collaboration of organisations representing the collective interests of artists and musicians such as the International Federation of Musicians (FIM) and the Association of European Performers' Organisations (AEPO-ARTIS).

The dissemination of the questionnaire was completed with messages on the social network X (formerly Twitter) to broaden the scope. However, the link was only provided upon direct request by direct message to the researchers to those interested in order to ensure that all participants fit the defined criteria.

Therefore, the sample under analysis includes creators who are representative of the different categories of the established taxonomy, also obeying a criterion of convenience in terms of the distribution of musical genres or styles and roles.

At the time of drafting this article, 43 artists had completed the questionnaire, 27 in English and 16 in Spanish. Each participant received their answers once the questionnaire had been completed, thus allowing for possible modifications, with the aim of ensuring the accuracy of the results.

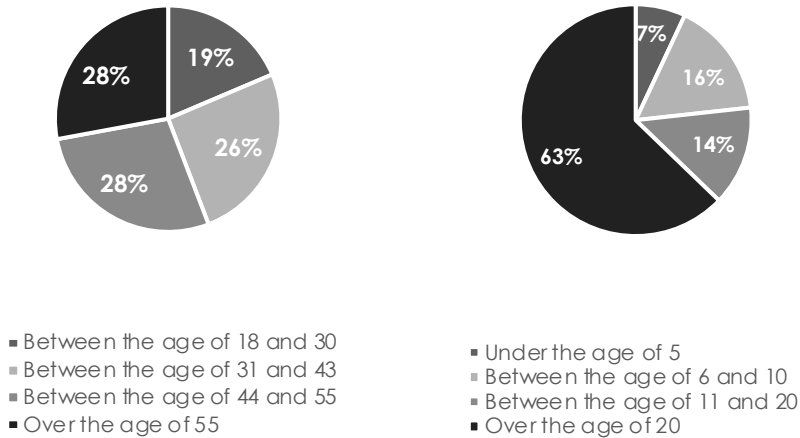
Table 1 lists the survey participants according to the established categories. Table 2 in the Appendix provides further details on role and country of origin.

Table 1. Categorisation of the artists surveyed during the analysis (N=43). Confidentiality of responses and participation is guaranteed by default

	Non-professionals	Semi-professionals	Professionals	Unclassified
Composers/Lyricists (only)	Juca Novaes	Frank Ekeberg	Jose Domenech Navi Producer Felipe Radicetti Kevin Sargent	
Performing artists (only)	Fremo Einar Bergem Ratish Tadge	Natiturner	Janet Collins Anonymous Artist 1 Voyage Svelma	
Performing artists (only)	Luciana Requião	-	Marcelo Novatti Camilo Velandia Pete Wallace	
Composers/ Lyricists and Performers	Anonymous artist 2 Delgado Kasti Ainara LeGardon Neal Sawyer	Samuel Kofi Agyemang	Carlos Cippelletti Julián Mayorga Manel Santisteban Monica Moss Jakob Glans Lange Frejat Andy Quin Juan Francisco Otón	Guzz Anonymous artist 3
Composers/ Lyricists and Performers	Fredrik Beckstrøm	Matthias Hornschuh	-	
Performers and Performing artists	Poliapolis Pa Modou	Ed Calle	Babett	
Composers/ lyricists, performers and performers	-	Edith WeUtonga	Tato Marengo	

In order to complete the characterisation of the sample, Figure 2 presents the distribution of participants in the study according to age and industry experience. In terms of age ranges, the sample presents a balanced distribution according to the different existing generations, as previously reported by Díaz Sarmiento et al. (2017). The age ranges corresponding to those aged over 55 and between 44 and 55 years, respectively, have 12 participants, each representing 28% of the sample. This is followed by those aged between 31 and 43 years (11 participants, representing 26% of the sample), and those in the range of 18 and 30 years (8 participants, representing 19% of the sample).

Figure 2. Distribution (%) of survey respondents by age range and distribution (%) of survey respondents by industry experience (years of experience)

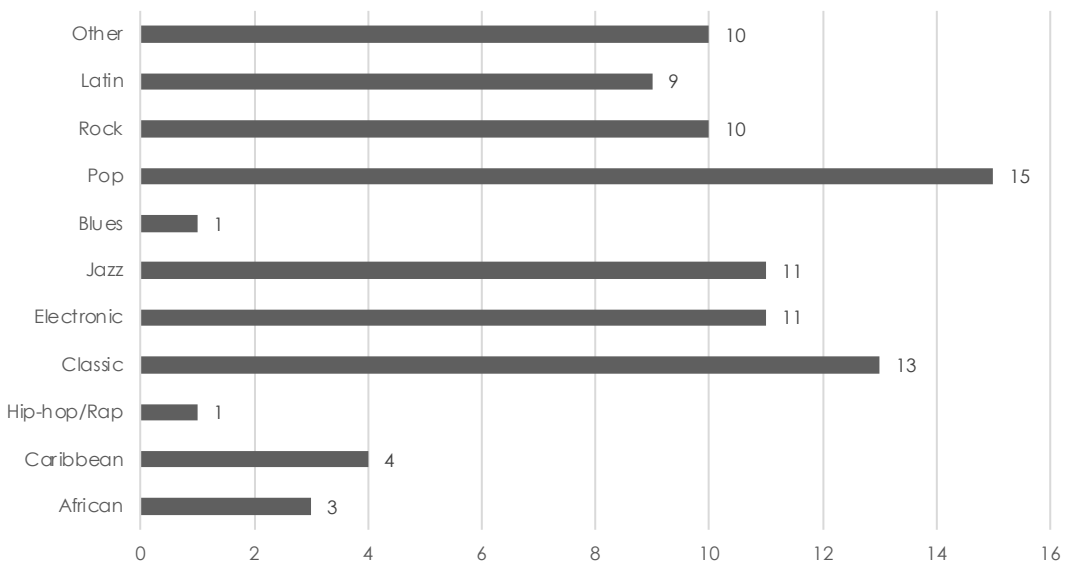


Source: authors' own preparation.

As for the distribution by years of experience in the industry, it is noteworthy that the vast majority of the participants have a career of more than 20 years (63% of the sample), which allows us to have a qualitatively representative sample in terms of professional career, something that we consider interesting when assessing the impact of AI.

Figure 3 illustrates the distribution of the sample according to musical genre. The sample is balanced between the most prevalent genres, with 15 participants identifying with pop, 13 with classical music, 11 with jazz and electronic music, 10 with rock, and 9 with Latin music. With regard to the additional genres identified by the participants in the "other" category, film/television music stands out, with four participants indicating their affinity for this genre, while folk was chosen by two participants. The additional categories include Brazilian popular music, gospel, experimental music, improvisation and electroacoustic music.

Figure 3. Distribution of musical genres/styles in which the sample participants see themselves reflected.



In light of the evolving nature of the phenomenon under investigation, an approach to qualitative and iterative analysis, as outlined by Miles and Huberman (1994), has been employed to reach the findings and conclusions presented in the article. In this manner, the responses of the participants are integrated

into the results, in conjunction with the ongoing literature review on the development of AI in the music industry. This facilitates the collection of relevant information. The analysis encompasses both academic and music industry sources, reflecting the dynamic and evolving nature of the subject matter.

Given the novelty and limited research coverage of this topic, the results are primarily descriptive, reflecting the exploratory nature of the analysis. Further research could be conducted with a larger sample size, allowing for more complex analytical techniques to be employed.

5. Results: the perspective of the creators

The results of the questionnaire, conducted with a sample of music creators, are presented in the following three sections, which coincide in their thematic focus with the three main blocks of questions. The initial section of the questionnaire pertains to perceptions regarding the influence of AI in streaming and its current status within the industry. The subsequent two sections, respectively, address the relationship between AI and the current use of AI in the industry, as well as the level of knowledge and future perspectives on the use of AI in the industry.

Due to the qualitative nature of the data, the results are presented in the form of illustrative quotations from the participants. The comments are presented in their original form, in either English or Spanish, according to the language version of the questionnaire completed by the respondent.

5.1. The streaming model in the face of AI: a view from artists and performers.

One of the most problematic aspects of the streaming model since its inception has been the relationship between creators (composers, performers), rights holders and streaming platforms. It is evident that streaming has been pivotal to the recovery of the music industry and has established itself as the dominant source of revenue for recorded music (Richter, 2023). However, the imbalance in the distribution of the value generated by streaming has been a persistent concern among creators in the music industry (Beaumont-Thomas, 2021; GESAC, 2023). In this context, it is evident that AI plays a pivotal role in the value proposition of music streaming platforms to users, through personalisation and/or recommendation of content, in addition to the sharing model known as the 'market-centric', 'pro-rata' model, and the 'big pool' model (Antal et al., 2021).

This model, which is now under scrutiny, has been widely criticised by creators for two reasons. Firstly, they argue that it is difficult to receive remuneration that allows them to sustain their creative activities. Secondly, they claim that there is a lack of transparency regarding remuneration and the uses of music. These criticisms have been echoed by various organisations, including the European Composers and Songwriters Alliance (ECSA, 2023) and the Ivors Academy of Music Creators (2021). In addition to the use of AI algorithms for content management, there are now the complexities arising from generative capabilities in the creation or modification of works.

The responses of the participants in the analysed sample indicate that both questions remain valid, which at least casts some doubt on the contribution of AI developments to the sustainability of the model from the perspective of the creators and performers themselves. Consequently, the perception of more than 88% of the artists interviewed is that streaming has not had a positive influence on increasing their revenues over the last five years. Indeed, 35% of the participants indicated a significant decrease in revenues.

These findings are consistent with the distribution model that was in place until 2023 on the platforms, which favoured music that was most commercially viable and the dominant rights holders, who received the majority of revenues regardless of the number of user listens. (FIM, 2018; Meyn et al., 2023) This situation is particularly evident in the case of performers, who typically receive a single lump sum payment for their services and do not receive any remuneration from streaming platforms and/or record companies, with some minor exceptions as noted by some of the informants consulted. These exceptions include remuneration through AIE, the Entidad de Gestión Colectiva de Derechos de Propiedad Intelectual de los Artistas, Intérpretes y Ejecutantes en España (Collective Management Entity of Intellectual Property Rights of Artists, Performers and Performers in Spain).

Conversely, the transparency of data associated with the uses and performances of music on music streaming platforms has been a significant point of contention in the industry over time, particularly from the perspective of creators (Castle & Feijoo, 2021).

Despite the announcements of improvements, such as greater transparency about business models and royalty sharing (Hissong, 2021; Yoo & Monroe, 2021), the majority of artists participating in the study concluded that the information they received on the use and economic returns generated by their music on the platforms was still insufficient, unclear and/or not understandable. Furthermore, there was a lack of uniformity in the reporting of data, as Ed Calle and Monica Moss observed.

Ed Calle: "It is challenging to ascertain the circumstances surrounding these companies. The companies in question are notably opaque in their operations.

Monica Moss: "There is a complete absence of transparency. Furthermore, the Excel performance tables are challenging to interpret [...]"

It is noteworthy that approximately half of the respondents were unaware of the sources of their income in the digital sphere. Furthermore, performers tend to perceive this issue as irrelevant to their primary role as performers or session musicians, as articulated by Camilo Velandia.

Camilo Velandia: "I am not particularly aware of where to look for information on this topic. However, given that the majority of my income is derived directly from artists and other producers, I have not felt compelled to investigate this matter further."

The lack of transparency is also reflected in the impossibility of contacting the platforms, as Edith WeUtonga points out.

Edith WeUtonga: "No one is available to explain anything really".

The usual debates around the distribution and commercialisation of content through streaming are largely concerned with the use of AI by platforms and the theoretical increase in reach and/or the possibility of reaching larger and larger audiences.

In this context, the vast majority of participants in the study believe that streaming platforms provide wider access to their audience. However, several of them express doubts as to whether this increases the chances of their music being discovered, at least organically, as artists Delgado and Kasti point out.

DELGADO: "I believe that editorial playlists represent an invaluable opportunity for any artist to gain exposure and recognition. It can be argued that curators' playlists also play an important role in the promotion of artists".

Kasti: "The phenomenon of an artist being discovered "organically" is so rare that it can be considered impossible." It is necessary to have contacts in order to gain access to playlists and to facilitate the growth of one's career through this medium".

Lange: "It's largely about algorithms and gaining prominent playlists. Labels with established relationships in these areas provide better results but take a bigger cut ".

Indeed, as previous studies have demonstrated, user interactivity and the growing array of curated publishing are among the key considerations when analysing the sustainability of the business model of streaming platforms (Arenal et al., 2022). According to several artists, the possibility of promoting certain songs in exchange for a royalty rate below the standard rate represents a new barrier to effectively reaching new audiences.

Juan Francisco Oton: "My music in the streaming platforms had a big boom of audience at the start, followed by a big decay in terms of promotion by the same streaming platform afterwards".

Kevin Sargent: " Hard to tell, as most discovery is presumably via algorithmic promotion".

Voyage: "Looking at my statistics, it seems like it is likely for my music to be discovered. It's important to note that the biggest platform, Spotify, provides tools to get your music discovered through either an upfront payment or a lower royalty rate. In my eyes this is payola".

This final aspect of the use of technological developments as a direct monetisation strategy for the platforms also raises questions about the effective use of AI developments to reverse or correct some of the less sustainable aspects of the streaming model.

5.2. On the current knowledge and uses of AI

As previously outlined in section 2, AI is present in a number of different areas within the music industry. With regard to the creation of music, an increasing number of artists, composers and technicians are reporting the use of such tools during the creative process (Google Arts & Culture, 2020). Furthermore, the innovation ecosystem surrounding AI and music is expanding (Sparrow, 2023; Thakrar, 2023). Nevertheless, this awareness and/or adoption is not homogeneous and does not appear to extend beyond the perception of a social debate, which is common to all creative industries, on the importance or imminence of this technology.

In the sample analysed, an adjusted majority (51%) of informants indicated that they possessed intermediate knowledge of the use of AI in industry, with 26% claiming to be very or fairly familiar with the subject. At the opposite end of the spectrum, 23% of informants indicated that they are not at all or only slightly familiar with the subject matter. The sample demonstrates a broad distribution, with a clear inclination towards self-perceived mastery or familiarity with the emerging technology. This is consistent with statements of interest and concern about AI in their field.

However, when it comes to the adoption of AI tools, the distribution is reversed. Forty-four percent of participants acknowledged having used AI tools in music creation, while the remaining 56% stated that they had not. These figures are consistent with other types of studies published by the industry (Pirate.com, 2023). Similarly, the areas of the value chain where the use of these tools is concentrated are music production and/or post-production (mastering, mixing, etc.) and musical composition of lyrics.

In terms of the impact of AI tools on efficiency and quality in musical creative activity, there is a near-equilibrium between those who perceive a positive effect on both dimensions and those who do not.

The reasons provided by those artists and musicians who have not yet utilised AI tools can be categorised into two main arguments. On the one hand, there is a lack of confidence in the ability to produce results of the desired quality standard, or a lack of confidence in the knowledge required to do so.

Artist who prefers not to be linked to the answers 1: "I haven't had the need and I don't trust her that much yet".

Felipe Raddiceti: "It's a personal question, I don't trust (AI) models".

Conversely, motivations pertaining to ethical considerations and the artist/musician's contribution to the creative process, particularly in composition, which renders it distinctive, are of particular significance.

Jose Domenech: "I think artificial intelligence is there to replace mechanical processes without the need for creativity or low creativity. To make art I still like to use normal intelligence".

Natalia Ramirez: "I don't feel that what I do can be replaced by a machine".

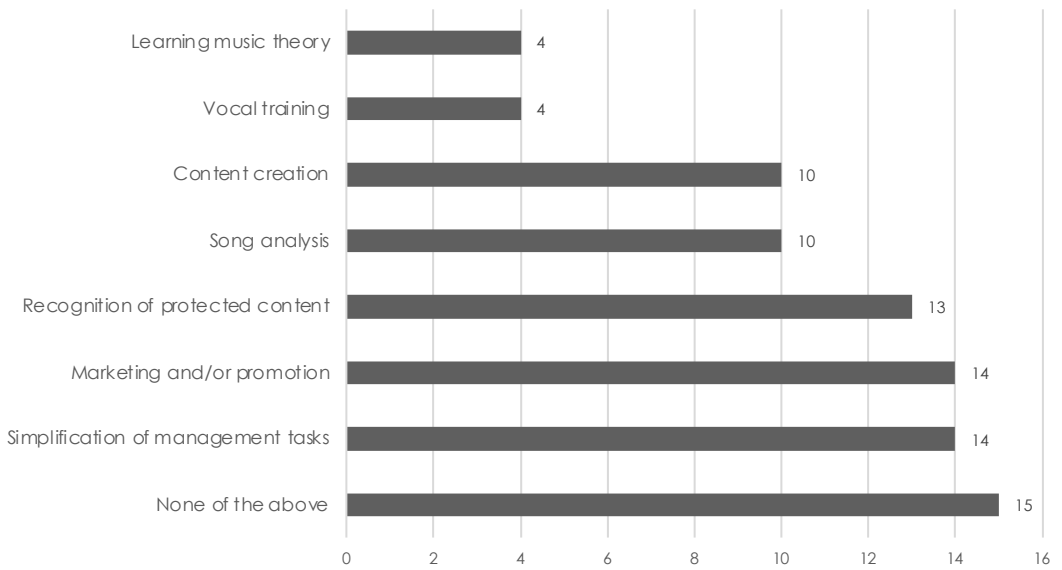
Ainara LeGardon: "My creative processes require working from the organic and the physical, which is what enriches me the most. I have not felt the need to use AI tools. Another reason has to do with ethical issues: most of the generative AI models that are available to us I think have been developed on the basis of a massive violation of intellectual property rights [...]".

Although most of the attention on the impact of AI on the activity of music creators is focused on the creative domain, there are applications and uses that are increasingly in demand (Hunter-Tilney, 2023; Pirate Staff, 2023).

Figure 4 shows the type of activities that participants in this study most identify with in relation to the use of AI tools outside of artistic activity. The most popular activities are the simplification of administrative tasks and marketing, while the least chosen are those that have to do with the uses of AI for music education (learning music theory, vocal training).

On the other hand, 35% of participants in the study do not identify with the use of AI tools in any of the options proposed and do not propose other uses, so we can understand that they do not use AI outside their artistic activity.

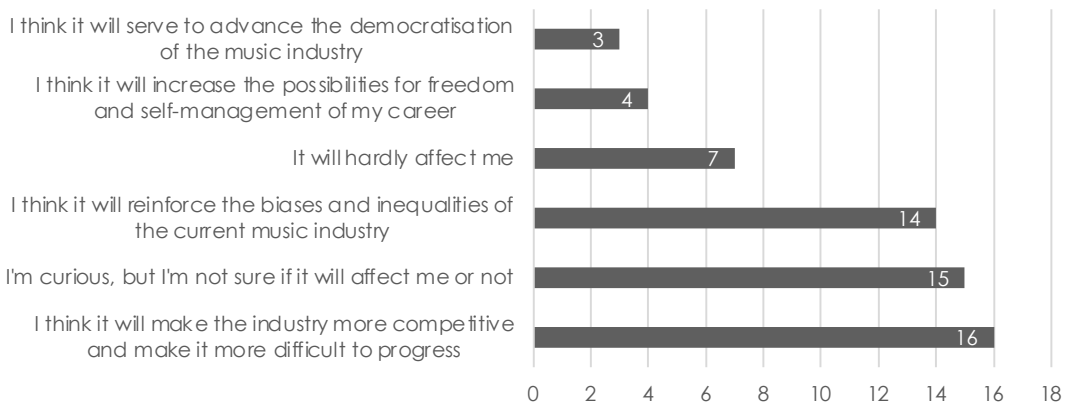
Figure 4. Activities with which the participants in this study most identify themselves in relation to the use of AI tools outside artistic activities



5.3. On the future impact of AI for creative people

In the context of perceptions regarding the potential impact of AI on the role of creators in the music industry (Figure 5), the surveyed informants exhibit a tendency to view this impact as significant (48.12%). However, a notable proportion of respondents (36.88%) indicate that they lack clarity regarding the extent to which AI will affect them. A mere 16% of respondents indicated that they do not anticipate being affected. In summary, the respondents' perceptions of the future impact of AI on the industry indicate a tendency towards increased competitiveness (37.2%) and further reinforcement of current industry biases (32.5%). A perspective that is characterised by inevitability and pessimism therefore predominates with regard to the role of AI in the industry in relation to its self-management options and overall impact on the democratisation of the industry.

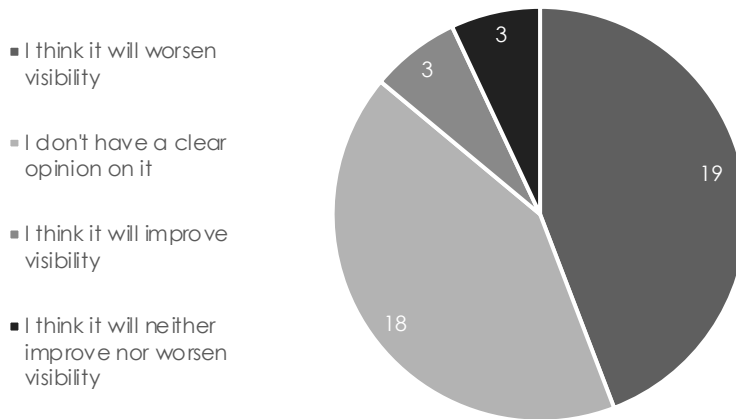
Figure 5. Participants' perceptions of how AI affects their role within the industry in the next 5 years



Figures 6 and 7 illustrate the specific responses regarding the anticipated impact of an increasing prevalence of AI use by streaming platforms on the visibility and distribution of streaming revenues.

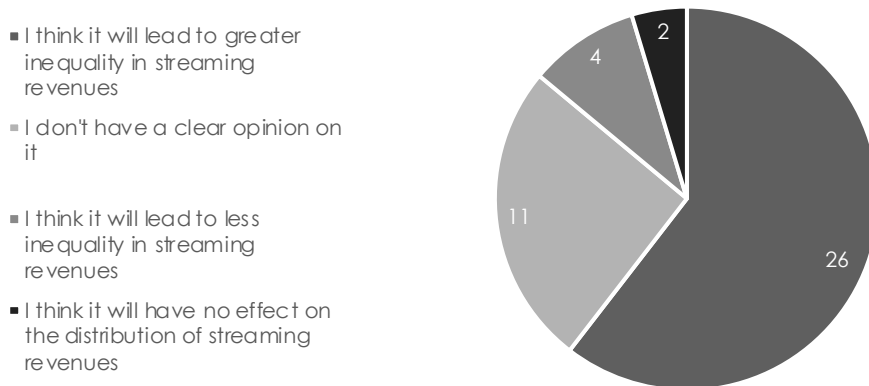
In accordance with the aforementioned findings, a considerable proportion of respondents (18 out of 43 participants in the sample) indicated that they lacked an opinion on the impact of AI on discoverability on platforms. Among those who do have an opinion, a significant majority (19 respondents out of 43 in the sample) believe that AI will worsen visibility for all artistic content. In contrast, only three respondents believe that discoverability will improve, while another three believe it will remain constant.

Figure 6. Perceptions of how the visibility / discoverability of artistic creators will be affected by increased incorporation of AI on streaming platforms over the next 5 years (N=43)



On the other hand, the majority of respondents believe that the further incorporation of AI-based functionalities in streaming platforms will lead to greater inequality in income distribution (26 out of 43 respondents). However, a significant number of respondents do not have an opinion (11 out of 43 respondents). Conversely, a clear minority (4) of respondents believe that inequality will decrease due to the incorporation of AI, while a further 2 respondents believe that income distribution will remain constant.

Figure 7. Respondents' perceptions of how the increased incorporation of AI into streaming platforms over the next 5 years will affect streaming revenues for artistic creators (N=43)



One of the most discussed issues in the policy-making sphere is the potential negative impact of AI on cultural diversity (DCMS, 2023; FTC, 2023; Renard & Milt, 2023). There is a divergence of opinion between those who believe that AI will enhance diversity by facilitating the creation of content and those who believe that diversity will be negatively affected by reinforcing the most in-demand content.

In this regard, the responses received from the survey participants are not unequivocal. On the one hand, there are those who posit that AI will facilitate greater diversity in music creation, as exemplified by the artist Poliapolis:

Poliapolis: "I think more people will be able to create Music thanks to AI and that will affect the real artists".

However, even if AI will favour diversity in the strict sense, several respondents point out some possible adverse effects due to content saturation and its impact on the quality of creations. As Natalia Ramirez and Voyage put it:

Voyage: "I think the collection music on streaming platforms would become too saturated. I think the diversity might increase, but at the cost of the quality".

Natalia Ramírez: "I feel that there will be even more music, but there will also be a lot more mediocrity within the world of creators".

A number of participants have highlighted the potential for AI to reinforce the dynamics of streaming consumption in terms of the reproduction of successful market formulas, the reduction of creativity, the emergence of greater homogeneity and the making of the scene more difficult for less popular genres. As an illustration, the testimonies of Julián Mayorga, Carlos Cippelletti, Ed Calle and Neal Sawyer may be cited:

Julián Mayorga: "I have the impression that the content will be even less diverse, that these tools will be used to repeat and reinforce the canon, and that music that responds to that canon will benefit even more".

Carlos Cippelletti: "I think that AIs will not have as their main objective to be creative, so their main objective will be to please the maximum number of listeners and to evolve and adapt as quickly as possible to demand in order to generate more revenue".

Ed Calle: "IA has the potential to support popular artists and create more difficulties for less popular artists, especially creators of less popular music such as jazz, classical, and folk".

Neal Sawyer: "Artistry will become more formulaic to fit in line with the new robotic standards".

And, as in other areas, some respondents point to AI tools as an enhancer of pre-existing skills, especially for those artists and musicians who integrate them into their day-to-day lives. Along these lines, Kevin Sargent and Camilo Velandia's comments:

Kevin Sargent: "I fear that Generative AI may reinforce existing styles and genres, deriving from existing material. It will make it easier for less-skilled practitioners to make convincing-sounding but mediocre pastiche. In the hands of the skilled, it will have positive impact in artistic expression".

Camilo Velandia: "A lot of talented people will use it to amplify their skills, and at the same time a lot of people who are not as talented will have the tools to be on the same platforms as people who have been working in this art all their lives. I think in the end, like all technology, it will make work easier for a lot of people, and take work away from other people, but that's something that will always happen in the cycles of the music industry, and those who learn to get on the train before the train leaves them will always find a way to have work and ways to share their art.

In consideration of the principal threats and opportunities that AI presents for creators in the music industry, the sample of artists and performers consulted exhibits a moderately pessimistic outlook with regard to the global impact. With regard to potential benefits, there is a general consensus that AI can facilitate the acceleration of numerous technical procedures associated with music production, particularly at the production and post-production stages. The potential impact of AI on various aspects of the music production process is a key concern for many of the artists and performers consulted. This is evident in the statements of Tato Marengo, Peter Wallace and Juan Francisco Otón, who highlight the importance of tasks such as mastering, mixing and even the more repetitive aspects of composition:

Peter Wallace: "Improvements in mixing, mastering & production side. Not so much in the composition and performance side".

Juan Francisco Otón: "Maybe, AI could be used to ease some particular tasks in music composition/production that are mainly based on repetition. Like the orchestration of a work to a specific type of orchestra, or the arrangement of a musical score into a digital work station)".

Tato Marengo: "(it will be useful when performing) Transposition, Orchestration, New sounds".

It is similarly postulated that AI can be a highly beneficial tool for the automation of activities that are not directly related to music creation, including the field of copyright protection.

DELGADO: "I do think it could help in music education and in copyright protection, plagiarism identification, etc..".

Kevin Sargent: "Content-identification and tracking of usage for purposes of financial compensation, copyright-infringement identification".

There is greater divergence of opinion when it comes to artistic creation in a more literal sense. However, some interpreters argue that AI can be a useful element at the level of experimentation at the beginning of creative activity and thus at the level of introducing innovations.

Kevin Sargent: "[...] Handling of usage data. Some artistic progress and innovation".

Artist who prefers not to be linked to answers 2: "Probably in the way you can analyse your audience and creation of good ideas paying the price for a bigger amount of bad ideas".

Monica Moss: "To improve the generation of ideas, languages and musical production arrangements. Especially in the most incipient phase of creative processes".

In contrast to the aforementioned opportunities, two significant concepts emerged as prominent themes among the majority of interpreters surveyed.

The first relates to unauthorised uses of existing creative content from real artists in the training of AI models that subsequently generate new content.

Carlos Cippelletti: "Unauthorised use of harmonic, melodic, timbral and thematic ideas of real artists. Unauthorised use of reproduction of works".

The second, partly a consequence of the previous one, concerns the non-existent remuneration of the creators whose content has been used in the successive creations consumed on the platforms, which allows further deepening the model of 'commoditisation' of music as a consequence of the distribution model of music streaming.

Voyage: "Streaming platforms need to pay rights holders their fair share. This is the cost of operation for them. They want nothing more than to reduce this cost. They have every incentive to normalize AI generated music".

Artist who prefers not to be linked to answers 2: "The record companies using their content in a less than honourable and honest way. Using past performances to create new unhuman artists".

All this configures a market scenario that does not allow human creators to compete, especially in the case of technical profiles, in the words of session musician and producer Camilo Velandia:

Camilo Velandia: "Certain jobs can be approached with AI, for less money than it would cost to use a person trained in that job. Examples are mastering engineers, mixing, etc..".

And this also applies in the case of music content less linked to artists, such as functional music or music used in audiovisual productions.

Juan Francisco Oton: "Specially related to composition, it might affect creativity at some point, as industries might start using AI tools instead of real composers to their soundtracks".

Artist who prefers not to be linked to answers 3: "I think that, in my sector, production companies are going to use AI to do all the music for their TV productions and they're going to skip the composers".

As a corollary to the perceived threats, several of the interviewees allude to a devaluation of the artistic profession and of creativity and cultural diversity itself, with explicit mention of the impersonation and/or duplication of other artists' voices.

DELGADO: "I am particularly concerned about the spread of emulations of the voices of deceased artists, or of artists who have not given their consent. And the creation of perfect voices behind which there is no human being.

Neal Sawyer: "Music will be resigned to repeat the past. Also, AI could mean true authenticity is even less appreciated and left outside of the limelight. Human imperfections in production are characteristics to make music authentic. Without such nuances, music will become more sterile than ever".

Andy Quin: "De-valuing human artistic creation to the extent that profitable lifetime careers like mine may not be viable".

Ainara LeGardon: "The false idea that anyone can become an artist in a matter of seconds,

devaluing artistic training and professional work... In addition to the devaluation and denigration of creative work, which will lead to more precariousness (if possible), another threat is the trend towards homogenisation of content, which is becoming less and less diverse, with the disastrous consequences that this implies for cultural diversity and the development of critical thought".

Ratish Tadge: "Only improvised music will be sustained, and fixed-format music will be affected".

In terms of potential solutions, there are three key ideas pointed out by the interpreters in the sample.

The first group of comments refers to the need to protect creators and the content they generate and have generated in the past by introducing explicit consent and permissions from the original creators to use their content, as well as the obligation to credit and compensate/remunerate them:

Ainara LeGardon: "An ethical use of generative AI would mean preventing companies from being able to train their systems with protected content without obtaining prior consent from the owners and without giving them credit or compensation. The focus should also be on regulations that protect against deepfakes and unauthorised uses, implementing truly effective solutions for creators.

Monica Moss: "[...] The labelling of samples and of those from whom they are generated. The prohibition of generating samples without permission of the creators. Watermarking of creations. New collective collection rights".

Artist who prefers not to link to answers 4: "Ensure copyright ownership of the human creator – economically compensate human creators for the use of AI in song creation – regulate the use of existing musical works in music production works through AI".

Artist who prefers not to be linked to answers 3: "Know what and from whom information has been used to create this supposedly original content".

VOYAGE: "AI as a tool NOT created by scraping people's copyrighted work. AI should be trained on work that the AI developers have the rights to. Such as music from the public domain and music they bought a license for".

The second group of shared opinions is that AI-generated content should not be protected by the same intellectual property rules as human-generated content.

Felipe Radicetti: "Copyright legislation. A machine cannot be considered as a creator of an art form or receive the same law protections of humans".

Voyage: "My hope is that not being able to copyright AI generated music would make them focus on human created music".

As a third focus of the discussion on solutions, Jose Domenech introduces a specific observation on the identification of supply, in the sense that consumers should be able and know how to differentiate between AI-generated content and human-generated content.

Jose Domenech: "I think the important thing is that the public knows how to differentiate between what is with AI and what is made by a human [...]. The lack of criteria of the public that receives musical creations. AI in itself is a good tool, but it cannot be the final product unless society takes it as such. The problem is not knowing how to differentiate it".

Thus, the opinions collected show that most artists and performers are not per se against technological developments in general and AI in particular, but they are concerned about the current implementation and the lack of control over it (lack of consent, compensation/remuneration, accreditation). In general, AI is regarded as a tool to automate or facilitate certain technical processes related to music production and post-production. On the other hand, less commercial genres, as well as functional music and soundtracks for audiovisual productions, are considered to be the main victims of the irruption of AI, although it is generally understood that the impact will be broad and there is not much confidence in potential solutions.

6. Discussion and conclusions

This article seeks to offer a first approach to the challenges posed by AI in the music industry from the perspective of the sustainability of the business models that manage the creation of value in the industry

and its relationship with the perception of composers/ lyricists and performers, understood as key actors in the value creation process. In this sense, therefore, this paper investigates aspects of social innovation related to the impact of AI in the music industry, and how it affects the creative actors in the value chain.

A secondary source analysis was conducted to investigate the impact of AI on the music value chain, with a focus on the various phases of the value creation process. The dimensions of this impact include the consequences derived from the automation of creative processes, the integration of process intelligence into the sector's own dynamics (creation, production, distribution, monetisation and branding), and the traceability of processes (management of intellectual property, reliability and authenticity of content).

It can be seen that AI encompasses all aspects of the industry, as evidenced by the developments and announcements that have taken place in 2023 (Cooke & Taylor, 2024; Forde, 2023). From the initial stages of composition and production to the final stages of consumption and appreciation, AI-powered tools are assisting musicians in the creation, recording, and mixing of music in a more efficient and creative manner. Additionally, AI is employed to personalise the music listening experience for users and to facilitate the discovery of new artists and genres.

In general terms, both the academic literature and the debate in professional circles emphasise two key aspects. Firstly, it is argued that the contribution of AI serves to accelerate or intensify some of the problems highlighted in the consolidation of the streaming platforms model, particularly with regard to its two major sustainability challenges. On the one hand, there is a displacement of value from the creators and performers who generate it to technology, which generates imbalances in the redistribution of income to the detriment of the aforementioned creators and performers. On the other hand, there is a growing homogeneity in the inventory, which is increasingly structured around mainstream proposals. This has implications for cultural diversity and creativity. Secondly, it appears that generative AI has a significant impact on the processes of creation and consumption, influencing the spheres and possibilities of value creation for musicians, composers, and performers, as well as the experiences of music use and consumption.

The consequences of this impact are evident in the intensification of issues surrounding the preservation and remuneration of intellectual property, which were already evident in the streaming platform model. The development of large language models, which underpin today's generative AI tools, has added to the controversy surrounding the intensive use of proprietary content for training algorithms. This gives rise to at least ethical questions regarding the fair use of such content, as well as the question of who is to decide on compensation for rights holders and who is to be compensated (record labels, publishers versus artists and composers). One potential solution, from the perspective of creators and performers, would be the development of codes of conduct that would oblige AI companies to obtain permissions to use training data and compensate creators and rights holders in an appropriate manner. However, the opacity surrounding generative AI training processes serves to compound the already characteristic lack of transparency of streaming platforms. Furthermore, by ascribing creative and originality capabilities to them, AI applications enter into competition on the same playing field with technical profiles (engineers, mixers, etc.) and directly with artists and composers.

Furthermore, the reproduction-imitation dynamics of generative AI and the associated issues with sound deepfakes have introduced a new dimension to the debate on derivative rights. In a context where AI-generated music may be indistinguishable from that created by humans, the question of copyright and the remuneration of creators and rights holders may be raised, particularly where artificial creations may include vocal synthesis, replication of instrumentation and even imitation of the composition of recognised authors or works. The fact that many of these models are trained using data that is freely available on the Internet also raises the question of whether it is too late to apply copyright and how this will affect the innovation process that has been triggered.

In the meantime, streaming platforms and major rights holders are engaged in bilateral discussions regarding the potential adaptation of business models to accommodate the progressive integration of generative AI tools in the content creation phase. For instance, Spotify appears to be inclined towards the implementation of thresholds to differentiate remuneration (Spotify for Artists, 2023), which it is combining with the diversification of services associated with marketing, discovery and personalisation. Nevertheless, it appears that the market and distributors are progressing at a different pace and following a different trajectory than the demands of creators' collectives and the social and regulatory concerns that emphasise transparency, the protection of rights, and the preservation of cultural diversity (Born et al., 2021).

In a similar manner to other sectors of the creative industries (Silberling, 2024), music creators and performers are beginning to mobilise and take action to ensure that their interests and perspectives

are taken into account. This encompasses the propagation of an “anti-IA clause” within the domain of reproduction and utilisation rights. This clause restricts or entirely prohibits the utilisation of creative material for the purpose of training, testing or enhancing any artificial intelligence model (LeGardon, 2023). Additionally, it prohibits the use of systems that impede the recognition patterns of algorithms, thereby hindering the process of categorisation and imitation (5). Conversely, some AI actors are contemplating the implementation of a certification system that would distinguish models that adhere to intellectual property norms (Dalugdug, 2024).

The music industry appears to be divided in terms of its positive and negative expectations of AI in general, as well as in the specific case of generative AI and its potential applications in the artistic creation phase. This dichotomy is also evident among creators, including composers, lyricists, and performers.

It is acknowledged that AI tools can contribute to certain phases of the creative process, including song analysis, management tasks, marketing, and the recognition of protected content. However, the perception of the main actors in the creative phase of the process endorses more than one aspect of the public debate in the professional music sector. The results of the semi-structured questionnaire, which was completed by a qualitatively significant national and international sample, provide a descriptive picture of the degree of knowledge of the implications of the pairing of streaming platforms and AI, of the adoption of AI tools by artists, and of their perceptions of the present and future impact of AI on the profession.

In relation to music streaming platforms, creators and performers consider that the problems traditionally associated with the lack of sustainability of the model – the lack of transparency and the controversy over remuneration models – are not only not solved as a result of the involvement of AI, but survive as an identifying feature of the model. Indeed, the surveyed sample perceives that AI extends the lack of transparency to the developers of AI models, who, to date, have no explicit obligation to declare whether they have trained their models with protected content.

Furthermore, artists do not perceive the technological contribution of the platforms to the visibility of creators and their works as a positive one. The potential for creators to reach a theoretically universal audience is constrained by the high volume of content uploaded to the platforms on a daily basis (Stassen, 2023c) and the personalisation features offered by the platforms themselves, which are further compounded by the development of AI (Carman, 2024).

The proliferation of content in an environment where generative AI offers a democratisation – or perhaps a massification – of creation as a music consumption experience poses a challenge for creators. Automated artificial creation is seen as a serious threat in specific sectors of music creation, such as soundtrack composition. Furthermore, the saturation of the market presents a challenge to distribution platforms, which must consider new forms of delivery that acknowledge the contribution of AI-generated content as a distinct entity from conventional creations. In addition, there is the problem of content that is not protected as such in the digital marketplace, as in the case of performance. This process of redefining platform sharing with the emergence of AI-generated inventory has raised a number of misgivings among creators, who fear that many will be left out of the sharing process.

Nevertheless, the artists surveyed acknowledge a high degree of uncertainty as to their capacity to anticipate the impact of AI on their activity. Beyond concerns about the generalisation of “artificial creation”, the accentuation of inequalities in remuneration and the foreseeable saturation of inventories, they also cite the homogenisation of styles and musical production and the loss of quality of content as factors that will affect their work.

The results of the survey offer a vision that combines uncertainty and pessimism. Technological innovations are characterised as accelerating the inadequacies or dysfunctions of the streaming platform model, which will result in the eventual devaluation of the artistic profession and of creativity and cultural diversity itself. In this context, the regulation of AI application frameworks and the establishment of a framework that facilitates end-users’ differentiation between artificial and “natural” creativity are put forward as potential solutions to the pessimistic scenario.

The limitations of this work are twofold. Firstly, it is a partial and preliminary study. Secondly, there is the possibility of expanding the sample. In the first case, this work forms part of a series of studies which aim to survey the perceptions and expectations about AI of different actors in the music ecosystem, including users. The contributions of these users will enable the creation of a complex and excessively broad mosaic which can be included in a single academic article. With regard to the size and composition of the sample, the diversity, the distribution according to key criteria and its qualitative representativeness, although sufficient for exploratory-descriptive purposes, can be further strengthened for prospective purposes. Future research could expand the sample size and/or the range of perspectives, for instance, by examining the perspectives and knowledge of end-consumers on the uses of AI in the music industry.

Conversely, the music industry, in conjunction with the video games sector, although in a markedly disparate manner, represents one of the most rapidly evolving sectors within the creative industries, undergoing a profound digital transformation (Darvish & Bick, 2023). Consequently, investigating the challenges and complexities associated with the integration of AI within these processes offers a valuable insight into the broader landscape of digital content.

6. Contributions

Task	Author 1	Author 2	Author 3	Author 4	Author 5
Conceptualisation	X	X	X	X	X
Data curation	X	X	X	X	X
Formal analysis	X	X	X	X	
Funding acquisition	X		X		X
Investigation	X	X	X	X	X
Methodology	X	X			
Project management	X		X		
Resources	X	X	X	X	X
Software					
Supervision	X	X	X	X	X
Validation	X	X	X	X	X
Visualisation	X	X	X	X	
Writing: original draft	X	X	X	X	
Writing: review and editing	X	X	X	X	X

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8. Declaration of conflict of interest

The authors declare that there is no conflict of interest.

9. Responsible declaration of use of Artificial Intelligence

No Artificial Intelligence tools have been used in the drafting of this paper, the production of images and/or graphical elements of the article, or in the collection and analysis of data.

10. Additional materials

Additional materials (semi-structured questionnaires in English and Spanish, informed consent form, etc.) are included as addenda in the article and also here: <http://hdl.handle.net/10201/139008>.

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13. Notes

1. The metadata associated with tracks is of great importance in ensuring that music creators are properly credited and compensated for their participation. This is because it describes who contributed to the creation of the track and in what role/roles. Nevertheless, it is evident that, thus far, metadata has frequently been inadequate or erroneous, resulting in delays in remuneration to creators and, in numerous instances, the inability to receive payment whatsoever (UK Intellectual Property Office, 2023).

2. At the time of drafting this article, Spotify, the leading platform in terms of market share, has proposed a model to be implemented from 2024. This model will require songs to have a minimum of 1,000 streams per year in order to be considered for remuneration. This information was provided by Spotify for Artists in 2023. In contrast, Deezer has entered into an agreement with the world's leading record company, Universal Music Group, with the intention of modifying the existing remuneration model in a more nuanced and "artist-centric" manner (Universal Music Group, 2023a). This approach also encompasses a set of thresholds to determine which artists are considered professional (1,000 streams per month and 500 unique listeners per month), thereby promising enhanced per-stream remuneration. Furthermore, the agreement stipulates that user-interactive listening (i.e. instances where users actively engage with the content) will be subject to a multiplier factor in contrast to non-interactive listening (such as playlists, etc.). This is to ensure that this mode of consumption is remunerated in the artist payment. Warner Music has indicated its intention to adhere to the agreement by the end of 2023 (Aswad, 2023).

3. For the sake of clarity, this text will refer to the provisions of the World Intellectual Property Organization (WIPO) in respect of musical works (WIPO, 1996):

- Author(s) are composers and/or lyricists who make an original contribution to an artistic musical work protected by copyright laws.
- Performers and performing artists shall be those persons (singers, musicians) who sing, interpret or perform [...] in any form of musical artistic works. Typically, performing artists correspond to session musicians or backing vocalists.

4. Two pertinent examples are YouTube's offer to generate voices for creators subscribed to its platform (Cohen & Reid, 2023) and Spotify's provision of automatic voice translation for podcasts (Walfisz, 2023). Other examples closer to business are Sony's statements that it is considering investments in 200 AI startups, while it has already made more than 10,000 requests to take down AI-generated content (Walfisz, 2023). 10,000 requests to remove AI-generated content for copyright infringement (Stassen, 2023a); the example of Boomy, an AI app that can generate songs from prompts, which encountered difficulties in May 2023 due to concerns that it was artificially increasing Spotify's listenership of its content (Martin Barbero, 2023), and which has a distribution agreement with Warner Music Group's ADA (Warner

Music Group, 2023). The case of Boomy, an AI app that can generate songs from prompts, is illustrative. In May 2023, it encountered difficulties due to suspicions of artificially increasing Spotify's listenership (Martin Barbero, 2023). Another example is Endel, a generative music application that has licensing agreements with Universal Music Group (Universal Music Group, 2023b) and Amazon Music (Dalugdug, 2023). Another example is BandLab, a company developing AI-based music creation tools, which announced a strategic partnership with Universal Music Group (Universal Music Group, 2023c).

5. See, for example, Glaze at <https://shre.ink/8x1Z>.