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Artist Rights Institute
where artists speak

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ΕΛΛΗΝΩΝ ΜΟΥΣΙΚΩΝ

CONTENTS

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MUSIC IN THE DIGITAL AGE

MUSIC IN THE DIGITAL AGE

ATHENS, GREECE - 22-24 OCTOBER 2025

STREAMING & ARTIFICIAL INTELLIGENCE

1. Music and New Technologies

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In recent years, and particularly since the COVID-19 pandemic, the artistic community and cultural management sector have focused on the working realities of musicians in the digital age—encompassing both employment and intellectual property issues arising from the online exploitation of their works, primarily through streaming technology.

This complex landscape brings three critical challenges to the forefront:
- The **inherent precarity** of music professions.
- The urgent **need for adaptation and continuous training** in new technologies.
- The **inadequate legislative protection** for copyright and related rights, which remain exposed to the business risks of the free market.

To these challenges, we must now add Artificial Intelligence. Currently, this leading-edge technology is being developed and funded without sufficient oversight, raising crucial ethical and legal questions. To the extent that these issues remain unregulated, they create a vacuum susceptible to lobbying and risk establishing a *fait accompli* in the creative industries.

2. The Challenge of Generative Artificial Intelligence

The artistic community is facing an unprecedented rate of income loss. The abuse of AI, driven by its unregulated exploitation, is leading to a loss of composure and perspective, with the mistake of adopting a purely oppositional stance being repeated: "AI is the enemy - it must be expelled from Art." This is an extreme narrative of an asymmetric threat, a digital Armageddon brought on by an uncontrollable machine that develops superior intelligence and destroys culture. While it is a compelling science-fiction dystopia, the reality is far more chaotic and complex. AI should be viewed as another tool to be integrated into our creative toolkit.[1]

Cultural management has developed tools, methods, and has extensively researched the Creative Industries. However, its findings often circulate internally within academia, failing to disseminate to the artistic community, the union movement, and, most importantly, failing to be applied to policy. This occurs precisely at a moment when techno-oligarchs are prepared to alter the very "social contract" to the extent that it impedes their vision of innovation.[2]

Legal science is struggling to keep pace with these rapid developments. Legislative initiatives to date have been hesitant, ambivalent, and generally inadequate to address the scope of the problems and the gravity of the circumstances. This discomfort is evident in the EU AI Act (Regulation 2024/1689)[3], which reflects the expediencies of a political environment where investors have the final say.[4] The US Copyright Office's opinion moves along the same wavelength,[5] concluding that "existing legal principles are sufficient and appropriate to resolve copyright issues."

Generative AI is a manufacturing process, detached from the concepts of lived experience, expression, and creative identity. While this ethical dimension may not be immediately apparent in the output, as the public may not be able to distinguish the creator of a work, it is imperative in the medium term to ensure fair compensation for artists whose works are used in AI training (the "input" problem). Correspondingly, significant income losses are recorded from the "output" side: the cannibalization of musicians' traditional revenue streams due to the substitution of their work by AI-generated content. It is estimated that by 2028, 24% of music creators' revenues will be at risk, leading to a cumulative loss of €22 billion.[6] A fair and realistic solution could be the extension of legislation on private copying (in Greece, Law 2121/1993, Art. 18).[7]

3. Streaming and Fair Compensation

Regarding streaming, artist remuneration is truly disheartening. Musicians earn fractions of a cent per stream, even as streaming accounts for 67% of the recorded music industry's revenue. The opaque financial management of the music industry, the predatory contracts of record labels, and the inaction of the artistic community allow Spotify, the world's largest streaming service, to pay rights holders an average of $0.003-$0.005 per stream.[8] This means an artist needs more than 800,000 monthly streams to earn the equivalent of a full-time, minimum-wage job at $15/hour.

In his 2015 annual report to shareholders, CEO Daniel Ek stated, "we don't sell music," but rather subscriptions and access;[9] music is merely an operational cost to be systematically compressed.[10] If AI-generated music does not generate royalties, providers will favor it as a cost-effective alternative. Thus, the already saturated "content" environment will be flooded with a plethora of royalty-free music, further intensifying the cannibalization of musicians' revenues, especially when the current pro-rata distribution algorithm exclusively favors top-performing artists.

With the financials of streaming providers remaining obscure, as they systematically report losses,[11] the principle of fair compensation must be clarified and formulated through a WIPO directive or similar "soft" legislation. Until then, a standing committee with local observatories could be established to circulate information and promote collaboration.

4. The International Conference: "MUSIC IN THE DIGITAL AGE"

Throughout its history, the music industry has experienced technological innovations as crises - and has always found ways to overcome them. The first printed score, mechanical pianos, magnetic tape, personal computers, broadband networks, and file-sharing all brought radical changes to the production and consumption of music. Musicians met these challenges by adopting and adapting to the innovations. Where this did not happen, negotiation failed: at the dawn of the digital age (late 20th century), record labels fought the internet by all means possible. The result was that they missed the train of the digital era, which is now driven by technology companies.[12]

Today, we find ourselves in a similarly critical period. It is now clear that new technologies are reshaping the creative industries and creating unprecedented challenges for musicians and audiovisual creators. Revenue streams are being disrupted, legislation is struggling to keep pace, and artistic labor is undervalued in a digital economy that prioritizes scale over sustainability. Furthermore, the degradation of musical work into mere "content" has cultural consequences in terms of aesthetics, symbolism, and social functionality. The crucial question is how musicians can adapt and negotiate to shape the future.

APOLLON, the Greek Collective Management Organization for Musicians' Neighboring Rights, and FIM, the International Federation of Musicians are organizing the conference "Music in the Digital Age: Streaming & Artificial Intelligence," an international forum on the future of music rights that brings together artists, industry professionals, academics, journalists, lawyers, politicians, and technologists.

During this three-day conference, held under the auspices of the Hellenic Ministry of Culture and various university departments, leading experts from around the world will address critical issues:

🎵 **Streaming & Fair Pay** - How can we ensure sustainable and equitable compensation models in a hyper-saturated digital economy?

🤖 **Artificial Intelligence & Copyright** - How can the rights of musicians be protected when AI systems are trained on their works and compete directly against them?

⚖️ **Legislative Frameworks & Innovation** - How can these be balanced to shape ethical AI and a fair digital market?

Through specialized panels, sessions, and cross-sector dialogue, we will analyze these challenges, seeking concrete and realistic solutions that will empower artists in the digital era to confront the potential cultural risks posed by new technologies. The keynotes, discussions, and networking opportunities with leading professionals from around the globe offer a unique chance to get up-to-date on the latest developments in music rights, technology, and policy.

More details on the three-day program and an updated list of panels and speakers can be found on the APOLLON and FIM websites
(https://apollon.org.gr/music-in-the-digital-age/
and https://www.fim-musicians.org/music-in-the-digital-age-streaming-and-ai/).
Alternatively you may scan the QR Code.

MUSIC IN THE DIGITAL AGE
ATHENS, GREECE
22-24 OCTOBER 2025

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ARTIFICIAL INTELLIGENCE & STREAMING:
The Cumulative Impact
of Converging Production
and Distribution Technologies
on the Music Ecosystem

Vasilis Ginos
Dinnos Georgountzos

The emergence and rapid spread of new technologies, such as Artificial Intelligence and Streaming, are introducing unprecedented dynamics into the way music is produced, distributed, consumed, and ultimately experienced as a cultural phenomenon. This paper explores the consequences of the application of new technologies in music production and consumption, examining how the overlap of AI and streaming, with the promise of digital democracy increasingly determines the form and content of music at the expense of its aesthetic value, symbolic significance, and consequently its social functionality. How does it affect the musical experience of musicians and audiences, how does it address the dilemma "art should be free - artists should be paid," and what are the cultural consequences of confining audiences to "aesthetic cells" and artistic communities to an economic margin, as the digital economy prioritizes scale over sustainability and innovation at the expense of artists' rights.

9

CONTENTS

1. Music as a Cultural Phenomenon and the Influence of the New Technologies

Music, with its profound character, connects humanity to its world and serves as a fundamental tool for its understanding. The musical experience, shaped by its respective cultural context, gives rise to musical genres. These genres function as markers of identity and cohesive bonds for communities, be they nations or online groups.

As a potent symbol of identity for individuals and groups, musical preferences reflect self-image and values on an individual level. On a collective level, they define communities, offering a sense of belonging and ultimately strengthening social cohesion, empathy, and solidarity through shared experiences.

As a supreme form of artistic expression, music transcends words, allowing creators to explore ideas and emotions, to innovate, and to experiment, offering aesthetic pleasure, emotional release, or catharsis. Its expressive power makes it a vital, evolving pillar of culture.

The rapid proliferation of new technologies, particularly Artificial Intelligence (AI) and streaming, is transforming the production, distribution, and consumption of music. This paper investigates how the convergence of these two technologies, under the promise of digital democracy, affects the form and content of music, potentially undermining its aesthetic, symbolic, and social significance. The study examines the impacts on the experience of both musicians and audiences, the confinement of audiences into "aesthetic cells," the economic marginalization of artists, and the prioritization of scale and innovation over sustainability and IP rights within the digital economy.

2. Artificial Intelligence, Streaming Services, and Their Convergence

2.1. Artificial Intelligence

The term "Artificial Intelligence" (AI) refers to the field of computer science dedicated to developing computational systems that simulate elements of human intelligence, such as learning, adaptability, and creativity[1]. In simpler terms, AI is the ability of a machine to replicate human cognitive functions in which it has been trained.[2]

AI systems are adaptive, capable of identifying patterns in data, and autonomous when making decisions without continuous human supervision[3]. An AI system is defined as software or a service that incorporates AI models (comprising code and "weights") for specific tasks[4]. AI is already widely involved in numerous sectors of daily life (e.g., transportation, media) and the sciences, and its proliferation is rapid.[5]

Generative AI (GenAI), which produces multimedia content (text, audio, image, video) based on user prompts, represents a pinnacle of AI development, competing with human capabilities[6]. Its rapid expansion is documented in patent applications, with over 54,000 filed between 2014 and 2023, 25% of which were submitted in 2023 alone. Of these, 13,480 relate to speech and music. Tencent, Baidu, IBM, and Microsoft are leading this trend, with China at the forefront (with 38,000 applications) followed by the United States (with over 6,000).[7]

Image 01 - Boris Eldagsen, "The Electrician"
(Source: Pseudomnesia)

Public perception of GenAI is predominantly negative (N Castelo et al., 2019; Pew Research Center, 2023c), as it is seen to encroach upon exclusively human creative processes[8]. Human art conveys intention, cultural and historical context, elements that GenAI lacks[9]. Recent awards for GenAI-created works, such as Boris Eldagsen's photograph "The Electrician"[10] (Image 01) and Rie Kudan's novel "Tokyo-to Dojo-to [11]," as well as instances of AI bands like Velvet Sundown[12], have sparked significant controversy. Despite this negative perception, 73% of independent artists believe that AI tools can enhance the creative process[13]. Furthermore, 13 20.3% of musicians have used GenAI for music production, 30.6% for

mastering, and 38% for creating artwork for their music[14]. From the audience's perspective, although human creation is preferred, studies indicate a growing acceptance of GenAI's ability to emulate aspects of human creativity.[15]

2.2. Streaming Technology

Streaming technology is defined as the technology used by digital platforms (Digital Service Providers - DSPs) to provide users with on-demand access to extensive music catalogs, podcasts, or audiovisual content (videos, vlogs) via the internet, without the need to download and permanently store files on the user's device. Instead, the media "streams" to the device during playback. Streaming accounts for 69% of recorded music revenue,[16] with over one hundred platforms[17] serving more than 600 million subscribers.[18] These platforms (Digital Music Streaming Platforms - DMSPs) operate on subscription models (offering unlimited access for a monthly fee) or through free, ad-supported access- and sometimes a combination of both. They have radically transformed the way music is distributed and consumed, replacing physical media (CDs, vinyl) and digital downloads. Providers such as Spotify, Apple Music, YouTube, and Amazon Music are dominant forces in the market.

Specialized AI systems ("Streaming Intelligence") have a catalytic effect on the listener's experience on these platforms.[19] [20] They are used on a large scale to personalize music recommendations with the goal of increasing subscriptions (O. Mokoena & I. C. Obagbuwa, 2025). For example, Spotify's "AI DJ" feature combines personalization technology with generative AI to recommend playlists (and enrich them with commentary and information), aiming for a more "human" and interactive listening experience.[21]

2.3. The Convergence of Technologies

AI produces "output" (e.g., content, recommendations) from "input" data, which in turn shapes the user experience on digital platforms.[22] For playlist curation and new music discovery, algorithms[23] analyze users' listening habits, song characteristics, and trends. This collected information (Big Data) is used to train AI systems that improve personalized recommendations, as well as to develop AI tools for music composition and production tailored to listener preferences.

   With streaming dominating distribution and algorithmic playlists serving as the primary promotional tool, platforms foster homogenization by featuring specific genres or AI-generated music (CISAC, 2024). The overwhelming majority of listeners (84%) cannot discern synthetic content[24]- that is also economically advantageous for providers, due to reduced or non-existent royalty payments (E. Shaikh, 2025).[25] It is estimated that 18% of new music on these platforms is fully AI-generated.[26] This state of affairs not only impacts music creation and consumption but also the very structures of the music industry, perceptions of creativity, and cultural trends, thereby accelerating the devaluation of professional artistic activity and creative labor.[27] Other risks include copyright infringement through deepfakes[28] and the unlicensed training of AI on protected works (Tencer, 2024). Therefore, exploring the convergence of these technologies is crucial for analyzing the cultural implications for contemporary music.

3. Artificial Intelligence in Music Production

Generative AI (GenAI), as a model that produces audio content,[29] is used for music creation. This can be either "original" music, based on training data from musical genres and traditions,[30] or imitations of specific artists through "deepfakes" (K. Brennan, 2023, p. 18). Regarding the generated content, a question arises as to whether it lacks the dimension that includes "the elusive concept of soul" (N. Hageback & D. Hedblom, 2021, p. 2) and the human essence of art. The absence of elements such as "human friction",[31] divergent thinking, and empathy,[32] is highlighted, attributed to a lack of connection with the real world (C. Seelinger & D. Elflein, 2024) - although the potential for training AI in emotion recognition is being explored.[33] For others, the use of AI for creation is considered a natural artistic evolution. The concept of "meta-creativity"[34] describes the participation of non-human systems, where AI undertakes repetitive tasks, thus enabling broader artistic explorations (P. Esling & N. Devis, 2020).

3.1. AI in the Creative Stage

Table 02: 45,6 million tracks with zero streams
(Source: luminate.com)

GenAI systems can facilitate the creative process by suggesting ideas, overcoming creative blocks, augmenting melody and harmony passages or creating new sonic textures (E. Navas, 2023; P. Esling & N. Devis, 2020; C. Seelinger, D. Elflein, et al., 2024). However, popular commercial applications such as Soundraw, Boomy, and Suno are not aimed at musicians but at the genral public, allowing music to be created via simple text prompts. This leads to abuse, with millions of tracks[35] flooding already saturated platforms and cannibalizing the revenue of human artists (CISAC, 2024).

Table 03: 1.33 million new artists for 2023
(Source: chartmetric.com)

In 2024, approximately 120,000 tracks were uploaded daily,[36] a significant portion of which (43% of 184 million in 2023)[37] had minimal or zero streams (Table 02). Meanwhile, the musician community grew by 1.3 million artists in 2023 (Table 03), with very few having any prospect of gaining recognition.[38] It is the abuse of AI within the framework of a "digital democracy" that raises the question of whether AI constitutes a threat or a tool for musicians.[39]

An example of this disruption is found in production music,[40] where producers can create music at a low cost,[41] threatening traditional production music libraries - a scenario identical to what happened to stock photography.[42] The often low quality of AI-generated music is overlooked, due to its low cost, thus diminishing the aesthetic value of music in the audiovisual sector.

Beyond original creation, AI canemulate artists or completeunfinished works (e.g., Bach,[43] Mahler,[44] The Beatles[45]). Deepfakes, such as the fabricated Weeknd-Drake collaboration by Ghostwriter[46] go viral, while virtual artists[47] and concerts (e.g., ABBA, Elvis)[48] blur the lines between the physical and digital worlds. The use of AI in live performance is limited due to the demands of interaction and improvisation, although pre-recorded backing tracks are very common in the live sector,[49] and there are examples that appear to be overcoming this barrier.[50]

3.2. AI in the Technical Stage

In audio production, AI is applied to mixing, mastering, and plugins (e.g., iZotope, LANDR) [51] increase speed and reduce costs, facilitating DIY production with a professional sound; for instance, LANDR processes over 3 million tracks annually (J. Bhattacharya, 2023). However, the reliance on stereotypes creates a risk of substituting specialized technicians, thereby precluding original creative decisions.[52]

AI-assisted score transcription (e.g., ScoreCloud)[53] saves time, although few musicians consider the time spent on transcription to be excessive, recognizing its value as a practical exercise.[54] Nevertheless, here too, the commercial argument is one of ease and accessibility.

The restoration of old recordings (with remastering having increased by 120%, according to J. Bhattacharya, 2023) or the separation of stems using AI are useful for the preservation of musical heritage. However, these stems are often commercially distributed as karaoke tracks or sample libraries without compensating the creators and performers. Furthermore, vocal removal [55] to create karaoke tracks is frequently done either without copyright checks or under the loose provisions of safe harbor laws.[56]

3.3. AI in the Business Stage

In music marketing, AI assists in understanding audiences and optimizing release strategies. In the past, only major labels had the resources for sophisticated market research. AI-powered tools (like Chartmetric) can give an independent artist powerful insights into where their listeners are, which playlists are driving discovery, and what kind of content resonates. However, as everyone follows similar strategies, standing out becomes more difficult, even for established artists (Chartmetric, 2023), thereby reinforcing the trend of "old music killing the new".[57]Investors show a preference for established back catalogs over new artists.[58] Promotional algorithms on streaming and social media platforms favor commercial appeal and recycling over innovation,[59] leading to stagnation, "echo chambers," and marginalization.[60]

3.4. AI in Copyright Management

Copyright Management Organizations face challenges in the identification, tracking, licensing, and distribution of revenue from rights. Issues such as multiple data standards, errors, and incomplete metadata,[61] are exacerbated by AI, which introduces problems of transparency and authenticity.[62] The EU Regulation (1689/2024) on the labeling of AI works is considered lenient,[63] with GenAI providers shifting responsibility to the user. As each provider sets its own rules,[64] only Deezer has developed an identification tool (the reliability of which remains to be proven).[65] In theory, AI systems could be used by CMOs to scan the entire digital landscape - social media, streaming platforms, games, films - to identify unlicensed uses of their members' music with incredible speed and accuracy. This AI wouldn't be generating content; it would be a powerful enforcement tool, finding revenue streams that are currently lost and ensuring creators get paid for uses that are impossible to track manually. Still the paradox is that its training already involves massive-scale mining of protected content, often without permission and hence can't be trusted to be let loose..

Image 04: SomaxII is a modular, interactive improvisation software, written in Max and Python by the Ircam Music Representation team. It can be controlled simultaneously by multiple performers and at various levels of interaction.
(Source https://www.stms-lab.fr/projects/pages/somax2/)

17

3.5. AI in Music Education

AI can be an educational tool featuring virtual tutors and interactive systems (e.g., Yousician, SmartMusic).[66] It has the potential to stimulate interest and aid in the preservation of local traditions.[67] However, the lack of emotion and cultural context - the "magic" of teaching - remains a limitation, especially in oral traditions. Experimental improvisation applications, such as SOMAX II (Image 05, IRCAM, 2022), OMax, ImproteK, Djazz,[68] LyricJamSonic,[69] Virtual AI Jam[70] show promise.[71] Yet, on a global scale, there is a lack of research, guidelines, and regulations addressing the ethical issues of connectivism, such as data security, reduced human interaction, bias, and the blunting of critical thinking.[72] The EU has focused on regulating AI for administrative functions in education rather than for pedagogical tools (EU Regulation 1689/2024). Technical difficulties, including infrastructure and training, persist despite calls for action from the European Parliament. [73]

Despite the immense and acknowledged potential for AI to serve as a creative catalyst, a tool for accessibility and a powerful assistant in management and education, its current implementation by dominant market players has overwhelmingly trended not towards artist empowerment, but towards cost reduction, content homogenization, and the systemic devaluation of human creativity.

4. Streaming Technology in Music Distribution

The music industry has historically been shaped by the technology of consumption (T. Bonini & P. Magaudda, 2024).[74] Today, streaming is dominant, offering instant access to millions of songs and an apparent "digital democracy" free from piracy, where artists can promote their music on equal terms.[75] However, in contrast to owning physical media like CDs, users now "rent" music through subscriptions, transforming recorded music into a service controlled by providers and record labels on corporate terms (L Pelly, 2025). Artists, dependent on streams for revenue, receive minimal compensation, raising the question of whether streaming has created more problems than it has solved.

4.1. Historical Background and the Rise of Streaming

Throughout the 1970s to the 1990s, when vinyl and subsequently the CD were the dominant formats, music publishing was a profitable endeavor, with record labels investing in artist development. The 1990s brought the advent of the World Wide Web (www)[76] and file compression (.mp3)[77] which led to massive digital piracy and fostered a culture of free music circulation. The industry resisted by suing users and implementing copy-protection on CDs, but from 2000 onwards, the decline in physical sales was dramatic(Table 05; Baskerville, 2006). Artists turned to self production (DIY), while record labels shifted their focus to management services and the acquisition of back catalogs. While the latter fought the internet by all means, technology [78] companies seized - and now maintain - control over music distribution and,consequently, the music industry itself (T. Gioia, 2019).
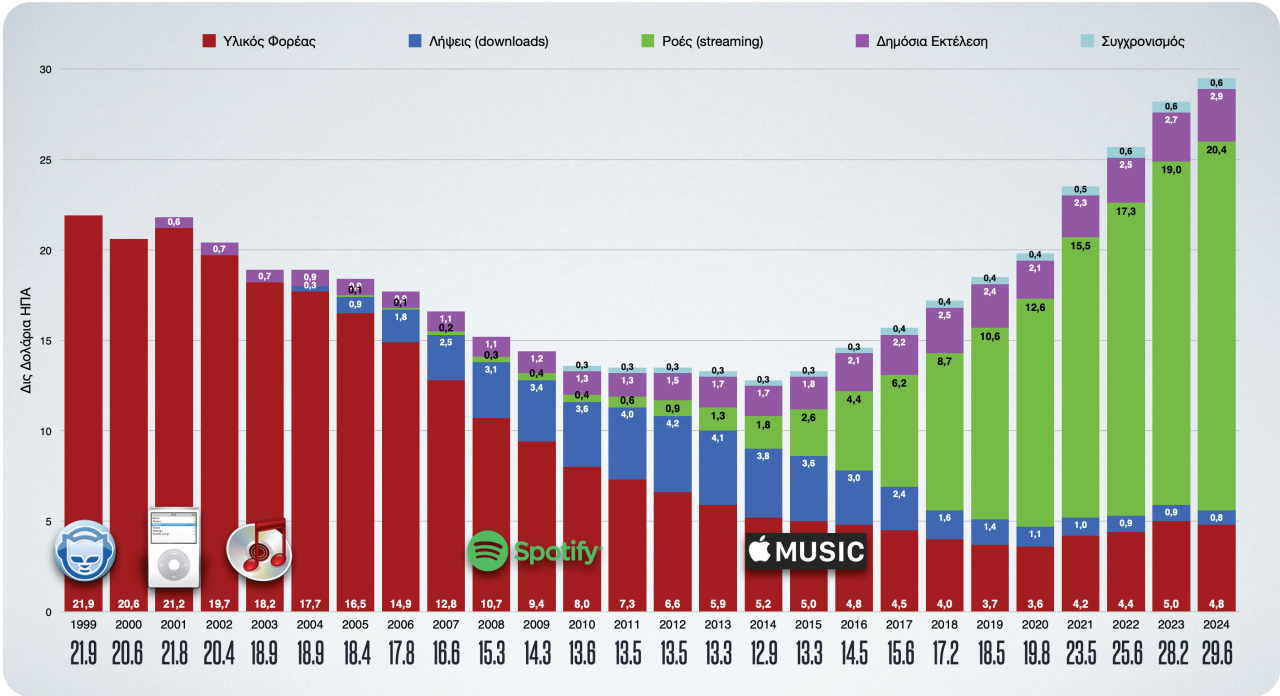
Table 06: Recording Industry Revenue 1999-2024
(Source IFPI Global Music Report 2025)

Daniel Ek, the founder and CEO of Spotify (established in 2006), identified an opportunity for legal and profitable online distribution. Initially using pirated files, Spotify evolved into a service that offered instant access to vast catalogs, first with advertisements and later with a "freemium" model. The agreements with record labels included large advances, guaranteed payments, and equity stakes, with Ek stating that Spotify sells access and subscriptions, thus treating music as an operational cost rather than a profit-generating asset (L. Pelly, 2025; T. Gioia, 2019). Simultaneously, Apple's iTunes (launched in 2003) promoted a model of purchasing and owning music,[79] a format that never managed to offset the losses from declining physical sales (M. 79 Eriksson, R. Fleischer et al., 2019; S. Carlsson, 2021).

4.2. Economic Data and Revenue Distribution

Spotify holds a 34% market share, paying artists between $0.003 and $0.005 per stream (Table 07),[80] with final earnings dependent on multiple factors such as the user's subscription type, country, and the artist's specific agreements.[81] For companies like Apple, Amazon, and YouTube, music serves as a supplementary component to their primary business operations. The prevailing model encourages passive listening, treating music as "wallpaper," which devalues the musical work and, from the providers' perspective, justifies the low royalty payments. The use of the term "content" as a synonym for "music," as seen in Ek's 2024 tweet regarding zero production costs (Image 07),[82] signifies this effort to diminish the value of the

cultural good. As former blitzscaling startups, [83] these platforms have focused on rapid growth, often at a loss; Spotify, for instance, reported a profit for the first time in 2024 (Table 08). [84]

Platform	Current Rate Range
Deezer	$0.00935 – $0.01143
Apple Music	$0.00804 – $0.00982
TIDAL	$0.00720 – $0.00880
Amazon Music	$0.00516 – $0.00630
YouTube Music	$0.00449 – $0.00549
Spotify	$0.00325 – $0.00397
Pandora	$0.00193 – $0.00235

Table 06: Streaming platforms rates
(Source: Royalty Exchange)

Daniel Ek @eldsjal

Today, with the cost of creating content being close to zero, people can share an incredible amount of content. This has sparked my curiosity about the concept of long shelf life versus short shelf life. While much of what we see and hear quickly becomes obsolete, there are timeless ideas or even pieces of music that can remain relevant for decades or even centuries.
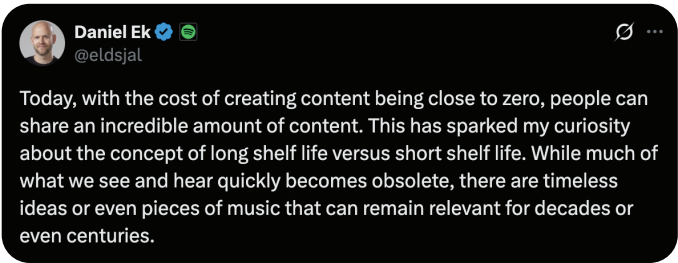
Image 07: Daniel Ek's Tweet about content cost
(Source: Twitter - X)

The industry's revenue is essentially the turnover of technology companies that are not committed to the well-being of music culture. When adjusted for inflation (Table 09), the growth of the music industry over the past 50 years may be marginal.[85]
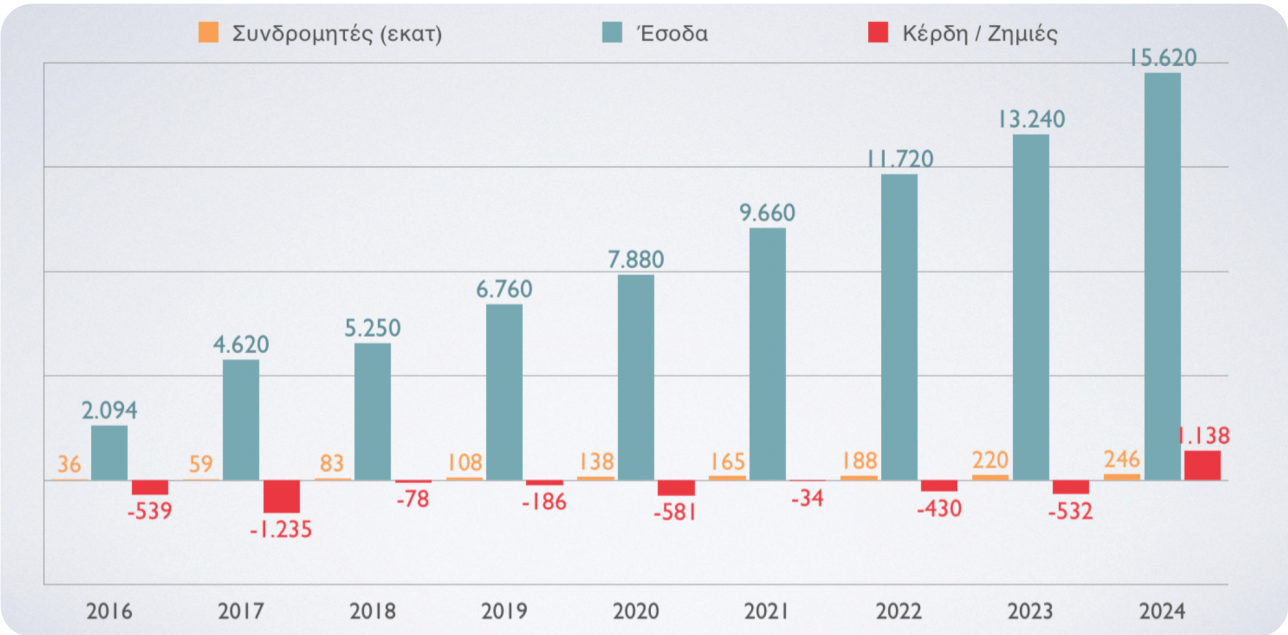

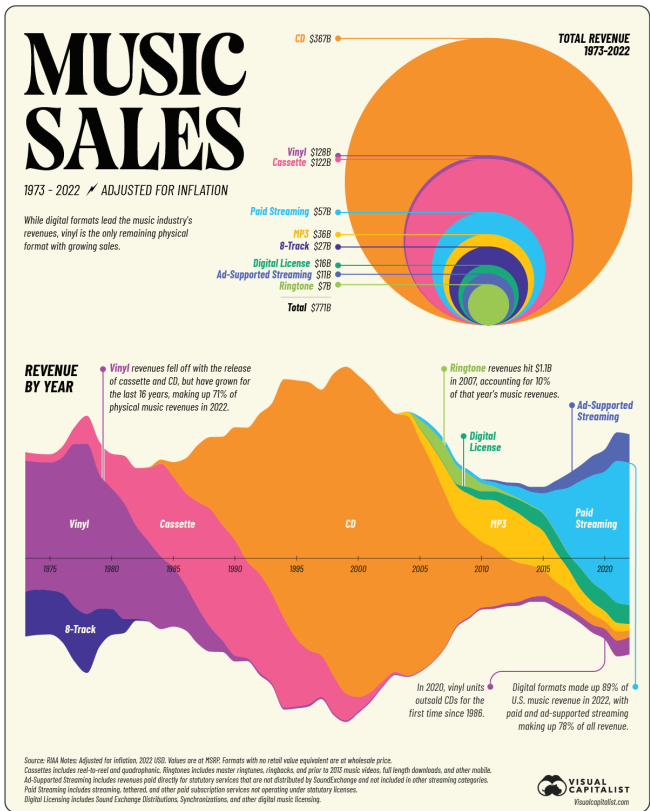Table 08: Spotify Revenue 2016-2024 (Source: businessofapps.com)

Table 09: Recording Industry Revenue, adjusted to inflation. (Source: VisualCapitalist)

The "pro-rata" revenue distribution model is based on each artist's market share of total streams. Typically, 30% of the revenue goes to the platform, while the remainder is distributed through complex, non-transparent contracts to record labels and publishers, resulting in significant losses for creators (approximately 11% for the artist and 10% for the songwriter in the example provided by D. Stopps, 2024, Table 11). Kobalt CEO Willard Ahdritz estimates that 75% of the money disappears within a dysfunctional system (de Souza, 2019), while the vast volume of data has led to litigation over unallocated royalties.[86] As the number of tracks increases, the per-stream royalty rate tends to decrease.[87]

Furthermore, the pro-rata model favors famous artists, absorbing the subscription fees even from users who do not listen to them.[88] Alternatives like the user-centric model (employed by SoundCloud[89] and a Deezer/ Universal version[90]) are currently under consideration. However, the majority of artists (80% on Spotify in 2022)[91] have very few monthly listeners (Table 12). As of April 2024, Spotify ceased paying royalties for tracks with fewer than 1,000 annual streams (affecting 62.5% of its content)[92], a move aimed at combating the exploitation of the platform with "white noise" tracks or content created by GenAI.[93] It is notable that 99.5% of artists receive just 10% of total streams, while the top 0.5% (57,000 artists) command the remaining 90%.[94]
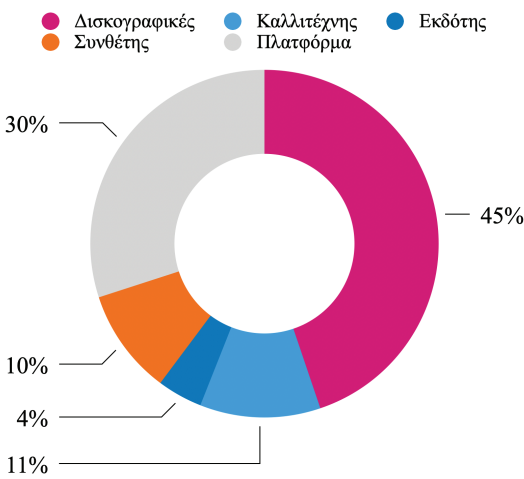
Table 10: Percentages from streaming (Source: D Stopps_"How To Make A Living From Music)

22

How many of Spotify's 8 million artists have *fewer than* X monthly listeners?

● No. of artists in millions   ● % of total Spotify artists

	Under 35 monthly listeners	Under 50 monthly listeners	Under 100 monthly listeners	Under 1,000 monthly listeners
% of total Spotify artists	75.4	78.4	83.3	93
No. of artists in millions	6.03	6.27	6.66	7.44

Source: Spotify Loud & Clear / MBW calculations
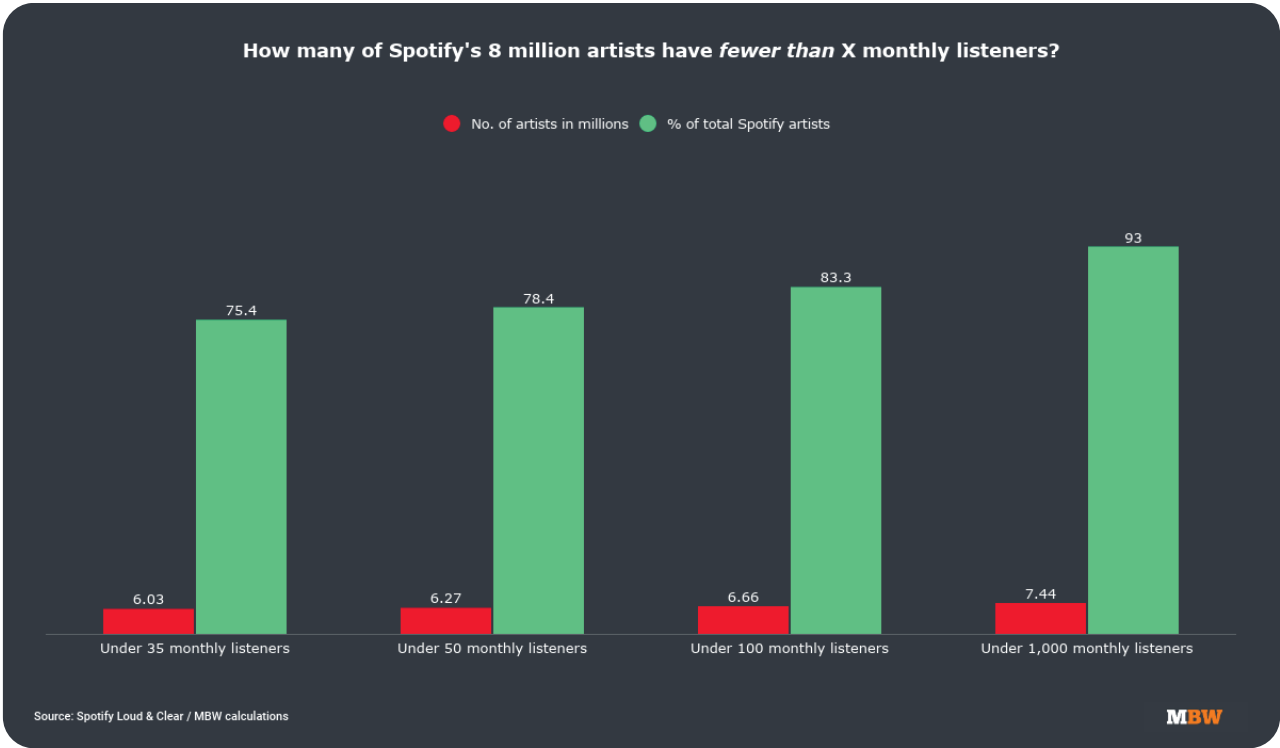
Table 11: 78.4% of the artists have less than 50 listeners/ month (Source: MusicBusinessPodcast)

Despite the industry's revenue growth, creators feel deceived[95], as the largest portion ends up with intermediaries.[96] Platforms are increasing subscription prices for consumers while paying progressively less to musicians (12-17% of total revenue).[97] In the United States, the "Living Wage For Musicians Act," [98] a legislative proposal introduced in March 2024, aims to boost musician earnings by increasing subscription fees and creating a new fund. In the same month, Spotify unilaterally reduced its mechanical royalty payments to the US collection society MLC by 50%, justifying the cut by classifying its premium subscriptions as a "special bundle." [99]

5. The Cumulative Effects of AI and Streaming on the Music Ecosystem

5.1. The First Stage: The Demand for Perfect Fit Content (PFC)

Streaming, the dominant mode of listening (accounting for up to 80% of revenue in some markets), serves a massive scale of consumption (A. Arenal, C. Armuna et al., 2024). Spotify, which initially focused on user-driven music discovery, shifted its strategy in 2013 towards curated playlists, emphasizing listener mood (T. Bonini & P. Magaudda, 2024) and predicting preferences based on listening history - a practice subsequently adopted by all major providers. Streaming has thus integrated AI through algorithmic curation and personalized playlists, which are fundamental to both the user experience and the business model.

It is true that a significant market for purely "functional", mood music (for focus, sleep, workouts, background ambience) has always existed and is distinct from the market for "artistic" music. One could argue that the rise of PFC doesn't necessarily cause a decline in artistic listening, but rather serves a different, pre-existing need with new tools. The problem arises when the platform's architecture and economic model fail to distinguish between the two, actively promote functional over artistic content (as it's cheaper and more predictable), and incentivise the blurring of the lines, thereby devaluing artistic work in the process. While "curated" playlists aim to provide a personalized experience, they actively shape listener preferences (M. Eriksson, R. Fleischer et al., 2019), promoting specific values and framing music with the invisible authority of the algorithm (R. Prey, 2020). This process commodifies music, establishing a content policy that reduces it to a homogenized background, detached from its message, context, and even its creators.

Spotify's "Discover Weekly" feature (launched in 2015) is a prime example: AI algorithms-including language models, collaborative filtering, deep learning, and reinforcement learning-generate personalized playlists in a non-transparent, "black box" manner (T. Bonini & P. Magaudda, 2024), with their validity judged solely by commercial outcomes (T. Hodgson, 2021; A. Mathews, 2024). This mood-based organization turns music into "streambait" (a term analogous to "clickbait")[100], reducing the cognitive effort of discovery and leading to "easy listening" (L. Pelly, 2025). The platform promotes the perpetual playback of "wallpaper" music, or Perfect Fit Content (PFC), focusing on mood and "vibe" instead of on artists, thereby shaping a particular type of listener and creating a musical pulp devoid of identity. Algorithmic playlists (which account for 60% of consumption on Spotify, according to Bhattacharya, 2023, and 70% of streams on Amazon Music via Alexa)[101] encourage passive listening.

For their part, artists, seeking visibility, adapt their music to be "streaming-friendly," a trend that leads to "Spotifycore." [102] [103] Spotify's "Discovery Mode" program, a form of payola,[104] promotes tracks in exchange for reduced royalty rates without any disclosure to the user - a practice criticized by the U.S. House of Representatives (2021) as a "race to the bottom." [105] Even platforms with more equitable models, such as SoundCloud and Bandcamp,[106] have proven vulnerable to market pressures, leaving artists to search in vain for stability in the absence of structural regulation.

5.2. The Second Stage: The Creation of PFC

The "platformization" of culture - that is, the infiltration of platform infrastructures and strategies into the circulation of cultural goods - is leading to a reorganization of the creative industries (T. Bonini & P. Magaudda, 2024). This constitutes a radical shift in power, as creators are compelled to adapt their work to the platforms in order to reach an audience, [107] effectively "optimizing" it for the algorithms. This leads to changes in composition, such as the elimination of intros and the reduction of track length (adhering to the "30-second rule," J. W. Morris, 2020),[108] as well as more frequent releases of individual tracks. This trend was encouraged by Daniel Ek, who stated in 2020: in the streaming world, "*you can't record music once every three to four years and think that's going to be enough to live on*".[109] The demand for abundant, inexpensive, and "fitting" mood-based content is being met by a new class of music producers who exclusively publish "mood content" - primarily lo-fi beats or ambient music - with the goal of siphoning royalties. These "fake artists" are the quintessential symptom of the "race to the bottom," and Generative AI serves as the ideal tool for their proliferation.
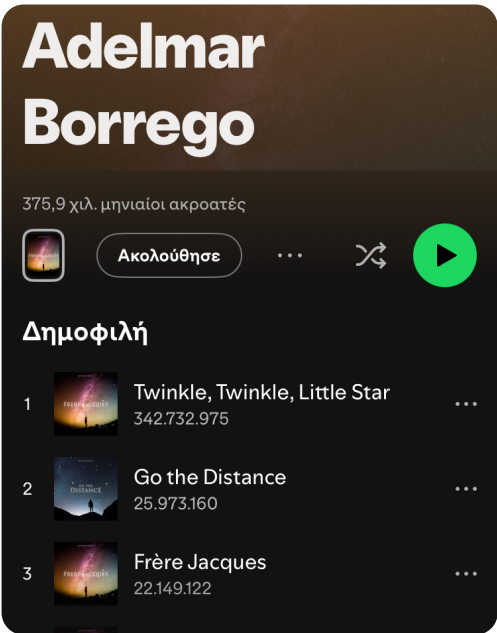
Image 13: Adelmar Borrego on Spotify (Source: Spotify)

5.2.1. Case study 1: Fake Artists

According to an investigation by a Swedish newspaper,[110] Swedish composer Johan Röhr, using 656 pseudonyms, has accumulated 15 billion streams on Spotify[111] from 2,700 instrumental tracks featured in over 100 of Spotify's own playlists, which have more than 62 million subscribers. His earnings in 2022 amounted to $3.13 million. His musical pieces, such as "Twinkle Twinkle" with 341.5 million streams (as of May 21, 2025), "Frère Jacques," or "Kumbaya" (under the pseudonym Adelmar Borrego, Image 14), are generic "elevator music" intended for mood-based playlists.

Röhr's success depends on assigning his 2,700 tracks to fake creators, as no single artist could plausibly claim such monstrous inspiration (except, perhaps, GenAI) - and besides, more creators mean more streams. The YouTube channel for "Adelmar Borrego" has only 73 subscribers.[112]

According to the same investigation, 91 Swedish individuals, using 5,700 pseudonyms, are credited as composers on over 13,000 tracks. The practice of using multiple pseudonyms serves the demand for vast quantities of content. Companies like Epidemic Sound [113] and Firefly Entertainment,[114] acquire music through one-time buy-out deals and promote it under various pseudonyms. Major record labels, such as SONY[115] employ similar tactics (M. Stassen, 2022). Finally, Spotify itself has been accused of collaborating with numerous composers like Röhr, thereby cannibalizing the revenues of "real" artists who do not have the privilege of being featured on the provider's official playlists.[116] Indeed, the platform would have every incentive to create its own "fitting content": it would be lower-cost than licensing from major or independent label catalogs, could be promoted for free on algorithmic playlists, and would allow Spotify to retain a share (or even all) of the royalties. A former Spotify employee confessed that this practice is part of "a series of internal initiatives to reduce the royalties the platform pays to major labels. [...] and it helps in negotiations with them."[117] Of course, such an activity could not be done openly, as it would be considered direct competition with its own suppliers. In any case, Spotify has categorically denied hiring producers to compose music under pseudonyms, after first pointing out that neither the use of pseudonyms nor the creation of mood-based playlists is illegal.[118]

Meanwhile, a growing number of new songs and albums on these platforms do not belong to real bands or artists but to AI-generated entities, often accompanied by fabricated biographies and historical details. A recent example is the band Velvet Sundown: they suddenly appeared in Spotify's Discover Weekly, rapidly acquiring hundreds of thousands of listeners without any prior history or information about their members. Their promotional photos and album covers, being unnaturally "clean" and digital, immediately suggested AI creation. Their biography, song titles, lyrics, and other texts were vague, lacking references to producers or collaborators, and filled with the kind of abstract, poetic expressions frequently generated by AI.

Velvet Sundown themselves fueled the mystery by denying they were AI, until a representative for the group publicly admitted that the music and the entire project had been produced on Suno.[119] He characterized the project as "marketing" and "trolling," emphasizing his intent to explore the boundaries between real and fake in the internet age - not without financial gain, one might add. A former Spotify employee stated that Velvet Sundown's popularity likely stems from the service now accepting payments for playlist promotion, with playlists being

increasingly curated by algorithms that "select songs based on their sonic characteristics."

5.2.2. Case Study 2: Fraudulent Streams

In September 2024, Michael Smith was prosecuted in the United States for creating hundreds of thousands of GenAI songs and using bots to generate billions of streams, from which he extracted over $10 million in royalties.[120] He used thousands of fake accounts and randomly generated artist and song names to make the streams appear legitimate. The phenomenon of "streaming farms"[121] is widespread: a 2023 study in France [122] identified over 1 billion fraudulent streams. Deezer suspects that 7% of its streams are fraudulent, while the Financial Times suggests the figure is closer to 10%, [123] thereby depriving legitimate rights holders of their due royalties. In 2018, Tidal was accused of inflating the stream counts for artists such as Beyoncé and Kanye West.[124] In 2024, a Danish man was sentenced to 18 months in prison for fraudulently inflating the streams of hundreds of songs on streaming platforms; he was also found guilty of copyright infringement for 37 of these songs, which he had "created" by altering the tempo and duration of existing tracks and releasing them under his own name.[125]

6. Legislative Discomfort

As digitization and online distribution redefine the music industry, a polarized debate over copyright is unfolding: artists and record labels are calling for stronger protections, while technocrats warn against counterproductive measures. With AI dominating music discovery (used by 74% of users) and many top songs being shaped by algorithms (E. Shaikh, 2025), the combination of fake artists, fraudulent streams, and GenAI music creates a grim mosaic.[126] Despite new penalties introduced by Spotify in 2023,[127] algorithmic playlists and the ease of producing "perfect fit content" (PFC) with GenAI encourage the mass production of streambait. This content degrades quality, with 84% of listeners unable to distinguish synthetic music (E. Shaikh, 2025), portending a cultural cheapening. And while history is replete with legislative attempts to regulate music culture (T. Gioia, 2019), the legislature of a modern state would not wish to do so (though there are alarmingly many attempts).[128] However, it does try (as it is obligated to do) to regulate the unchecked infiltration of GenAI into the artistic ecosystem and its consequences in the field of copyright.

€16Bn

Market size

Estimated market value of Gen AI outputs in Music in 2028

Gen AI outputs in Music will be worth a cumulative **€40Bn over the next five years**, rising to an annual value of €16Bn in 2028.

By 2028, Gen AI music will account for around 20% of music streaming platforms' revenues and around 60% of music libraries revenues.

€4Bn | 24%

Revenue loss

Music creators' revenues at risk in 2028
(compared to a no Gen AI situation)

Under current conditions, this market penetration by Gen AI outputs could put 24% of Music creators' revenues at risk in 2028.

This represents a cumulative loss of **€10Bn over the next 5 years**, and an annual loss of €4Bn in 2028.

€4Bn

Gen AI services' revenues

Estimated revenues of Gen AI Music services in 2028

Gen AI services in Music (both mass public and professional tools/software) are projected to generate exponential revenue growth, reaching an estimated €4Bn in 2028, with a cumulative total of **€8Bn over 5 years**.
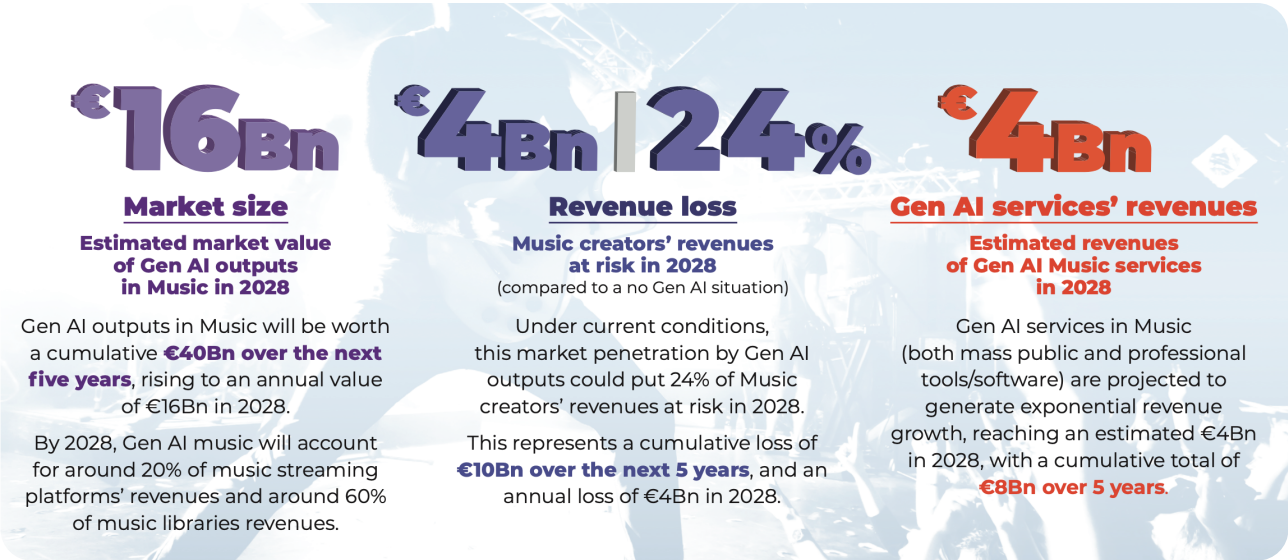
Image 14: 24% of creators' income will be at risk in 2028 (Source: CISAC)

The prevailing view is that machine creation does not give rise to a copyright claim (United States Copyright Office, 2025), or at least that it depends on the percentage of technological involvement in the creation.[129] The training of GenAI on protected content without compensating creators (the "input problem") and the cannibalization of their traditional revenues by AI-generated works (the "output problem") pose a significant threat to creators, with an estimated 24% loss of revenue, or a cumulative €10 billion by 2028 (Table 15, CISAC, 2024). Despite the existence of potential solutions (e.g., extending private copying legislation),[130] lack of agreement and political will favors the interests of investors.

Mustafa Suleyman (head of Microsoft's AI division, which is inundated with lawsuits for the alleged use of protected works),[131] has argued that online content constitutes "freeware" based on a social contract,[132] and, in any case, its use should be considered "fair and reasonable." The concept of "fair use," often invoked by AI companies, does not cover the mass training of AI systems on protected works, as this use does not fall under the limited exceptions (such as criticism, teaching, etc.) provided for by national and international legislation (like Law 2121/1993 in Greece). However, Sam Altman, CEO of OpenAI, which is being sued jointly with Microsoft (E. Creamer, 2025), has stated that if the "social contract" is a problem, it can be changed.[133]

6.1. Legislative Initiatives and Reactions

In the United States, Joe Biden's Executive Order 14110 (October 2023) on the safe development of AI was revoked by Donald Trump in January 2025.[134] In April 2024, a bill was introduced[135] requiring GenAI companies to disclose the protected works used in the training of their models, a measure supported by the music industry and a letter from over 200 artists (via the Artist Rights Alliance) protesting the "predatory use of AI".[136] And while state courts are issuing rulings on GenAI abuses concerning privacy, fraud, and bias,[137] the U.S. Congress (as of May 2025) is considering a ten-year moratorium on state-level AI regulations.[138]

In UK in 2024, the government proposed[139] that creators must explicitly state if they do not permit ("opt-out") the use of their works for AI training, thereby shifting the burden onto them.[140] An amendment from the House of Lords calling for transparency from AI companies was rejected by the House of Commons due to cost concerns,[141] with a new, more ambiguous amendment currently under consideration.[142] It must be said that the very concept of an opt-out system is seen by rights holders as being in direct violation of long-standing international copyright principles. The ARI argues that such a system illegally imposes preconditions on the exercise of a fundamental right":

"A reservation of rights system simply adds formalities to the current copyright system. The Berne Convention's prohibition on formalities is a key principle that ensures the protection of copyright without requiring any formal procedures... the 'enjoyment and the exercise' of copyright shall not be subject to any formality." (Artist Rights Institute, 2024)

In the European Union, the AI Act (EU Regulation 2024/1689) requires providers of General Purpose AI (GPAI) to comply with copyright law and to provide summaries of their training content. However, the GPAI's[143] effort to establish a binding Code of Practice failed, as the draft was deemed inadequate by 26 organizations and unions[144] for protecting creators' rights.

Europe, dependent on American technologies,[145] hesitates to impose strict compensation, fearing the political cost of increased subscription fees. Despite imposing significant fines on American companies,[146] from time to time, primarily for reasons related to personal data and oligopolistic practices, copyright law is suffering the consequences of an undeclared economic war.

At the international level (WIPO), the countries of Latin America and the Caribbean (GRULAC)[147] have been requesting talks on the inadequate compensation for creators from online exploitation since 2015.[148] Despite frequent and persistent consultations with representative organizations and numerous WIPO studies,[149] WIPO's Standing Committee on Copyright and Related Rights (SCCR)[150] cannot proceed due to a veto from the United States, which invokes market freedom.[151]

Despite ongoing and intense global protests from European artists[152] and the recent successful mobilization of the SAG-AFTRA union in the US,[153] it appears that the artistic community is facing powerful lobbies and predetermined political decisions. The legislative inertia is viewed by creator advocacy groups not as a failure of understanding, but as a deliberate policy choice, aligning national interests with those of major technology firms. As Baroness Kidron argued:

"The Government are doing this not because the current law does not protect intellectual property rights, nor because they do not understand the devastation it will cause, but because they are hooked on the delusion that the UK's best interests and economic future align with those of Silicon Valley." (Baroness Kidron, quoted in Artist Rights Institute Consultation, 2024) As legislative regulation is delayed, record labels and rights management organizations are turning to the courts.

6.1.1. Case Study 3: Universal, SONY & Warner vs. Suno & Udio

In June 2024, the "big three" major labels - Universal, SONY, and Warner - filed a joint lawsuit against Suno and Udio, the leading GenAI music platforms, for copyright infringement.[154] The lawsuits state that a GenAI service's ability to produce convincing musical imitations is based on "copying a massive trove of sound recordings" for training purposes. The plaintiffs allege that during the training process, popular sound recordings spanning decades and from around the world were copied and used to train GenAI models to "emulate their qualities." The record labels insist that these specific GenAI services "exploit protected sound recordings without a license." The platforms invoke "fair use," combined with the argument that their "technology is designed to generate completely new output, not to memorize and regurgitate existing content."

According to the CEO of Suno, they attempted to explain this to the record labels, but "instead of entertaining a good faith discussion," the labels "reverted to their old-school, lawyer-driven playbook." For their part, the record labels maintain that Suno and Udio are profiteering by deeming it "fair" to use an artist's life's work without compensation. Although this is a positive development for musicians, in reality, record labels and DMSPs are fighting for a seat at the table, as music for the former is a profit-generating asset, while for the latter, it is a cost to be minimized.

Other entities are also pursuing legal action[155]: in January 2025, GEMA, a major German collective management organization, took action against Suno, accusing the platform of processing sound recordings from its catalog without payment.[156] Earlier, in 2024, the Recording Industry Association of America (RIAA) filed two copyright infringement lawsuits against Suno and Udio for the use of protected sound recordings that were copied and exploited by the companies without a license.[157]

Bollywood has taken similar legal steps: a group of Indian record labels and publishers, from T Series and Saregama to Sony, is participating in a copyright lawsuit against OpenAI in New Delhi, highlighting their concerns about the unauthorized use of sound recordings for training GenAI models.[158]

One might argue that labels want "a piece of the action", and these legal actions are merely ways to trigger negotiations between them and Big Tech. However, there is an obvious power imbalance that leads to a situation of de facto impunity for large platforms, a reality that has led creator groups to call for a radical shift in enforcement, moving from impractical civil remedies to state-enforced consequences:

"We suggest a very simple policy guideline - if an artist is more likely to be able to get the police to stop their car from being stolen off the street than to get the police to stop the artist's life's work from being stolen online by a heavily capitalized AI platform, the policy will fail." (Artist Rights Institute, 2024)
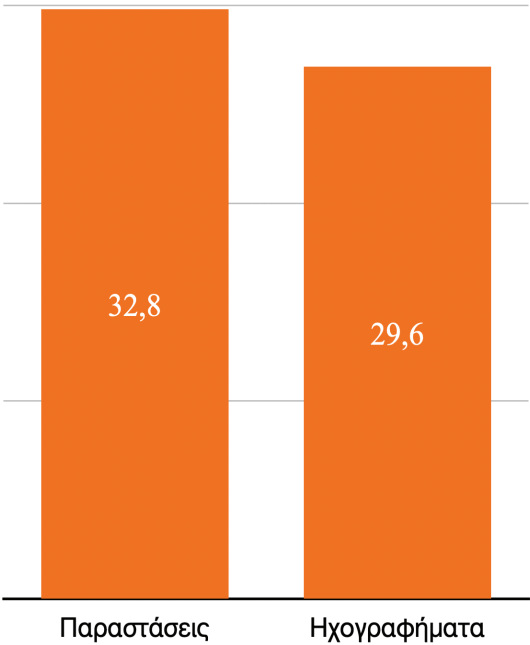
7. The Situation for Creators and Performers

Table 16: Musicians' revenue from live and recording (Sources: Live Music – Global Strategic Business Report and IFPI Global Music Report 2025)

While streaming opens up global markets, it also intensifies competition and threatens local music scenes. The centralized distribution of recorded music profits makes it difficult for artists to achieve sustainability, leading to an erosion of their middle class. Low revenues, combined with an emphasis on algorithm-friendly music, cause musical homogenization, discourage investment in innovation, and favor established names and older repertoires (T. Gioia, 2022; S. Ramesh, 2024). With streaming revenues being absorbed by a technocratic elite (Spotify, Apple, Amazon, Google),[159] live performances have become the primary source of income for musicians[160] In 2024, live music generated $32.8 billion[161] compared to $29.6 billion from recorded music (Table 14, IFPI, 2025). However, even successful artists are finding it difficult to make a living solely from their music.[162]

7.1. International Overview of Working Realities

United Kingdom: Despite high levels of education, over 50% of musicians earn their living from other sectors.[163] The average musician holds 3-4 jobs, with an annual income from music of approximately £30,000 (lower than the national average salary)[164]. Less than 0.4% of artists on streaming platforms achieve 1 million streams per month, the level considered necessary to make a living.[165] 65% do not make pension contributions, making retirement difficult.[166]

United States: The primary source of income is live performances (28%), followed by teaching (22%) and salaries from ensembles (19%). Recorded music accounts for only 6% of total income.[167]

Australia: Self-employment is predominant, with over 50% holding other jobs (89% of their income comes from non-music-related work).[168] In 2023, 50% of musicians earned less than $6,000.[169]

South Africa (Jazz scene): Even well-known musicians earn approximately $1,392 per month, with no job security or stable income.[170] Professional expenses are burdensome, and piracy severely impacts their earnings.[171]

Asia: Despite strong music scenes in countries like Japan, South Korea, China, and India,[172] musicians face economic instability, limited job security, and pressure from technological advancements and streaming, as well as issues of censorship.[173]

7.1.1. European Context and Challenges

Within a context hostile to creators' rights, a revealing study commissioned by the European Parliament in 2021[174] (which led to the "European Parliament resolution of 20 October 2021 on the situation of artists and the cultural recovery in the EU") summarizes the precarity of the music profession on the European continent. The sector, which employs 3.8% of the European workforce and represents 4.4% of the EU's total GDP, is not adequately protected.[175] Atypical forms of work, unstable income, and limited opportunities for collective bargaining are prevalent, alongside a high risk of underpaid or unpaid work, false self-employment, and abusive buy-out clauses.[176] Specifically, the main characteristics of the working conditions for artists and cultural workers across all member states are:

- Multiple definitions of the term "artist," which hinder uniform recognition.
- Low incomes and precarity due to multiple income sources and market saturation.
- A lack of uniform regulations for taxation, social security, minimum wage, and the recognition of diplomas.
- Challenges of the digital environment, particularly regarding fair remuneration and cultural diversity.
- Frequent career changes without adequate support.
- Chronic inequalities related to gender, disability, age, and origin.
- Risks to freedom of expression and human rights.

In addition to the systemic and structural weaknesses exacerbated by the economic crisis, the pandemic and inflation, and compounded by incomplete or non-existent mapping and documentation due to atypical employment, artistic communities also face the labor deregulation caused by neoliberal policies. This occurs within an environment of general disengagement from collective bodies (unions, cooperatives, associations), which appear to have disillusioned the public. Automation is expected to further impact routine sectors such as production music, mixing, and mastering, while AI in distribution dictates the creative frameworks.

A case in point is Germany, where in 2022, out of 69,000 professional musicians,[177] 70% did not work exclusively as artists. The average monthly income was €2,660 (with women, who make up 28% of the total, earning 24% less).[178] One in five musicians earned less than €1,500 per month.

7.1.2. The Situation in Greece

In Greece, culture is often treated as a conservative, state-supported ideology oriented towards the past, resulting in the degradation of its social functionality. The lack of comprehensive mapping, the absence of a standardized framework for music studies, and the fragmentation of collective management organizations (CMOs) are indicative of the problems. Following the COVID-19 pandemic (during which the turnover for live entertainment decreased by over 80% across Europe)[179], he music profession returned to its pre-coronavirus "normality": entertainment venues and music scenes are once again operating only on weekends, and the drop in turnover has kept wages below levels seen when the cost of living was 60% lower. A study on the musical idioms of Greece, the Balkans, and the Eastern Mediterranean,[180] showed that two-thirds of instrumentalists/ songwriters have an annual income from music of up to €7,200, while 52% hold other jobs. Furthermore, 41.5% are not compensated for recorded sessions, 51% have never signed a contract concerning their rights, and 52% have limited or incorrect knowledge of copyright and neighboring rights.[181] From the user side, it is estimated that the collection of royalties from businesses obligated to pay could be four times higher (up to €42 million) compared to the total turnover of the relevant CMOs.[182] Proposed alternative income sources for musicians, such as teaching, instrument making, and independent micro-scenes[183] require a favorable social environment and further training. Outside of major urban centers, holding multiple jobs is the only viable option.[184]

Beyond the practical costs (equipment, transportation, tuition, working hours, etc., as noted by C. Cooke, 2023), musicians face a deficit in "survival skills" (management, marketing, networking, technical expertise, stage presence), which are a consequence of the new market demands.[185] Interaction with other arts, knowledge of different musical traditions, multimedia expertise, and communication and business skills are now essential. Musicians must build a diverse portfolio, taking on multiple roles: creator, performer, entrepreneur, leader, and teacher. However, educational institutions do not adequately prepare them for this reality,[186] [187] leading to failure, resignation, and psychological distress.[188] Research from the Journal of Psychiatric Research indicated that 73% of independent creators exhibit heightened levels of depression/anxiety and a five-fold higher rate of suicidal ideation compared to the general population.

Based on the above, there is an urgent need for targeted training for musicians in three areas:

• Understanding music as a cultural industry and familiarizing themselves with its characteristics, specificities, and technologies.

• Acquiring the technical and business skills necessary for the modern musician who produces, promotes, and commercializes their own music.

• Understanding intellectual property and the laws that regulate the rights of creators, performers, and other industry professionals (publishers, record labels, producers, managers, etc.), as well as the revenues derived from them.

This training can be supported by:

● State Institutions: Arts education requires robust reform, standardization, and a broader curriculum. It must develop a strong connection with the professional field, modernize, become intervention-oriented, and illuminate trends, attitudes, and values. This presupposes generous funding, infrastructure, and tax incentives for musicians who invest in their professional development, as well as subsidies for startups in instrument making, music technology, show production, and recording, with an emphasis on local music scenes and their international presence. Educational practices must also reinforce the protection of intellectual property.

● Major Employers: Cultural organizations, established orchestras, and foundations can provide training and professional development opportunities, such as educational programs, tuition reimbursement, and incentives for musicians who participate - including conferences, seminars, or events, and collaborations with educational institutions.

● Labor Unions: Beyond negotiating with employers and applying public pressure to elevate the profession, unions can develop their own or collaborative programs, offer access to educational   resources (spaces, subscriptions, equipment), and foster organized communities.

● Collective Management Organizations: CMOs can ensure that musicians receive the royalties they are entitled to by pursuing legal action where necessary, intervening in the preparatory work of legislators, monitoring technological developments, and actively participating in international   federations and European lobbying efforts to promote the interests of musicians.

8. Is AI the Ultimate Threat to Musicians?

Examining the utility of AI for musicians, it appears that the benefits derived from using it as a "tool" are disproportionate to the consequences of its abuse. Given that AI is here to stay and that every supposed "good use" either undermines existing revenue streams for musicians or replaces them entirely, it is essential to highlight its inherent weaknesses in relation to music as both an art form and a social phenomenon. These weaknesses include the lack of musical intention and meaning, the inability to perform and improvise in real-time, the incapacity for radical innovation, and the difficulty in understanding cultural/historical contexts or creating a genuine artistic identity.

Two primary paths of response emerge. On one hand, there is the redefinition of the value of human music, emphasizing characteristics that artificial intelligence cannot replicate: emotion, interaction, expression, and connection with listeners. On the other hand, there is the push to reclaim control over the technology, at least in partnership with the companies that produce it. Towards a strategy of adaptation without concessions and gaining control of the value chain, the following are necessary:

Legal and Political Protections: There is a clear need for greater transparency in royalty calculations, compelling AI companies to disclose the works used to train their models, and for more equitable revenue distribution models that are proportional to human artistic value, supported by updated and stronger copyright legislation. The structures tasked with their enforcement must be modernized to ensure that AI-generated music is not trained on works without permission and compensation (S. Ramesh, 2024). A collective compensation model for AI-generated music is needed: if platforms profit from AI music, musicians must receive a share, especially if their work contributed to its training. In Greece, we have Article 18 of Law 2121/1993 on private copying, which could be extended to include AI-generated works. However, not all countries have a corresponding regulation, and even in our own, companies are constantly seeking ways to circumvent it. This requires persistent legal efforts (and corresponding expenses), which technology companies will fiercely oppose.

Collective Bargaining: Musicians must negotiate with technology companies and streaming platforms. If American actors and writers (SAG-AFTRA, WGA) fought for protection from AI, musicians can do the same. The challenge is that musicians serve different genres, have diverse income sources, and often compete with one another. Politicians and investors know that musicians are, by nature, too independent, unconventional, and competitive to unionize effectively - and they rely on this to push AI with minimal resistance. Public pressure campaigns are essential to raise awareness among consumers who may not understand what

is at stake and why real musicians matter. If AI music becomes dominant, diversity, cultural identity, and any notion of artistic expression will be lost. Major platforms like Spotify, YouTube, and TikTok promote whatever is most cost-effective—and soon, that will be AI music. Incentives must be sought to encourage the promotion of a broader range of artists and genres to mitigate the phenomenon of homogenized music and streambait.

   Positioning "authentic" music as a "premium" product, could create a specialized market. We can envision the creation of a counter-economy centered around a type of machine-readable "watermark," incorporating metadata that proves human creation. Such branding, supported by communities, could generate new musical movements with an emphasis on artistic individuality, experimentation, and innovation. Seeking funding from state bodies, non-profit organizations, and grant programs can provide the infrastructure and financial support for the production and promotion of authentic music. Within this framework, alternative revenue streams outside of streaming - such as live performances and the "fan economy" (licensed merchandise, crowdfunding, sponsorships, and other forms of direct support) - can be explored in collaboration with industry professionals.[189] Live events will gain even greater significance, as people will seek experiences that neither streaming nor AI can offer.

None of the above proposals is a panacea, and new data may emerge to complicate matters further. But the alternative of unchecked AI would be an even worse dead end. We have experienced technological changes in the past; while some fears proved exaggerated (e.g., drum machines and DAWs), others (like the internet and file-sharing) had catalytic effects (T. Gioia, 2019). Artificial intelligence presents itself as the most serious threat to date because it does not simply change how music is created: it replaces entire sectors in composition, performance, production, and licensing.

In any case, the cultural industries employ 15 million artists and professionals and are the third largest employer across Europe.[190] Therefore, the grim state of music industry management should not be considered inevitable. It is the deficient representation of artists' interests in international lobbying that has shaped a global market that thrives on the commercial exploitation of their works and distributes profits according to the interests of the three major conglomerates that control 70% of the global repertoire (Universal, SONY, and Warner)[191] the major intermediaries (Google, Amazon, Facebook, and Apple), and the AI tech-magnates (S. Hollister, 2024; D. Krukowski, 2024; V. K. Tiwari, & K. Siddiqui, 2025). From this perspective, the global lack of political will to control AI, under the pretext of research and innovation - but with the real cause being speculation - is particularly alarming.

9. Epilogue

It is easy for a musician to lose sight of the big picture, focused as they are on the latest musical trends, technological innovations, and popular idols - and the vast majority think this way. The deluge of information alters their aesthetic, and it becomes increasingly difficult to be impressed or   inspired by the sheer volume of available music. Their exposure to the negative aspects of the industry, usually from the side of the wronged, and their conflicts with amateurs, opportunists, and other undesirables, frustrate their motivation and their disposition to offer and create. Combined, these two dynamics lead to "disenchantment" and cynicism. They become those who detest "the music of our time" and dwell on what they should have, could have, or would have done.[192]

However, this discontent is often caused by the idea that somewhere out there, a technology exists   that could solve musicians' problems but is not being advanced due to "vested interests." But no   technological intervention will solve the complex and constantly shifting problems of the music industry - not downloads, not streaming, not GenAI. Because these problems are not technological. The problems that musicians face, like all problems in our society, are problems of power. (L Pelly, 2025)

The future of musicians was not sealed by the deals made between corporations, providers, and software engineers - they are not the ones who decide whether artists will win or lose. Justice and sustainability are values that are created and destroyed, claimed and defended - and sometimes lost, as technologies and formats come and go. There was a time, very recent, when the world lived without streaming and AI. To fix what is wrong with music, it is not enough to repair the music industry. It has, after all, been disappointing artists and audiences for generations. We must highlight why music and access to it matter, and what systemic political and economic realities are preventing so many people today from engaging with it seriously. Music cultures would be far more exciting and diverse if so many did not have to abandon the arts to find a job with health insurance.

As the reach and influence of Spotify's and YouTube's algorithms expand globally, it is urgent that we understand what is happening to musical practices and creativity in regions like South America, and South and East Asia, which are often overlooked by a Western-centric music industry (T. Hodgson, 2021). It is not enough to think only about changing music or changing technology. We must think about the world we want to live in, and how music fits into that vision (L. Pelly, 2025).

Some of us will live to see the era where robots make music for robots. At that point, we will need to redefine what music is and what purpose it serves. Because Art that needs to point out how necessary it is, is either not Art or not necessary.

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THE DEVELOPMENT OF GENERATIVE ARTIFICIAL INTELLIGENCE FROM A COPYRIGHT PERSPECTIVE

EUIPO
EUROPEAN UNION
INTELLECTUAL PROPERTY OFFICE
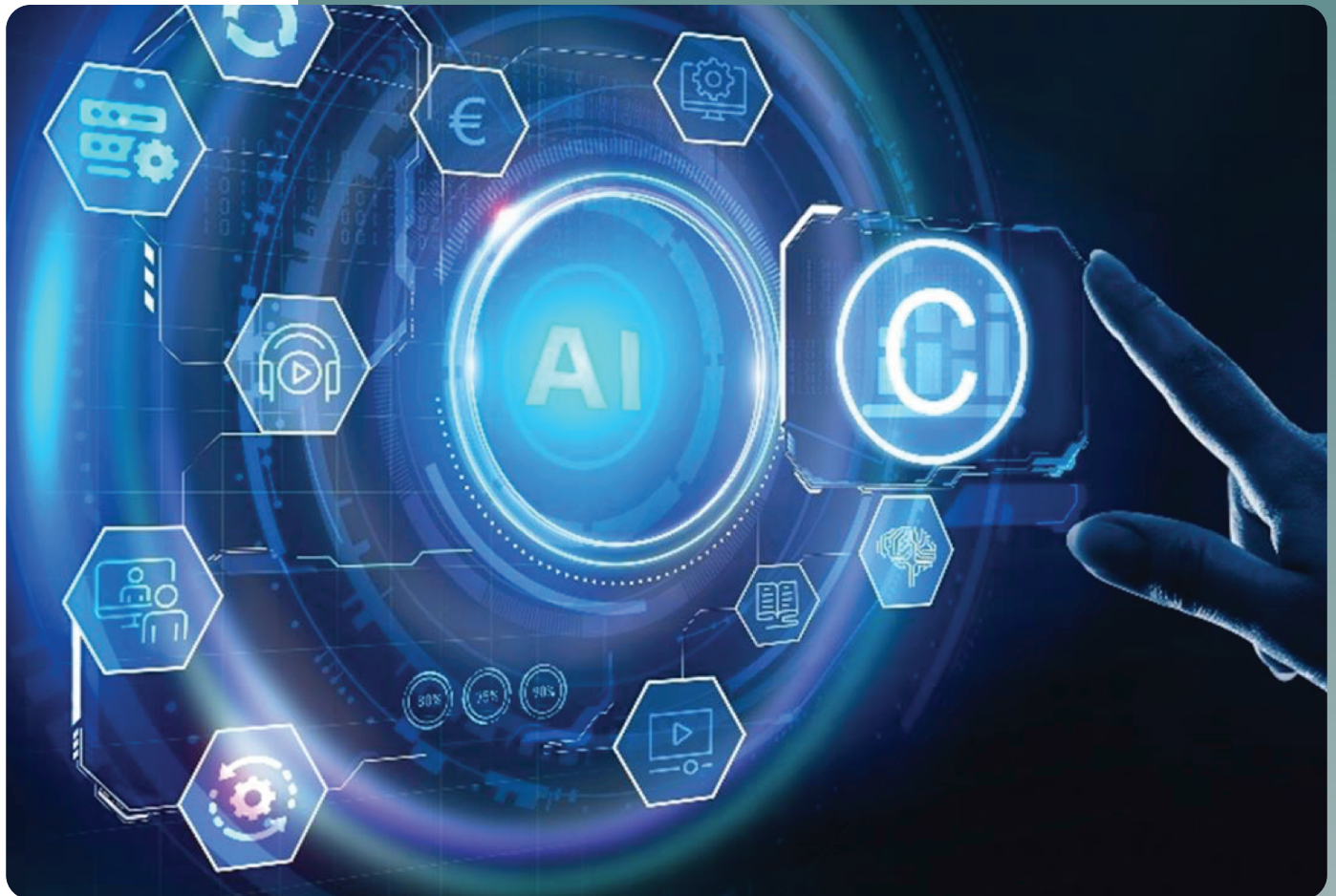
Over the past number of years Artificial Intelligence (AI) technologies have undergone major advances, most notably with the release of Large Language Models and Generative AI (GenAI) systems. GenAI services that generate text, code, images, videos, and audio content are now widely available. This has led policymakers and regulators to examine how existing legal frameworks should evolve to address the implications of large-scale AI adoption, and to balance innovation with intellectual property (IP) protection.

This study explores the developments in GenAI from the perspective of EU copyright law. It is structured around three main components, (1) **a technical, legal and economic analysis** to further understand the functionality of GenAI and the implications of its development, as well as a detailed examination of copyright-related issues regarding the (2) **use of content in GenAI services development** and the (3) **generation of content**. The main findings are:

- **Access to high-quality content is central to the development of GenAI services.** The AI training process is complex and uses content as input at different stages. However, as GenAI models are "specialised" for certain functionalities they need access to high quality and up-to date content, which is reflected in emergence of a direct licensing market, with some GenAI developers licensing access and use of high-quality content from copyright holders. The capacity for copyright holders to effectively reserve their rights a pre-requisite for the licensing market to develop.

- **No 'one-size-fits all' solution for copyright holders to protect their rights has emerged yet.** Instead, different approaches and solutions are developing for copyright holders to protect their rights, and for AI developers to respect their regulatory obligations: On the one side, the rights reservation mechanisms for the **INPUT phase** (related to training AI models), whereby rightsholders can express their opt out from the 'text and data mining' (TDM)-exception. On the other side, transparency measures exist for the **OUTPUT phase** that allow the indication and recognition of AI generated content.

- **Public authorities**, such as national IP authorities and the EUIPO, **may play a role** by providing technical support (for copyright holders to reserve their rights, and for AI developers to effectively respect such reservations) as well as non-technical support (e.g., public awareness, forums for technical information sharing, providing information to the public on available solutions, trends and developments).

Foreword

In an era marked by rapid technological transformation, copyright remains a cornerstone of Europe's cultural diversity and economic strength. The European Union's creative industries - firmly supported by a robust copyright framework - play a vital role in sustaining employment, fostering innovation, and preserving cultural heritage. Copyright-intensive sectors alone account for more than 17 million jobs and nearly 7% of the EU's GDP, underlining the central role of intellectual property in driving Europe's prosperity and global competitiveness.

Over the past three decades, successive waves of digital innovation have reshaped the way content is created, distributed and accessed. Throughout these transformations, copyright law has adapted to ensure that creators receive recognition and remuneration for their work, thereby sustaining the creative sectors that enrich our societies. However, the emergence of Generative Artificial Intelligence (GenAI) presents unprecedented challenges and opportunities, necessitating a re-evaluation of existing legal frameworks and support mechanisms to address the complexities introduced by this technology.

GenAI is already transforming the way we create, communicate, and innovate. While it offers immense potential as a source of growth and competitiveness in the future, it blurs the existing lines of content creation and introduces a new paradigm where not all content is created by humans. It therefore raises profound questions about how copyright can continue to serve its purpose while supporting innovation. It is essential to find a balance between these two objectives.

GenAI is often described as a black box, with little transparency around its input, functioning and outputs. This makes understanding its impact on copyright even more complex. This evolution prompts critical questions: How does GenAI use copyright-protected content? What is the European Union (EU) legal framework applicable to such use, and how can copyright holders reserve their rights and opt-out content from GenAI training? What are the developing technologies to mark or identify AI-generated content? And finally, what are the opportunities for copyright holders to license the use of their content by GenAI? All questions that need answers if we are to fully understand the development of GenAI from a copyright perspective.

This study is designed to clarify how GenAI systems interact with copyright – technically, legally, and economically. It examines how copyright-protected content is used in training models, what the applicable EU legal framework is, how creators can reserve their rights through opt-out mechanisms, and what technologies exist to mark or identify AI-generated outputs. It also explores licensing opportunities and the potential emergence of a functioning

market for AI training data. Although the study is intended for experts in the field, it lays the groundwork for developing clear and accessible informational resources for a broader audience.

Furthermore, this report will provide insights for policymakers to maximise the innovative potential of the EU in light of these new technologies. As the Draghi report on the future of EU competitiveness recently underlined, and as highlighted in the European Commission AI Continent Action Plan, Europe must lead in the digital and AI transformation, not only by investing in infrastructure and skills, but also by shaping the regulatory frameworks that govern emerging technologies. Copyright is a key component of such a framework. It is central to maintaining Europe's capacity to innovate on its own terms - grounded in values of fairness, transparency, and respect for intellectual property.

The EUIPO Strategic Plan 2030 reinforces this vision. It calls on the office to support the strengthening of the IP ecosystem in line with technological developments, such as the rise of GenAI, demonstrating the need for action and new solutions to support both innovation and copyright protection. This study represents an early and important step in meeting that strategic commitment. But it is also a starting point. Much more is needed to guide and support rights holders, AI developers, and policymakers through this fast-changing environment, if we are to realise the full potential of EU digital markets for creators and businesses.

To that end, the EUIPO will launch the Copyright Knowledge Centre by the end of 2025. With regard to GenAI, this new Centre will equip copyright holders with clear, practical information on how their works may be used in the development of GenAI – and how they can effectively manage and protect their intellectual assets. It will also provide a platform for stakeholders, enabling creators, developers, and institutions to share needs, identify gaps, and explore opportunities for collaboration. Drawing on the insights of this study, the Centre will provide a foundation for discussions among experts on how copyright can effectively support content creation and innovation in the GenAI landscape.

It is essential to make copyright rules work in a way that keep human creators in control and ensure their proper remuneration, while allowing AI developers of all sizes to have competitive access to high-quality data. Balancing both interests can be facilitated by simple and effective mechanisms for copyright holders to reserve their rights and the use of their content, as well as licensing and mediation mechanisms to facilitate the conclusion of license agreements with AI developers. As GenAI applications and markets mature, further reflections might also be needed on whether content generated by AI deserves protection through existing or new

intellectual property rights.

   At the EUIPO, we stand ready to play our part. By working in close cooperation with European and international institutions to contribute our expertise on IP protection and awareness, and in the development of technical solutions and mediation services to help ensure that, as with earlier digital innovation cycles, copyright keep supporting creators and technological progress.

Executive Summary

Over the past several years Artificial Intelligence (AI) technologies have experienced major advances, with the release of Large Language Models (LLMs) and Generative AI (GenAI) systems. GenAI services to generate text, code, image, video, and audio content are now widely available. This has led policymakers and regulators to examine how existing legal frameworks should evolve to address the implications of large-scale AI adoption, and to balance innovation with intellectual property (IP) protection.

In this context, this study explores the developments of GenAI from the perspective of EU copyright law. It is structured around three main components, (1) **a technical, legal and economic analysis** to further understand the functionality of GenAI and the implications of its development, as well as a detailed examination of copyright-related issues regarding the (2) **use of content in GenAI services development** and the (3) **generation of content.**

Technical, Legal, and Economic Background

In the EU, two legal instruments are particularly relevant for framing the implications of GenAI developments from a copyright perspective:

The Copyright in the Single Market Directive (CDSM Directive) creates a legal framework for **'text and data mining'** (TDM). TDM is a central part of GenAI development, as it is the main process through which content is collected, analysed and used as an **input** to develop an AI model's parameters and weights. This process often requires the reproduction of training content, which may involve the exclusive rights of copyright and database owners. The CDSM provisions on TDM provide for specific limitations to these exclusive rights. Article 3 of the CDSM allows for TDM by scientific research organisations while Article 4 allows TDM by any user, including commercial AI developers. Importantly, the exception under Article 4 is subject to rights holders ability to reserve their exclusive reproduction rights, commonly referred to as **'opting-out'** of the TDM exception. To be valid, such an opt-out reservation must be made expressly, by the right holder, and in an appropriate manner, including **'machine-readable means'** for content made publicly available online. To use content for training where an opt-out reservation has been placed, AI developers need an authorisation by the right holder, for example through licences.

The EU Artificial Intelligence Act (AI Act) sets out a regulatory framework for AI technologies in the EU, with specific obligations on the providers of general-purpose AI (GPAI) models. Regarding copyright, these obligations refer to the **compliance with Article 4 of the CDSM**

Directive, on the TDM opt-outs expressed by copyright holders. The AI Act addresses a broad range of concerns such as risk management, transparency, data governance, ethical considerations and compliance with fundamental rights across all AI systems. GPAI system providers are also required to **publish sufficiently detailed summaries of the training data** they utilise, to facilitate the ability of copyright holders to enforce their rights where relevant. The AI Act also places obligations on the deployers of GenAI systems to **ensure that generative output is detectable** in a machine-readable format.

The global GenAI landscape involves a rising number of legal disputes between rights holders and GenAI system providers, with a substantial number occurring in the United States of America (USA). To date, there have been four court cases identified in the EU that relate to copyright and AI training, the September 2024 case Kneschke vs. LAION being a noteworthy first. While the German court deemed that LAION (a major provider of text-image datasets used for GenAI training) benefited from the Article 3 CDSM exception for scientific research TDM, it made several obiter dicta references that provide insights into how future courts might interpret the legal requirements for valid TDM rights reservations under Article 4 CDSM.

In parallel, several high-value agreements on the use of copyright protected content for AI training have been reached, between rights holders and GenAI developers. **Direct licensing** by copyright holders who effectively opt-out their content from being used under Article 4 CDSM, has the potential to bring new revenues streams. The study identifies several factors driving such agreements, including (i) the perception of impending **data shortages** for machine learning, (ii) the role of **data quality** and the importance of metadata and data annotation, (iii) the **attitude towards risk** of GenAI developers and relative negotiating power, (iv) the role of **synthetic data as a substitute** to training input, and (v) the emergence of **content aggregation services** which serve as commercial intermediaries for smaller rights holders who seek to access the emerging training data market.

While the specific dynamics of direct licensing markets differ between content sectors, the publishing sector (and in particular the press and scientific publishing) is uniquely positioned to take advantage of **licensing opportunities associated with Retrieval Augmented Generation** (RAG, see also part on GenAI Output) applications that are central to the development of some GenAI services.

Several key considerations that may affect **licensing terms** are also identified, including (i) the **development of benchmark market rates**, (ii) the **metrics used for remuneration** (iii) innovation in the types of licensing being offered, (iv) the potential to **link input-based and output-based licensing permissions**, and (v) **reciprocal exchange of commercial assets**.

The evolution of these aspects should be followed to understand the dynamic of direct licensing markets, as **standard contractual practices and norms** eventually emerge.

An emerging issue is the potential for **'data laundering'** to arise from the interplay between scientific-research TDM activities covered by Article 3 CDSM Directive, and commercial TDM activities for AI training covered by Article 4 CDSM Directive. The relationships between scientific researchers building datasets pursuant to Article 3 CDSM Directive, and commercial AI developers using these datasets for their own purposes, has raised concerns of scientific research privileges being exploited for commercial purposes.

Generative Artificial Intelligence Input

Data collection process is the first stage in GenAI training, and it must comply with copyright obligations. Depending on the context, copyright obligations may include respecting TDM opt-outs, or where necessary, entering into direct licensing agreements with rights holders. Collected data must then be cleaned, annotated, and processed before it is used in the AI training, which consist of multiple stages from **model pre-training** to **model fine-tuning**, and possible reinforcement learning.

While several large datasets are publicly available for AI training, they may include **pirated content**, as well as unspecified, incorrect, or standard **licences not tailored to the actual use of the dataset**. These issues may result in copyright liability passing down the AI value chain from the AI dataset creator to the GenAI developer and GenAI service deployer, all of whom must comply with their obligations under EU copyright law and the AI Act.

Content publicly available online is a central source of data used in AI training processes. While **web crawling** has traditionally been used for search engine indexing, **web scraping** is now widely used to collect massive quantities of data for the development of AI training datasets. As a result, many of the measures used by copyright holders to control access to their works, focus on addressing this practice. The Robots Exclusion Protocol (REP) currently serves as a *de facto* standard for managing web crawling and scraping activities and has largely been deployed as a primary strategy for TDM rights reservations. However, there is a prevailing consensus amongst stakeholders that REP is not optimal as a TDM opt-out mechanism and serves more as a temporary solution. This is mainly due to REP's **inherent limited granularity and use-specificity**, its need for intermediation by website managers, unenforceability, and the voluntary disclosure of web-crawler identities. In that respect, REP is also sometimes complemented by traffic management strategies for restricting web-crawlers access to online content in the first place.

Given the complexity of the AI ecosystem, and the specific needs and business models of different content sectors, **no single opt-out mechanism** has emerged as the sole standard used by rights holders. Instead, **legally-driven measures** and **technical measures** are used by rights holders to express their TDM rights reservations. The legally-driven measures for rights reservations reviewed in the study include unilateral declarations, licensing constraints, and website terms and conditions. Meanwhile, the technical measures for rights reservations include REP, TDM Reservation Protocol (TDMRep), Robots Meta Tags, the C2PA Content Authenticity Initiative, the JPEG Trust standard, as well as services developed by SpawningAI, the Liccium Trust Engine Infrastructure (linked to the ISO ISCC code identifiers), and

Valuenode's Open Rights Data Exchange platform.

The study is comparing such measures in relation to seventeen key criteria: (i) typology, (ii) user-specificity, (iii) use-differentiation, (iv) granularity, (v) versatility, (vi) robustness, (vii) timestamping, (viii) authentication, (ix) intermediation, (x) openness, (xi) ease of implementation, (xii) flexibility, (xiii) retroactivity, (xiv) external effects, (xv) generative application, (xvi) offline application, and (xvii) market maturity. This analysis supports the understanding on the r**espective advantages and limitations** of the different measures to support the expression and implementation of TDM reservations by right holders, their readability by TDM users, as well as their effectiveness to support licensing for different use cases.

In general, none of the reservation measures analysed support enforcement of an expressed reservation. TDM users are generally responsible for properly configuring their data collection policies, scraping tools, and data cleaning procedures, to comply with expressed TDM reservations. Legally-driven measures are typically applied to specific copyright-protected works, but also entire repertoires of works. Technically-driven measures are categorised as either **'location-based'** (i.e., associated to the location of a piece of content online) or **'asset-based'** (i.e., associated with the actual content irrespective of where it is made available online). Both approaches have their distinct advantages and limitations.

The diversity of measures is reflected in the indications from stakeholders interviews that their content management and rights reservation strategies often use a combination of various legal and technical measures.

The study identifies a trend towards **open standards** and open-source licensing in technical reservation solutions to support wide adoption and interoperability. Stakeholders on both the right holder and GenAI development sides of the TDM process generally seem to support increased efforts for standardisation of rights reservation measures, as well as the **flexibility to incorporate multiple measures** to adapt to different use cases. As the GenAI ecosystem keeps evolving, a number of standard practices are expected to emerge to address conceptual and practical challenges in adapting reservation measures to the specific needs of different content sectors and use cases throughout the AI value chain.

The current situation regarding rights reservation measures suggests a **role for public authorities**, such as national IP offices or similar national or supranational institutions. Institutional support may take the form of **technical support** in implementing and administering federated databases of TDM reservations expressed by right holders.

Nontechnical support may consist of increasing public awareness of the copyright issues surrounding the deployment and use of GenAI technologies, providing information on various rights reservation measures (including comprehensive lists of web scraper identifiers), and analysing industry trends in terms of technical developments and commercial licensing terms.

Generative Artificial Intelligence Output

The technical process of content generation depends on the type of GenAI model, as typical model architectures differ between the types of content they generate. Given the high costs of training AI models and the inherent limitations of constantly (re)training models on new content, there is a trend of increased deployment of RAG technologies that combine aspects of information retrieval mechanisms with GenAI capabilities. This improves model performance without having to frequently (re)train models on updated training datasets. RAG is gaining prominence in AI-driven search engines, also known as 'answer engines', presenting new challenges and opportunities for copyright holders. RAG comes with its own copyright issues that may depend on whether the application is based on static RAG and locally stored content used for retrieval, or on dynamic RAG which may incorporate forms of web scraping.

Given that the AI Act requires transparency on the content produced by GenAI systems, several measures have been developed to identify and disclose the nature of synthetic content. These generative transparency measures include provenance tracking, (including the C2PA Initiative, the JPEG Trust Initiative, and the block-chain based Trace4EU project), **detection measures** for AI-Generated content (including StyleGan3-detector for images, or Deezer's detection methods for audio), as well as **content processing solutions** (including various protocols for watermarking and digital fingerprinting), and **membership** inference attacks.[1]

This study compares a selection of these **generative transparency measures** in relation to ten key criteria: (i) typology, (ii) versatility, (iii) openness, (iv) market maturity, (v) human readability, (vi) cost implications, (vii) robustness, (viii) interoperability, (ix) scalability, and (x) reliability. This comparison supports the understanding on the relative advantages and limitations of each measure.

Once a model is trained on input data, the patterns and correlations extracted during the machine learning process are embedded in its parameters. The extent to which these representations influence the model's outputs depends on its architecture. While some GenAI models abstract knowledge in a way that makes direct extraction of training data unlikely, others – particularly LLMs and generative vision models – may exhibit **'memorisation'**. This may lead to a situation where certain outputs can closely resemble or even replicate training inputs. Memorisation is thus a technical issue which creates a legal issue, with potential for **plagiaristic output** and **content 'regurgitation'** (explicit reproduction of the trained content).

GenAI system providers have developed various technical solutions to address memorisation. These measures include various tools to **compare generated content** with

potential input sources, filters for preventing duplicative output, and different approaches to prompt **rewriting or filtering**. An emerging technical research field to address these issues consist of **'model unlearning'** and **'model editing'**. These are methods for erasing, adjusting or updating the information coded into the model's parameters, enabling AI developers to solve issues detected after the model's deployment. In addition to these technical measures, other means are also used to address the challenge of potentially infringing output. Several GenAI system providers offer some form of **legal indemnification** to mitigate the risk for their customers.

The issues surrounding GenAI outputs and copyright also suggests a potential **role for public** institutions active in the field of IP. On information for GenAI developers and **policy makers** they could openly share information on measures available to mitigate potential infringing output and detect synthetic content, and good practices developing in that field. **On information for the general public**, they could provide information on ethical prompts usage and cooperate with other relevant bodies to increase the public's capacity to identify generative output. On the **technical side**, public institutions could serve as forums for information sharing and collaboration supporting the interoperability of output transparency measures across platforms and GenAI systems.

Concluding observations

The study takes a structured approach to clarify, from a technical point of view, the interaction between GenAI and copyright. The study shows, firstly, that **no single solution has emerged as the sole standard** opt-out mechanism for rights holders to express their TDM rights reservations, or transparency measure to identify and disclose the nature of synthetic content. Secondly, although the global GenAI landscape involves a **rising number of legal disputes**, the study also notes that several high-value agreements have been reached between rights holders and GenAI developers. Lastly, the current situation suggests a **possible role for public authorities** in providing technical support for implementing and administering databases of TDM reservations and raising awareness on measures and good practices to mitigate potential infringing output.

As a disrupting technology, the development of GenAI has caused shifts in the creative and the IT industries, and significantly altered how rights holders and AI developers operate. While it may take some time before a new balance is established, the study importantly showed the relevance of accessing essential information about works' origin and permissible uses in view of proper respect, benefit and enforcement of copyright.

[1] A membership inference attack allows an adversary to query a trained machine learning model to predict whether or not a particular example was contained in the model's training dataset

BATTLE FOR THE SOUL OF CULTURE
A Review of the
Artist Rights Institute's Consultation
on Copyright and Artificial Intelligence

Artist Rights Institute
where artists speak

Home   Breaking News   Blog   Financial Education   Symposium
Public Policy Filings   Surveys

Never take it for granted that justice will be done.

In early 2025, the UK Intellectual Property Office launched a consultation on how the government could ensure that the legal framework for Artificial Intelligence and copyright supports both the creative industries and the AI sector. Among the opinions submitted was one from the Artist Rights Institute (ARI).

The Institute is based in Austin, Texas, and was founded in 2023 by Dr. David Lowery of the University of Georgia and music attorney Christian L. Castle, with the aim of advancing the study and discussion of artist rights. It sponsors the annual Artist Rights Symposium, manages the ArtistRightsWatch.com blog, and is a frequent participant in the public policy debate surrounding artist rights.

The ARI's consultation (penned by Christian Castle) transcends the scope of a typical, legal-technical submission. It is a meticulously structured indictment that functions as a historical analysis, a legal treatise, and, above all, a stark warning. It stands as a manifesto for creators against what it portrays as a coordinated and well-funded assault - the latest and most dangerous battle in a war that has been raging for decades.

The central thesis of the opinion is that the proposed legislative solution—namely, the establishment of a provision for Text and Data Mining that allows rights holders to declare their non-participation (the so-called "opt-out") - is not merely a bad idea; it is a trap. The Institute presents it as a deceptive tactic designed to legitimize what is described as "the most massive theft of intellectual property in human history." The opinion argues that any such solution would retroactively legalize illicit acts and shift the burden of protection from the perpetrator to the victim, thereby definitively destroying the economic and moral foundation upon which the law of human creativity rests.

This accusation is founded on three interconnected pillars:

- **The Historical Parallel:** It uses the history of internet piracy, the .com bubble, and the Google Books case as irrefutable evidence of a repeating scenario - a playbook that tech giants are once again implementing with AI.
- **Systematic Deconstruction:** It analyzes in detail why the proposed "opt-out" system is legally incompatible with international treaties, technically unfeasible, and ethically reprehensible.
- **Transcending the Legal Framework:** It shifts the debate from a narrow issue of intellectual property to a broader field concerning human rights, economic justice, wealth distribution, and the very structure of our society.

1. History Repeats Itself - The Silicon Valley Playbook
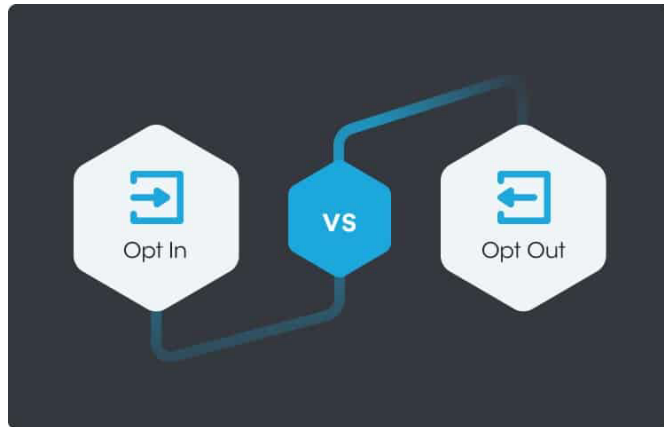
First, let us clarify "Opt-in" and "opt-out", the new terms that have entered our lives with the proliferation of AI in the creative sector.

An **"opt-out"** system is like an automatic subscription to which someone is enrolled without being asked. For example, imagine a new service that collects photos from social media profiles to train an AI model for painting or facial recognition purposes. Under an "opt-out" (exemption by declaration) system, the service is permitted to use the photos. Owners' consent is inferred from the fact that they have uploaded them publicly, and their silence is considered consent. If they DO NOT want their photos to be used, THEY must take action. They must find the special form, change certain settings, or send an email requesting to be excluded, along the lines of "I do not make my photos available for the training of your machine."

Conversely, under an **"opt-in"** (participation by declaration) system, the photos cannot be used by default. Silence is considered refusal, and the service must first ask the owners: "We want to use your photos to train our machine. Do you agree?" Only if they consent, can the service use them.

Artists want an "opt-in" system (to be asked for permission to use their works), while technology companies propose an "opt-out" system (the material is free to use, unless the artist explicitly states their objection).

Proponents of AI development argue that, unlike the simple distribution of content online, generative AI is a foundational technology with unprecedented potential to accelerate scientific research, improve medicine, increase productivity, and solve complex social problems. According to them, training these models requires vast, unprecedented amounts of data, making traditional, work-by-work licensing models practically inefficient. Consequently, they argue it is necessary to create a new legal paradigm that recognizes this unique nature, rather than trying to apply rules designed for a previous technological era.

For the ARI, the piracy of the tumultuous '95-'00 period (we all remember **Napster**) was not an uncontrolled side effect of the new World Wide Web technology. It was the fundamental business model that drove the rapid adoption of broadband. Free, illegal access to music, movies, and software created demand for high-speed internet and attracted millions of users to the new platforms. This unprecedented transfer of value from creators to technological intermediaries, generated the immense wealth of companies like Google. This wealth was then converted into political power, allowing them to shape legislation as they saw fit. According to the ARI, these platforms never saw piracy as a problem but as an opportunity: every click on a pirated piece of content was a data point, an ad impression, a user becoming addicted to their ecosystem.

The opinion focuses on the Google Books project, describing it not as a humanistic effort to save knowledge, but as a coldly calculated data collection operation. The massive, unlicensed digitization of millions of books is revealed, through the testimony of George Dyson,[1] as the first step in creating the large language models (LLMs) that dominate today. It was proof that the "grab first, ask for forgiveness later" strategy works. Google, after infringing on rights on an industrial scale, engaged in years-long legal battles, which it ultimately partly won, setting a dangerous precedent. Google's victory was not merely legal; it was also rhetorical: it managed to convince many that its actions constituted "fair use" and served a higher good—access to knowledge. This is precisely the rhetoric being used by AI companies today.

As much as reality is often more chaotic, and as much as developments arise from converging interests rather than a single, secret plan, the strategy of these companies is real and entangles academics, NGOs, and government officials. If there is a "playbook," it is divided into clear chapters-steps, which are being followed today:

- **The Grab:** Ignore existing legislation and massively scrape protected content, using innovation as the excuse.
- **The Propaganda:** Fund academic studies, think tanks, and non-profit organizations to create a narrative that presents the infringement as progress and a benefit to humanity.
- **The Legal Battle:** Use accumulated financial power to exhaust opponents in costly legal fights.
- **The Legislative "Fix":** Present the legal battles as proof of a vague and outdated law and demand a "modernization" that is, in fact, a new "safe harbor" that retroactively legitimizes the initial grab. The opinion claims that the consultation on the TDM exception is precisely the fourth step of this plan.

2. The Opt-Out Trap

Supporters of the exception present the opt-out model as a necessary and pragmatic compromise. They argue that a strict prior-permission regime (opt-in) would amount to a de facto ban on the development of large-scale AI models, leading to technological and economic stagnation for Europe compared to the US and China. The opt-out, in their view, strikes a difficult balance: on the one hand, it respects the rights holder's sovereignty by explicitly allowing them to prohibit use, while on the other, it allows innovation to proceed for content whose creators have not objected. They admit that the technical means are not perfect but see them as a starting point for developing better, industry-wide standards in the future. For the ARI, this proposed solution is a dead end and catastrophic.

The legal counter argument is sharp and absolute. An opt-out system, where the creator must do something to prevent the use of their work, constitutes a "formality" in the legal sense. The Berne Convention, the cornerstone of international copyright law, is categorical in Article 5(2): protection is automatic and cannot be subject to any formality (such as registration, notice, etc.). The opt-out reverses the fundamental logic of the law: instead of use requiring permission (permission-based, opt-in), protection requires action (action-based, opt-out). This is not just a technical detail but an overturn of an established legal principle. The proposed solution violates international treaties, rendering it not just bad policy, but also illegal.

Technical means, such as machine-readable codes, cannot solve the problem. The "robots.txt" file is the perfect example of a simplistic, unreliable, and easily bypassed technology. The detailed list of technical weaknesses (malicious crawlers, syntax errors, inability to cover dynamic content, bypassing via cache) is not merely a technical analysis. It proves that the entire idea is based on an illusion of control.

The central point here is existential: the failures of "robots.txt" in the past simply meant that a page appeared in search results. The same failure in the age of AI means that a creator's work is used to train a system that could make them unemployed. The scale of the damage is incomparably greater.

> **"OPT-OUT SCHEMES IN GENERATIVE AI ARE NOT ONLY EGREGIOUSLY UNFAIR TO RIGHTS HOLDERS – THEY SIMPLY DO NOT WORK. THEY GIVE RIGHTS HOLDERS THE ILLUSION OF CONTROL OVER HOW THEIR WORKS ARE USED; NOTHING MORE."**

Finally, the asymmetry of power makes the opt-out system the epitome of injustice. It is designed by the powerful for the powerful. The multi-billion-dollar platforms, the ones who profit from the exploitation, have no obligations. Conversely, the individual artist, writer, photographer, or musician is burdened with the cost, time, and technical complexity of self-protection. This is a scenario where the victim builds their own cage to protect themselves from the predator, while the predator roams free. This fundamental imbalance is not only unfair but also evidence of bad faith.

3. Beyond Legislation

For its proponents, AI is not just another sector but a "productivity multiplier" that will benefit all industries, from manufacturing and agriculture to services and health. The benefits will not be confined to the AI companies themselves but will diffuse throughout the entire economy, creating new markets, new jobs (while others will change form), and improving the global competitiveness of the country that embraces it. Investing in AI infrastructure should not be considered a subsidy but a strategic national investment in the future.

For its part, the Institute directly links AI to speculative bubbles like the .com one. The establishment of AI data centers in Oregon serves as a warning of what will follow on a global scale: local communities and taxpayers will be asked to subsidize the immense infrastructure and energy needs of AI, while profits and control will be concentrated in the hands of a few. The phrase "Socialization of Costs, Privatization of Profits" is not just a slogan but the core of the ARI's economic critique. It argues that the "innovation" of AI, as presented, is nothing but a vehicle for one of the largest wealth transfers in history, from the creative class and taxpayers to the technological oligarchy.

Data centers claiming a larger share of power use

TOTAL DATA CENTER ELECTRICITY CONSUMPTION
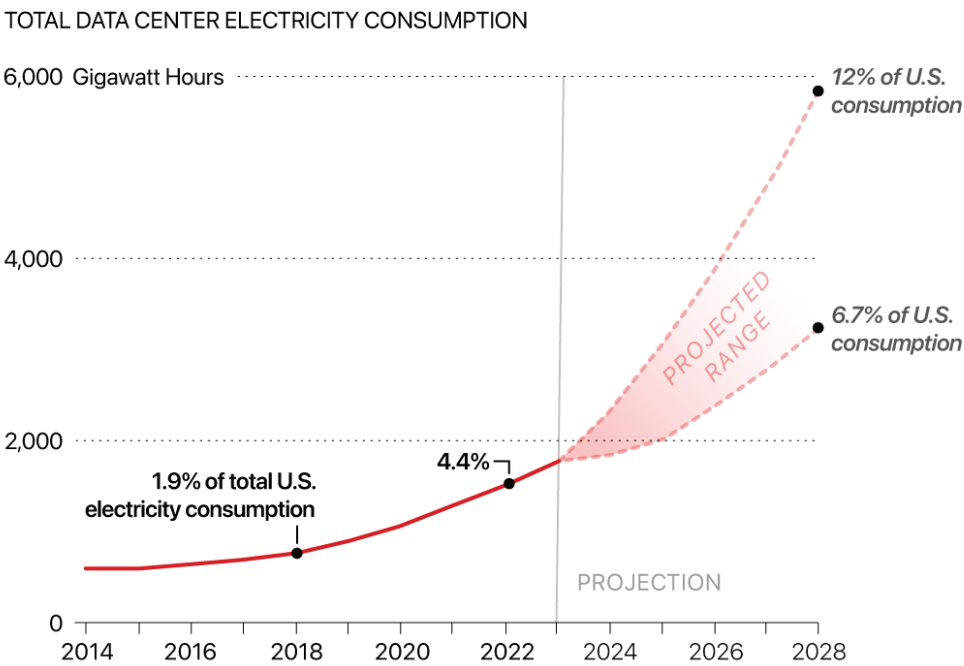
Source: 2024 United States Data Center Energy Usage Report, Lawrence Berkeley National Laboratory

& the West

74

Furthermore, copyright law is not a dry, commercial regulation. It is the legal expression of a fundamental human right, as enshrined in the Universal Declaration: the right of a creator to the moral and material interests resulting from their intellectual labor. The assault on copyright is an assault on human rights, and it carries a moral weight that transcends technical details and cost-benefit analyses.

Therefore, if civil remedies are useless due to economic inequality, perhaps the criminalization of mass infringement is the ultimate answer. The analogy is simple and powerful: why is the theft of a car prosecuted criminally by the state, while the theft of a person's life's work is left to their financial ability to take legal action? Of course, criminal law requires a high degree of intent (*mens rea*), which is exceptionally difficult to prove in complex corporate structures. However, the ARI's proposal for imprisonment, business activity bans, and punitive damages that make infringement economically unviable is based on a cynical assumption: the only way to change the behavior of these companies is when the fear of punishment exceeds the benefit of the transgression.

4. Technological Innovation and Intellectual Property - Finding the Balance

The Artist Rights Institute's opinion frames the dilemma in the most absolute terms: culture or barbarism, human or machine. Its final position is that the game is already rigged; the infringement has already occurred and continues on an unimaginable scale. Any delay, any discussion of "solutions" that do not address this original sin, simply gives the opponent time to consolidate their position.

The fundamental power imbalances, the historical continuity of exploitation strategies, and the existential threat facing human creativity if left unprotected are undeniable. On the other hand, the vision of AI as an engine of progress and prosperity cannot be dismissed wholesale as mere propaganda. The technology does indeed possess tremendous potential. The challenge for modern legislation is titanic: it is called upon to design a framework that will not choose a winner between "creativity" and "innovation," but will recognize both as fundamental social goods. It must ensure that creators have control and are fairly compensated for their contributions, without, however, hindering the research and development that could benefit society as a whole. The final solution, most likely, will be neither absolute prohibition nor unchecked freedom, but a new, complex social contract for the digital age.

Protesting a proposed change to British copyright law that will allow AI companies to train their AI models using copyrighted creative material, a stellar group of more than 1000 composers, musicians and singers have come together to release a 'silent' album.

[1] As George Dyson the tech historian observed in 2005 after a trip to the Googleplex during the Google Books digitization craze: "We are not scanning all those books to be read by people," explained one of my hosts after my talk. "We are scanning them to be read by an AI." George Dyson, Turing's Cathedral (October 23, 2005)

FIM EXECUTIVE COMMITTEE STATEMENT ON AI IN MUSIC

Once AI has ingested and analysed performers' works, sounds, voices, images, likenesses or styles, it can use these data to output new contents at a scale representing a considerable market distortion and an objective threat to the careers and livelihoods of all present and future artists. We need a sustainable legal and economic environment that efficiently prevents AI-generated sound and audiovisual materials from distorting the market with prices much lower than those of protected human creations.To the extent that AI-generated content draws its value from human creations exploited on a large scale, it is entirely relevant to consider remuneration mechanisms based on the output.

The music sector is regularly confronted with disruptive technological innovations that impact the industry, the public, and the artists. Certain historical changes perceived today as progress could, at the time, destabilise the performers' jobs, weaken their income, and profoundly modify their way of working. This was the case with radio, the LP, the minicassette, the CD, and computer music, more recently with downloading and streaming, and now, artificial intelligence.

The evolution of the normative framework can help balance these effects for the different parties concerned. For music performers, the Rome Convention and the WPPT have provided welcome solutions regarding broadcasting and communication to the public. Unfortunately, these instruments have failed to regulate download and streaming effectively, with Article 10 of the WPPT, as currently implemented, not allowing artists to benefit from a fair share of the revenue generated by the online exploitation of their recordings.

Recent advances in generative artificial intelligence and the techniques implemented for machine learning suggest an analogy with human learning mechanisms. However, this analogy quickly reaches its limits. Indeed, the volume of data ingested and the speed at which the machine collects and assimilates these data are incommensurate with what the human mind is capable of. Machine learning consists of appropriating all the creations of the human mind currently accessible and encoding them into algorithms to generate new content based on the knowledge

acquired. This new paradigm radically differs from the slow and gradual knowledge acquisition process at work in humans.

The AI services recently made available to the public translate into a competitive and fast-growing market with strategic implications and considerable profit prospects. However, this new ecosystem is not regulated by any adequate normative framework protecting the community of creators whose work and talent are exploited in proportions beyond comprehension.

AN INADEQUATE COPYRIGHT FRAMEWORK

The existing copyright and neighbouring rights normative frameworks were not designed to address the particular problems posed today by generative AI, whether for incoming or outgoing data. One should, therefore, not assume that the transfer to a producer of a performer's exclusive rights covers the right to authorise or prohibit the use by AI of that performer's recorded performances, irrespective of whether such use includes an act of reproduction.

The performers' moral right introduced by the WPPT in 1996 does not help. It is limited to *"the right to claim to be identified as the performer of his performances, except where omission is dictated by the manner of the use of the performance and to object to any distortion, mutilation or other modification of his performances that would be prejudicial to his reputation"*. In the AI environment, performers need and deserve a more robust moral right, broad enough to allow them to individually oppose the use of their works, sounds, voices, images, likenesses or styles for either TDM Purposes or the generation of audio products by AI (or with its assistance), including deep fakes.

The copyrightability of content produced by AI (or with its assistance) is a new and complex question that gives rise to discordant decisions depending on the country. At this stage, deciding firmly between the copyrighting of AI-generated content (or with its assistance) and its classification as public domain remains challenging.

THE EUROPEAN UNION'S LEGISLATION PROVIDES NO SATISFACTORY RESPONSE

Art. 4 of Directive 2019/790, which provides an exception to the exclusive right of reproduction for *"text and data mining"* (TDM), allows rights holders to reserve their rights through *"machine-readable means in the case of content made publicly available online"*.

Firstly, it is necessary to clarify whether the TDM exception of Art. 4 mentioned above is compliant with the three-step test enshrined in the Berne Convention, the WCT, the WPPT, the Beijing treaty and the EU acquis, which allows limitations to an exclusive right only if the following cumulative criteria are met:

a. in certain special cases;

b. that do not conflict with the normal exploitation of the work; and

c. that do not unreasonably prejudice the legitimate interests of the author / right-holder.

As far as the AI-generated output is intended to enter the market and compete with human creations on unfair terms, compliance with steps b and c is highly questionable.

Another problem with this article is that five years after the adoption of Dir. 2019/790, we still lack standardised *machine-readable means*.

Finally, the number of rights holders in a recorded performance makes the "opt-out" mechanism a complicated machinery for which no consensual solution has emerged yet.

Art. 50 of the European AI Act requires a minimum level of transparency regarding the sources used for content generation via *"transparency obligations for providers and deployers of certain AI systems"*. We welcome this first step and believe that any content generated by AI (or with its assistance) should be documented with detailed information on the sources used and a guarantee that all creators' rights have been respected. It is also essential that members of the public are informed of the nature of the content and know whether they are dealing with the workof a human mind or an AI product.

RECOMMENDED REMEDIES

On the input side

Preventing human displacement

A vibrant culture of human artistry is an inseparable component of the foundation of a civilised society. This precept demands a fair but firm set of controls that balances the demands of commercial enterprise with the imperative of every society to protect and preserve its cultural soul from displacement by the inexorable advances of technology.

It is unacceptable, therefore, that music performers can be the victims of large-scale exploitation of their works, sounds, voices, images, likenesses or styles without their free, prior and informed consent and against no financial compensation. Performers should have the right to authorise and effectively prohibit the scraping and analysis of their works, sounds,

voices, images, likenesses or styles by an AI system, including after the transfer of their exclusive rights, and to receive financial compensation for such use.

It is also vital to ensure that performers enjoy the same level of protection against unauthorised use of their performances by AI, whether based on a literary or artistic work, an expression of folklore, or AI-generated material.

On the output side

Preventing market distortion

Once AI has ingested and analysed performers' works, sounds, voices, images, likenesses or styles, it can use these data to output new contents at a scale representing a considerable market distortion and an objective threat to the careers and livelihoods of all present and future artists. We need a sustainable legal and economic environment that efficiently prevents AI-generated sound and audiovisual materials from distorting the market with prices much lower than those of human creations protected by copyright and neighbouring rights.

Financial compensation based on the output

To the extent that AI-generated content draws its value from human creations exploited on a large scale, it is entirely relevant to consider mandatory compensation mechanisms benefiting the creative community and applying to all generative AI tools.

Innovative remuneration mechanisms based on the output should, therefore, be considered. Any AI-assisted generation of musical content should be subject to fair payments to performers as their work and talent constitute the knowledge base at the origin of such content. Such fair payments, however, must not operate to normalise or unduly encourage the supplanting by generative AI of the work of individual human beings. We need a payment system that will honestly compel a producer who is contemplating the use of generative AI to weigh the economic advantages of human-produced products and performances against the convenience of a generative AI-produced products.

This may require the creation of a sui generis intellectual property regime as stand-alone legislation for adequate compensation. The *United Nations Declaration on the Rights of Indigenous Peoples* (UNDRIP), which affirms the right of Indigenous Peoples to restitution or just, fair and equitable compensation for resources taken and used without their free, prior and informed consent, provides a wise principle that we recommend following. Existing private copying compensation mechanisms may also represent a valuable model for collecting payments from the users and distributing them to the performers concerned.

We also strongly support the language in Principle 11 of the G7's *International Guiding Principles for Organizations Developing Advanced AI Systems* and urge the EC and the G7 to continue supporting explicit language on respecting material protected by intellectual property rights, including copyright-protected content, and ensuring transparency of data sets, as part of promoting safe, secure, and trustworthy Artificial Intelligence (AI) technology worldwide.

27 June 2024

APOLLON

GREEK MUSICIANS' ROYALTIES COLLECTING SOCIETY