NEW TOYS, NEW APPS, NEW IDOLS: K-POP'S AI IMAGINARY

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ABSTRACT

This article explores how AI is imagined in processes of cultural production, using K-pop as a case study. K-pop serves as a 'canary in the coalmine' for the global music industries, having adapted to technological change earlier than its regional counterparts. In this article, I examine the sociotechnical imaginaries of K-pop management companies, fans, and the IT sector in depicting AI as a future-making technology. It explores how K-pop stakeholders envision AI's transformative effect on the creative and cultural industries, highlighting differences in their AI imaginaries and visions of AI's utility. Stakeholders reveal different and contrasting perspectives, shedding light on the future of the industry and the broader creative culture sector. These imaginaries of AI reveal how AI exists within networks of power and capital, and indicate different visions of AI as a future-making technology in the music industry. The discussion calls for further critical analysis of AI as a socially constructed concept, and its implications for the future of music.

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INTRODUCTION

The video for 'Super Real Me', a medley of songs promoting girl group ILLIT's new album of the same name, is a two-minute song compilation accompanied by anime-inspired visuals. The minimally animated cartoon shows a pastel-coloured *inhyeong bbobgi* (claw machine) retrieving a teddy bear and other ornaments, followed by a starlit bedroom, and a rear view of the group members. At first glance, the video is aesthetically pleasing, and was well received by most fans. However, several features caught the attention of global netizens. Smudged lines and odd details led to speculation that parts of the video were AI-generated, prompting some to call the decision to use AI "disappointing", and that the group's agency HYBE were "stealing from and exploiting artists" (Reddit, 2024a). Neither the artist's parent company HYBE nor Mooncube, the music video's creative production agency, responded.

The negative reaction to the video by a minority of fans, following the discovery that certain parts may have been AI-generated, illustrates how fans and publics increasingly associate the creative use of artificial intelligence with symbolic and deeply contextual meanings. The proliferation of online, publicly accessible generative AI tools from 2022 onwards -- including text generators such as ChatGPT; image generators, including Midjourney and Stable Diffusion; video generators such as Sora; and music generators, including Suno, Udio, and Uberduck -- have created substantial public awareness of AI, as well as its disruptive potential for the creative sector. High-profile legal and labour disputes have followed the public accessibility of generative AI. In June 2023, the US Senate's Hearing on Artificial Intelligence and Intellectual Property heard testimonies from artists, music industry leaders, and tech company executives on the use of copyrighted content to train AI models, in which visual artist Karla Ortiz asserted that these systems "[create] an exploitative environment that threatens artists' livelihoods" (Crowell & Moring, 2024). Likewise, one of the main concerns of the SAG-AFTRA strike in the latter half of 2023 was to implement protections for any instance where machine-learning tools are trained on members' creative works or likenesses. Each of these disputes positions human creators in diametrical opposition to tech companies, who seek to exploit their intellectual property without consent or compensation. Yet for studios, agencies, and music labels, AI promises both efficiency and the opportunity to create new kinds of content.

The music industries have experienced successive decades of disruption, following the relatively stable era of recorded physical media formats throughout the latter half of the twentieth century. File-sharing, digitisation, streaming, social media, and platformisation have irrevocably changed the economic and labor structure of the music industries, as well as music's sociocultural uses and value. Each of these changes also demonstrates music's proximity to the information technology sector. Hesmondhalgh

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and Meier (2018: 1565) position this relationship as one of reliance, stating, "the recording industry [...] remains dependent on and must react to the IT industry". This relationship is not wholly one-way, however; music is also a particularly potent way to attract consumers to new technologies, as the authors note (ibid: 1567). Today, the IT sector and proprietary technologies are an inextricable part of all parts of the music industries, from production to distribution. Considered in this trajectory, the rapid insertion of AI into the music industries is a logical progression. The case of ILLIT's music video exemplifies the basic utility of generative AI, as a means to efficiently produce content for a consumer market; it also illustrates sensitivities to AI as a creative technology, and conflicting views of its application within the music industries.

This article investigates perspectives towards AI in the context of K-pop, namely the discourses propounded by fans, the IT sector, and music companies. It focuses specifically on how these parties imagine AI as a future-making technology, and negotiate issues of ownership, commercialisation, and creative control. Although there is an emerging body of literature examining the implications of AI for creative sectors (Jin, 2021; Lee, 2022; Filimowicz, 2023; Walkowiak and Potts, 2024), the examination of AI as a topic of discourse within the creative industries, and its different implications for industry stakeholders, audiences, and the IT sector, has not been significantly addressed. This approach draws on the concept of the technological and sociotechnical imaginary, as proposed by authors such as Barbrook (2007) and Jasanoff (2015). In particular, Jasanoff's definition of the sociotechnical imaginary as "collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology" (2015: 4) guides this inquiry.

Moreover, I argue that K-pop is a 'canary in the coalmine' for global music industries, adapting to change earlier than comparable countries' music industries. For instance, South Korea was a pioneer in the area of digital music platforms. The country transitioned from having the second-highest rate of online music piracy globally (Do, 2010) to a highly integrated techno-cultural music sector backed by significant investment, exemplified by the launch of the subscription-based music service Melon in 2004, four years before Spotify (Parc, 2018). Additionally, as an export-driven sector, it is closely attentive to global markets. Attitudes to AI from K-pop stakeholders therefore point to where the global music sector will likely follow. Fundamentally, this article argues that the use of AI within K-pop, and within creative industries more generally, should not be considered only terms of efficiency or human displacement; but also consider nuances of power, control, and agency held by various stakeholders.

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ARTIFICIAL INTELLIGENCE AND IMAGINARIES

Applications for artificial intelligence span all sectors, including creative practices and industries. While the extent of its effects on the economy, law, labour, and productivity are unknown, the proliferation and adoption of AI is generally agreed to be an epochal event. With relation to the creative industries, the EU's report on The Use of Artificial Intelligence in the Cultural and Creative Sectors (Caramiaux, 2020) emphasises that AI has entered the creative value-chain at every level: creation, production, dissemination, and consumption. Broadly speaking, the aforementioned report identifies that AI poses difficult questions for creative labour, copyright, diversity, discrimination, and governance; few outright benefits are identified, save that it might create opportunities for accessibility (ibid).

There are myriad intersections between the music industries and artificial intelligence. Within academia, researchers have long investigated machine learning, neural networks, and related technologies for music composition (see Roads, 1980; Miranda, 2021), musical feature extraction and recommendation (see Li and Ogihara, 2008: Van den Oord et al, 2013) and singing voice synthesis (see Cook, 1996; Nishimura et al., 2016). In practice, AI has already disrupted the value chain at each of the four points identified by the above EU report. At the level of creation, apps and platforms that use generative AI for mobile and amateur music creation abound, as mentioned earlier. Production has likewise been profoundly changed by AI tools for music mixing and mastering (see Collins et al., 2021). AI is also embedded in the everyday business of the music industries, including artist discovery (A&R), music platforms' recommendation systems, and the predictive valuation of music catalogues (Keith et al, 2023). Across the music industries, AI is increasingly viewed as "the next stage of development, integrating and leveraging previously distinct sectors to create a frictionless landscape enabled by the reduction of musical artifacts, practices and culture to data" (ibid: 49). This in turn shifts the music industries away from creative workers and creative skills, and towards investment in technical skills, and ownership of technology, data, and intellectual property.

As a recent technology poised to disrupt almost every aspect of the music industries, but with its full effects yet to be determined, AI discourses reveal *imaginaries*. The imaginary, as an anthropological and political framework, describes cultural models that are "shared, implicit schemas of interpretation" (Strauss, 2006: 329). Two influential texts on imaginaries are Benedict Anderson's 'Imagined Communities: Reflections on the Origin and Spread of Nationalism' (1983) and Charles Taylor's 'Modern Social Imaginaries' (2002); Taylor's definition of the social imaginary as a "common understanding that makes possible common practices and a widely shared sence of legitimacy" is of relevance for this research.

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The technological, or sociotechnical, imaginary is a growing area of attention. Barbrook (2007) identifies artificial intelligence as a territory for imagination since the Cold War and the early days of digital computing, with companies such as IBM promoting sentient machines as "technological fixes for socio-economic problems" (p. 165). Today, AI is an increasing priority for industry and governments worldwide, even as its exact definition and future capabilities are unclear; workers must "make sense of imaginaries and expectations, and turn these into practices" (Hautala and Ahlqvist, 2022: 11). A related concept is future-making, a topic of interest among cultural studies researchers, notably in Appadurai's *The Future as Cultural Fact: Essays on the Global Condition* (2013). Appadurai's approach illustrates how narratives of the future are not just technical projections but also cultural products shaped by human imagination, anticipation, and aspiration (ibid: 286). The boundless (yet never arriving) promise of AI can also be theorised as an 'anticipatory regime', as defined by Adams et al (2009). Under anticipatory regimes, subjects are bound in "affective economies of fear, hope, salvation, and precariousness" (ibid: 260) and are called to prepare and optimise for an imminent future.

AI compels publics to imagine the future through its transformative potential, encompassing technological advancements, socio-economic shifts, ethical considerations. Examining discourses around AI, separate from technological, economic, or legal impacts, is therefore useful because it acknowledges the subjective and sociocultural contexts in which its effects are felt. As Doris Bachmann-Medick suggests, humanities researchers must "[pay] attention to the methodological suppositions underlying the various conceptions of the future" (2020: 5), to highlight significant issues for social action and for further research.

AIMS AND METHODOLOGY

This study explores how AI is envisioned in processes of cultural production, specifically, in the domain of K-pop. It achieves this by considering three different parties – K-pop management companies, fans, and the IT sector. This comparative approach seeks to "identify the content and contours of sociotechnical imaginaries [while avoiding] taking as universal epistemic and ethical assumptions that turn out, on investigation, to be situated and particular" (Jasanoff, 2015: 24). In other words, it acknowledges the "subjective and psychological dimensions of agency" (ibid) concomitant with technological systems. Discourse analysis is used as a methodology to uncover recurring themes in these parties' understandings of AI. Using web searches focused on K-pop and artificial intelligence, perspectives from K-pop management companies and the IT sector were gathered from news articles and mainstream media outlets, while fan perspectives were gathered from discussion boards and social

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media platforms where individuals engage in more informal, user-generated discourse. Representative findings and quotes are presented to illustrate dominant discursive themes.

The study firstly addresses South Korea's technology sector. For these companies, who are external to the conventionally defined music industries, AI provides an opportunity develop apps, platforms, and services for K-pop. Secondly, it addresses K-pop management companies, also referred to as agencies or labels, including HYBE, YG, and SM Entertainment. These entities are part of the conventionally defined music industries, although many are now conglomerates with diverse interests. Finally, K-pop fans, as consumers, are the end users of K-pop products and content, and their attitudes towards AI are crucial to consider. It is necessary to recognise that one important party is not examined in this article; artists and creative workers (as distinct from K-pop management companies). This is partly because contracted parties cannot freely provide comment, with rare exceptions. Nonetheless the value of artists and creative workers to K-pop, and AI's potential effect on their work, is acknowledged.

This article does not address questions of authorship, copyright, intellectual property, rights, authenticity or artistic integrity in relation to AI's use in K-pop. Nor does it consider concerns about labour or the economic effects of AI. While these are valuable questions, they are outside the scope of the present discussion, which addresses how stakeholders imagine AI as a future-making technology in K-pop. By comparing discourses surrounding AI in K-pop among fans, the K-pop industry and the broader tech industries, this article seeks to uncover how these different actors conceptualise AI's use value. These discourses point towards the imagined future of K-pop, as well as the creative industries and culture sector more broadly. As AI becomes increasingly widely used in the creative industries, the implications of these technologies need to be critically investigated. Specifically, this article asks: how do K-pop's stakeholders envision AI's transformative effect on the creative and cultural industries? And how are music, fans, and artists, and creative work represented in these imaginaries?

K-POP, TECHNOLOGY, AND AI

AI is the the most recent stage of K-pop's longstanding interest in exploring new technologies. This interest has its origins in South Korea's statist information technology and cultural policies, which have co-ordinated support and infrastructure for both the K-pop and IT industries. This includes implementing legislation to manage and protect copyright, facilitating internationalisation, funding training initiatives, and fostering cross-industry collaboration. As outlined by Kwon and Kim (2014: 427), the 1990s saw the domestic market for cultural products expand rapidly by using IT, telecommunication, and electronics technologies, establishing "a virtuous and mutually beneficial cycle of growth among these sectors" (ibid). Since the 1990s, many IT and telecommunications innovations have leveraged integration with

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K-pop, and vice versa, with three illustrative examples being holograms, games, and the metaverse. Hologram performance, extensively studied by Kim (2018), offers a technological solution to the problem of live experience scarcity for global K-pop audiences; while live experiences such as concerts are limited by performers' time and substantial costs, hologram concerts (in specially equipped theatres) provide a reproducible quasi-live spectacle for fans, on demand. The swift growth of South Korea's gaming industry has likewise resulted from major IT and telecommunications investment (Jin and Chee, 2008: 44) and is increasingly integrating K-pop IP and concepts; *In the SEOM,* a 2022 BTS-themed puzzle game, and K/DA, a virtual group created to promote the video game *League of Legends* are two notable instances. More recently, IT and telecommunications companies produced 'metaverse idols' such as APOKI, a part-rabbit virtual artist created by 3D graphics company AFUN Interactive; and triple iz, a K-pop supergroup formed by SK Telecom, comprising human members that undertake activities in SK Telecom's proprietary metaverse service Ifland (SK Telecom, 2024).

K-pop and new technology are therefore deeply imbricated. Idols have long served as models for Korea's advanced technologies; the cover of Dal Yong Jin's 2017 book *Smartland Korea* features K-pop idols Girls Generation smiling winsomely while holding smartphones. As Jin (2017: 67) points out, technology is both a tool for the *dissemination* of pop culture via smartphones, apps, and platforms; and also (particularly in Korea) a product that is sold *by and through* popular culture. In other words, K-pop not only advertises cutting-edge technologies, but also facilitates the uptake of new consumer technologies created in Korea, whether fan platforms, *selca* apps, idol-focused games and video/livestreaming apps, or voting apps. For platforms, K-pop is an inducement to recruit users, creating an audience commodity that also produces data (after Smythe, 1977).

The proliferation of K-pop AI products is a natural progression within this context. AI is a critical priority for the South Korean government, as Jin (2021: 43) points out, and its AI policy has been developed with relevance to the cultural industries, as well as the economy as a whole. Under the framework of the Fourth industrial Revolution, Korea embarked on wide-ranging public-private partnerships to develop AI-integrated strategies for the workforce, economy, and society (Jin, 2021: 45). This push mirrors the givernment's 'hands-on' support of cultural production through legal and financial resources, as well as R&D investment. As such, it is no surprise that Korea's AI strategy is enmeshed with its successful cultural strategy.

For the purposes of this research, there are several notable aspects of this burgeoning K-pop AI interest. Firstly, there has been substantial public attention and investment in K-pop AI projects even as the definition of AI remains unclear. While terms like machine learning, neural network, and algorithm have distinct meanings in scientific and mathematical contexts, artificial intelligence does not. A 2020 report

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for the European Commission identifies several different working definitions of the term, most of which refer to an automated system demonstrating human-level intelligence or decision-making capability, but note that "despite the increased interest in AI by the academia, industry and public institutions, there is no standard definition of what AI actually involves" (Samoili et al, 2021: 7). Nonetheless, the term is extensively in business contexts and public discourse, particularly public- and investor-facing media, as it "signals data-driven insights, market competitiveness and scalability" (Keith et al,. 2023: 46).

In media discourse on K-pop AI, the term is used as a catch-all for technological innovation. Its vernacular meaning encompasses virtual and metaverse products, generative AI, and a range of other cutting-edge technologies. A 2021 news article titled 'The future of K-pop with AI' discusses a livestreamed BTS performance integrating live video effects and synchronised light sticks, the recreation of deceased singer Kim Hyun-sik's voice, and personalised language textbooks featuring the virtual voices of K-pop artists (Lee, 2021). Given the importance of both K-pop and AI to South Korea's economy, the high number of mainstream articles on the topic is not surprising, and it remains an inviting topic for comment. As well as updates on new K-pop AI products and technologies, these articles provide a space for speculation about a future in which South Korea's robustly developed digital infrastructure, IT, and culture industries are poised for even greater global success. Similar articles consider the potential of virtual singers in the metaverse (Go, 2021); and the virtual idol group 'Eternity', who according to their production company's CEO, are "perfect and more human than humans" (Lee and Hemphill, 2022). A further article identifies AI as one of the three "growth axes" of K-pop, alongside fandom platforms and virtual reality (Lee, 2023).

In these scenarios, AI is depicted as the key to unlock K-pop's potential beyond geographical, language, and human limits, while creating new personalised experiences for fans. It is not just a technology, but an element of digital capitalism and culture, as Jin (2021) outlines. K-pop's 'AI turn' occurs at the same moment that the creative industries have reached maturity as streaming- and digital-first industries, and cultural production has become heavily dependent on platforms (Nieborg and Poell, 2018). Global K-pop is today almost entirely platformised through global and South Korean platforms and IT intermediaries. For Korea's well developed cultural and IT industries, AI presents an opportunity to further expand and to gain a first mover advantage in the global market. AI also transforms K-pop from a business centered on developing artists to one focused on digital wares and IP, in the form of products which can be endlessly (re)produced, sold, individualised, and attuned to the needs of the market. This market-focused approach is not new; since the 1990s, the overarching strategy of K-pop agencies has been to explore the market, and to systematically produce artists and products that meet demand. This systematized approach has

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since become the dominant K-pop training and development method, as Shin and Kim (2013) discuss. AI can therefore be considered a logical development under K-pop's commercial imperatives.

The close integration of K-pop with AI thus serves clear commercial and economic aims, as well as the Korean government's strategic priorities. In public discourse, major industry leaders have opined that increasing collaboration between these sectors is unavoidable. In 2023, the Korea Music Contents Association (KMCA) held a conference on the theme of 'AI and the K-Pop Industry' where the director of the Electronics and Telecommunications Research Institute predicted "a completely new business model" for the music industry, with artificial intelligence used throughout production, arrangement, performance, and distribution (Lim, 2023a). At the same event, the secretary general of the KMCA stated that AI's effects on the K-pop industry would "inevitably increase" (Seo, 2023). In another feature on K-pop's adoption of AI, an unnamed IT industry official notes that K-pop entertainment companies are investing heavily in technology, adding, "The boundary between K-pop and the tech industry will gradually disappear" (Chosun Media, 2023). HYBE's founder Bang Si-Hyuk, in an interview for Billboard, also indicated that artificial intelligence would be a key strategy for the company, stating "I have long doubted that the entities that create and produce music will remain human. I don't know how long human artists can be the only ones to satisfy human needs and human tastes" (Karp, 2023).

While there is clear interest and logic underpinning the integration of AI into K-pop from the perspective of K-pop management companies and the IT sector, and from a commercial standpoint, consumers' interest in AI-generated K-pop content and products integrating AI is less clear. Virtual idols, perhaps the most obvious manifestation of AI in K-pop, have had moderate success; the 5-member virtual group PLAVE, which debuted in 2023, has released a chart-topping album and performed on televised music shows (Korea Times, 2024). Yet there are cultural anxieties around the use of AI in general, and the displacement of human talent may not be well received. For instance, it is not clear whether fans will form attachments with virtual artists voiced by un-named singers, and developed by technical and creative teams, as fans form parasocial relationships with artists (Wise, 2022). Taking BTS as an example, much of the group's success is credited to their perceived authenticity – including their public messaging on hard work, mental health, self-love, and support for social causes (Mclaren and Jin, 2020)– which would be difficult to replicate using a non-human artist. Furthermore, there are many issues surrounding AI, as noted by Crawford (2021) including privacy, ethics, consent, and environmental costs that may concern certain audiences.

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KOREA'S ICT SECTOR

1. BACKGROUND

While K-pop is considered part of the creative and cultural industries, it has evolved alongside and in collaboration with Korea's growing ICT sector, as discussed above. As K-pop has expanded through platformisation and cross-media integration, the ICT sector has likewise utilised K-pop as a topic to develop new kinds of products, apps, and experiences that leverage K-pop's fanbase. The number of apps related to K-pop indicates this market; for example, STEPIN, billed as a "AI K-pop dance platform" that "brings together K-pop dancers from all corners of the globe" (Stepin.ai, 2024) is produced by AI motion-tracking company Sidewalk Entertainment (Sidewalk Entertainment, 2024). ICT startups have also endeavoured to provide technological solutions for K-pop's growth; FanPlay, a platform for livestreamed concerts, is described by the company's CTO as "a device that literally maximizes the fans' play experience and turns the digital concert hall into a kind of playground [...] we will be able to meet the needs of the global fandom by enabling constant communication between users" (Kim, 2024). This commentary reveals what Morozov (2013) terms 'techno-solutionism'; that problems (in this case, the non-interactivity of digital concerts and inability for audiences to communicate) can be solved with the right technological application.

The confidence of South Korea's ICT sector concerning K-pop is due not only its ongoing support from the government and existing linkages with the creative and cultural sector, but also its objectively strong national position in AI. An emergent concern for national economies is sovereign AI, "a nation's capabilities to produce artificial intelligence using its own infrastructure, data, workforce and business networks" (Streier, 2024). There is ongoing competition between Korean ICT firms, including SK Telecom, Kakao, and KT, to develop AI platforms (Lim and Kim, 2021). Korean ICT firm Naver has developed HyperCLOVA X, the third hyperscale AI language model to be made available to the public. HyperCLOVA X has been trained on Korean-language content from Naver's social media portals, including "various user-generated Korean content [...] accumulated with user consent for more than 20 years. The training data are 6,500 times larger than that of GPT-3, and contain relevant information on Korean culture and lifestyle" (European Commission, 2024). HyperCLOVA X's "strong reasoning capabilities in Korean backed by a deep understanding of the language and cultural nuances" (Yoo et al, 2024) constitute a valuable resource for its developers, and eventual users. Most notably, Naver's intention to develop HyperCLOVA as a multimodal AI that can process videos and images (Naver, 2023) hints at its potential for creative production.

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2. DISCOURSE

Future-looking commentators from within the ICT are unsurprisingly confident that AI will become thoroughly embedded in all aspects of K-pop production, leading to even closer integration between ICT and K-pop. Yoo Won-young, director of the Electronics and Telecommunications Research Institute, stated, "In the music industry, artificial intelligence is being used in all fields, from production to arrangement, performance, and distribution [...] in the future, a completely new business model that has never existed before is possible." (Lim, 2023a). One example of a new product is AI music app LAIVE, which generates music based on a few user-defined parameters. The app, created by Poza Labs, is backed by media conglomerate CJ E&M; the app could theoretically be used to generate K-pop songs in the style of artists in CJ E&M's management portfolio. Others, like the CEO of AI audio company Supertone (now part of K-pop management company HYBE) have proposed that AI will develop entirely new products and markets; "Artificial intelligence technology will break down the limits of creativity and make content that was only possible in imagination a reality" (Lim, 2023a). AI is also positioned as a tool that will become indispensable within K-pop's existing ecosystem; Park Chan-jae, CEO of AI content production company EnterArts, stated "AI composition will diversify the K-pop ecosystem as it creates songs according to individual emotions," adding, "We are currently developing AI that can not only compose music but also write lyrics" (Kwon, 2018). Park has also referred to AI as "a creative tool that all K-pop composers will use like a musical instrument" (Lim, 2023a).

3. IMAGINARY

The ICT sector therefore inserts itself as the provider of AI, as a revolutionary tool, for K-pop. Its sociotechnical imaginary depicts a future where the creative sector is dependent on proprietary technologies and tools to fulfil ambitious artistic and commercial goals. It promises to use AI to develop new commodities— new products, new apps, and new services — to further expand K-pop's global reach. Simultaneously, it envisions AI as an optimising technology within existing K-pop production processes, including composition and lyric writing, and allowing songs to be written both better and faster than before. This imaginary appeals to K-pop management companies, as a multiplier of their existing value in IP and creative products; and simultaneously to investors, as an invaluable strategic partner in K-pop's growth.

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K-POP MUSIC COMPANIES

1. BACKGROUND

Nieborg and Poell (2018: 4287) observe that platforms do not only transform market structures and create content; they also reshape how cultural industries organise production and distribution around platforms. Similarly, the ubiquity of platforms as the dominant mode of cultural production and distibution, and the reduction of many musical practices to data, has facilitated the insertion of AI into cultural production. For K-pop management agencies, the applications of AI are threefold. The first use is symbolic; as discussed earlier, AI is both indefinable and a powerful signifier of technological power, and its use in public media signals value to investors and the general public. A second use of AI is to develop new products and services, ranging from fan platforms integrating real-time translation, to virtual artists such as PLAVE. Thirdly, AI is employed as a tool to grow the value and market for existing K-pop artists and products. One such use, proposed by the COO of AI voice company Supertone, is to create virtual voices of real artists; "So, if BTS uses our technology when making games or audiobooks or dubbing an animation, for instance, they wouldn't necessarily have to record [that audio live] in person" (Stassen, 2021).

In the case of virtual artists (or virtual idols), while Aespa, PLAVE, MAVE, and Apoki have been developed recently, there are many historical precedents in this area. Kim et al. (2023: 2004) define virtual idols as having four characteristics; engaging in real-world activities, having a virtual human-like form, being a singer, and existing as a pop culture product. Under this definition, the first virtual idol in K-pop was Adam, created by software company Adamsoft in 1998 (Kim et al, 2023). Arguably the most influential virtual idol globally is Hatsune Miku (2007-), although unlike the current generation of K-pop virtual idols, Miku's voice is entirely synthesised. Discussing Miku and Japanese virtual idols in general, Black (2012: 225) writes that such idols appeal to a subculture "devoted to the consumption and production of a commodified, technologized, artificial femininity", but that it remains to be seen whether virtual idols will gain widespread appeal within a "celebrity culture still crucially concerned with the articulation of media persona and living body".

2. DISCOURSE

The tension between the virtual idol as a synthesised and perfected product, and a celebrity culture preoccupied with human characters and idiosyncrasies, is an issue that virtual idol producers are contending with. Advances in technology have been proposed as the solution to this problem, and this is a prevailing topic in news discourse. SM Entertainment's CEO Lee Soo-Man stated, "Previous AI

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artists had unnatural movements or had real humans acting behind CG, so it was difficult to view them as true virtual humans" (Jeong, 2023). SM Entertainment is trialling entirely virtual artists; in 2023, SM Entertainment's hybrid virtual-human group Aespa featured Naevis, an entirely virtual artist whose voice is synthesised from twelve voice actors (Park, 2023). Yet CEO Lee also acknowledged resistance to the idea of virtual artists, emphasising that effective music and storytelling would "allow audiences to accept virtual humans as real people" (ibid). Likewise, music critic Cha Woo-Jin describes audiences as "not enthusiastic" about AI-metaverse singers (ibid). For the moment, the most successful virtual 'AI-dols' appear to be those with a well-defined human element; Aespa comprises human members with virtual 'aes' (digital counterparts); KDA are voiced by established K-pop singers; and PLAVE are performed and voiced by un-named human artists, akin to VTubers (Suan, 2021). To familiarise the public with virtual idols, these groups have been assigned similar expository mythos, which reveals the aspirations of their creators to marry the virtual and 'real' worlds in a humanistic way. PLAVE inhabit the virtual world 'Caelum' and have been given special abilities to communicate with Earth (Jung, 2023); Aespa's name represents the ability to "meet another self through an avatar and experience a new world" (Lee, 2020); and MAVE's members are emissaries from a futuristic dystopia called IDYPIA, sent to Earth to rediscover emotions (Chakraborty, 2023).

Yet despite any resistance to virtual idols, commercial logic requires that virtual idols are produced. As Morreale, (2021: 109) asserts, music companies' interest in leveraging technological innovation is a "by-product of a techno-enthusiast environment (Morozov, 2013) connected to the hegemonic economic system based on the constant exploitation of new markets." The digitisation, platformisation, and now AI-integration of the music industries have facilitated new markets borne of the decreasing gap between the IT and music industries. Virtual idol group MAVE illustrates the increasing horizontal and vertical integration of K-pop production; the group is backed by telecommunications conglomerate Kakao, produced by gaming company Netmarble, and produced 'in house' using their Metaverse Visual Special Effects (VFX) lab. There are obvious efficiencies in this arrangement, which have been acknowledged in public discourse. While creative workers including choreographers, dancers, and vocalists are still employed in MAVE's creation, these roles can be filled on an ad hoc basis. A further benefit is the creation of fully controllable IP; while human artists age, incur scandals, or choose not to renew their contract, virtual idols are the property of their owner. As Park Ji-eun, CEO of artificial intelligence company Pulse9, said, "Traditional idols last for as little as 1 year or as long as 7 years, but virtual idols never change members or leave to pursue other dreams" (Lee, 2023). Similarly, virtual idols can be infinitely deployed and reproduced without regard for geographic or physical limitation. Lastly, virtual idols offer new cross-synergies with other digital media and goods, whether games, animation, or webtoon; each of

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these sectors are also major components of Korea's cultural export industries. Olivia Oh, MAVE's Task Force Leader at Kakao Entertainment, explains that her creative team aims to "propose a new trend by combining K-pop with digital human technologies" (Chakraborty, 2023). MAVE have released their own app, which "allows fans to interact with the members directly and create their own unique content" (ibid); they have been promoted by Netmarble's game characters; and have appeared in Netmarble's games (ibid). The group will also feature in a webtoon produced by parent company Kakao Entertainment (Dalugdug, 2023). Oh states, "we really want to use these collaborations as a bridge to add more expansive experiences for our fans" (ibid).

Virtual idols demonstrate one application of AI technologies for content creation within K-pop. There are many other applications, which enhance or amplify the potential of existing artists. One of these is voice synthesis, demonstrated by HYBE's CEO Jiwon Park in an investor audio presentation; after apparently addressing listeners, it was revealed that Park's voice had been generated using text-to-speech technology using the company's voice synthesis product Supertone (Stassen, 2024). The applications for voice generation are many; it can be used to voice virtual artists, to replicate voices of existing or dead artists (ibid) for licensing within games or other media, or to provide natural-sounding translated content. Automatic language translation constitutes a "major effort to globalize its music by breaking down language barriers" (ibid), and has been used by by HYBE artist MIDNATT, as well as MAVE. Translation has been upheld as the solution for K-pop's stagnation; the potential for Supertone and similar technologies to "[overcome] language and gender barriers" (Lee and Lim, 2023) is proposed as the way for K-pop to enter new global music markets, such as Latin America, China, or Japan, without the artist needing to develop language proficiency. Similar technologies are also embedded in global K-pop fan platforms such as Weverse, where real-time translation allows fans to translate artists' content into their language of choice.

3. IMAGINARY

For K-pop management companies, the sociotechnical imaginary of AI is an opportunity to rapidly develop new content, markets and collaborations in an cost-efficient manner. Public discourse reveals that virtual idols are not just novelties; they are result of strategic and rational commercial logics, even as public interest in virtual idols remains lukewarm. While virtual idols represent the most obvious manifestation of AI in K-pop production, translation and voice synthesis may prove to be be the more widely utilised technology. K-pop artists have long produced separate Japanese, Chinese, and English-language versions of songs; a tool for producing multi-language releases without any artist input will

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be an enticing prospect. As such, the sociotechnical imaginary of AI for K-pop companies is one of competitiveness, both within the domestic industry and for global markets.

K-POP FANS

1. BACKGROUND

Fan perspectives of AI in K-pop are more difficult to gather. On one hand, the virtual artists discussed thus far have had moderate success; simultaneously, incidents have occured where netizens occasionally express concern or distate over the use of AI in K-pop. As an example, SM Entertainment developed interactive touchscreen posters of NCT members for an event in 2023; fans could use touch gestures to make the artists smile, blink, or m public, rather than K-pop management companies. As an example, fan-made 'covers' of popular songs using AI simulations of real artists' voices have received significant online attention from both fans and management companies. While these AI covers likely infringe on the rights of both singers and songwriters, the public's response is more nuanced. Comments on a news article about fan-made AI cover of a K-pop song reveal that many are equivocal; responses include, "Singers have been singing with machine sounds for a long time", "when singers record songs, they [already] use machines to correct their timbre and piece together what they sing", ove their head. These posters were later released as a phone app, allowing users to "meet and interact with the member of their choice". Fans were uneasy about this use of NCT's likeness, with some calling it "creepy" (Bright, 2023). In another incident, a fan showed Yeji, member of the group ITZY, a deepfake video of herself performing a dance challenge during a fan call. K-pop deepfakes are widely used without the original party's consent, and are also used for criminal purposes, including pornography (Wang and Kim, 2022). As such, showing an artist a deepfake of herself was perceived as harassment and condemned by fans (Lucas, 2024). In another instance of the public's application of AI to K-pop, a local government's theme song competition was entered by an elementary school teacher who used AI music service Suno to generate a song in the style of K-pop. Professional composer Kim Hyeong-Seok called the song a "masterpiece" (Hong, 2024). As AI use did not breach the rules of the competition, the song was declared the winner.

2. DISCOURSE

AI clearly carries different implications when it is used by fans and the public, rather than K-pop management companies. As an example, fan-made 'covers' of popular songs using AI simulations of real artists' voices have received significant online attention from both fans and management companies.

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Although there are diverse views on the ethical implications of fan-created AI voice covers, these covers have attracted significant public attention, and an organised community of K-pop fans are engaged in producing them. One sizeable K-pop AI community based on Discord provides resources for fans wishing to produce their own AI covers, including guides on training datasets, vocal separation, and using different AI voice tools. The community has almost 12,000 users and includes active moderators, organised events and competitions, and a 'requests' section (including users submitting paid requests). The significant interest in K-pop AI covers is somewhat surprising, given that AI in K-pop production is still in an early and experimental phase. However, this demonstrates a notable aspect of AI in creative production; namely, that its utility depends on *who* uses it in an existing structure of power dynamics. AI has a specific use value for fans, and in most cases, this value is not economic. Fans' use of AI is agentic; in other words, fans are not simply the passive and desirable consumers envisioned in K-pop management companies' AI imaginary, but are individuals and collectives that can act in ways resistant to corporate aims (Sandvoss, 2005: 13). In many ways, K-pop fans' AI covers are a clear demonstration that fans are actors who are "actively engaged in constructing, deconstructing and reconstructing texts" (Guschwan, 2012: 25).

3. IMAGINARY

A common approach to evaluating the use of new digital applications is to ask whether they are tools, or toys (Lyall and Robards, 2017: Chou et al., 2009). Within the sociotechnical imaginary of some K-pop fans, AI is a technology for play, and to an extent, this allows fans to extricate themselves from complex questions around exploitation and ethics. It is used as a toy, not a tool; as Lyall and Robards

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(2017: 114) outline, "A 'tool' is something used by people; helpful and perhaps necessary. A 'toy' is something used for fun, and implies a light-heartedness whereby devices and practices are not taken too seriously." Fans may simultaneously worry about the potential of AI to 'replace' human artists in K-pop production, and engage in AI covers themselves, because they do not view the latter as significant or directly harmful to the artist.

This application of AI to produce content outside of established copyright and usage regimes has been sporadically acknowledged by K-pop management companies, as well as KOMCA, Korea's main copyright association. SM Entertainment founder Lee Soo-Man clearly outlined unauthorised AI content as a threat, stating, ""We are prone to issues such as copyright infringement, content piracy and plagiarism by AI and chatbots — whether it be intentional or not" (Yoon, 2024). Likewise, a spokesperson for the Korean Music Publishers Association voiced concern over AI-generated compositions breaching copyright, stating, "The provision that allows the use of data without restrictions even for commercial purposes may result in excessive harm to the rights and interests of copyright holders" (Lim, 2023b). Korea's cultural contents industry is presently grappling with the implications of generative AI for copyright; The Ministry of Culture, Sports and Tourism's forum on "Generative AI & Copyright: Striking a New Balance" sought to develop solutions to copyright issues raised by AI technologies (Ministry of Culture, Sports and Tourism, 2024). In all, fans have demonstrated a different sociotechnical AI imaginary to that of K-pop management companies, and to copyright associations; one that challenges structures of ownership and commercialisation, while simultaneously (in some cases) voicing concern for artists' moral rights and treatment.

DISCUSSION

Most news articles on AI depict it as a defined technology that may be used for good or ill, and one that is advancing inexorably on nearly all aspects of work, including the cultural and creative sector. By integrating the concept of the socio-technical imaginary (Jasanoff, 2015), this article has used public discourse to illustrate AI as a contested territory for future-making ideologies. In exploring differing narratives on AI in K-pop, according to management, fans, and the ICT sector, this study recognises the rhetorical construction of AI imaginaries (Bareis and Katzenbach, 2022) within the creative sector. It furthermore illustrates that AI's definition and applications vary depending on actors' positions in networks of power and capital. Furthermore, this study emphasises that AI has no agreed-upon scientific definition, and that the term 'AI' is a discursive term loaded with specific connotations. AI, as a word and concept, "offers the entire business sector a shared narrative, a demonstrable vision of the future

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and a promise to 'jump start' the global economy through advanced technologies" (Bourne, 2019: 116). The case study of AI in K-pop may suggest future developments for music and AI globally; however, it is also important to recognise that these specific circumstances of cultural production, technological infrastructure, and government support are unique to South Korea. Because AI is a global concern, however, K-pop provides a salutary example. To conclude, the prevailing discursive themes among AI imaginaries are presented below, as potential futures for K-pop and global creative sectors.

For music companies, one potential development is further horizontal integration, involving acquisition of technology startups and related businesses. This reflects the core business of music management shifting from the production and distribution of recorded music, creation of merchandise, and promotional activities, to one that is based around the commercialisation of brand IP in multiple digital formats. Brand IP, in this case, may refer to signed human artists, to virtual artists, or to a combination of the two. HYBE is the most illustrative example in this scenario, having pivoted firstly from music to entertainment, and now comprising three core divisions: Labels (core music management), Solutions (IP management across media), and Platforms (currently, the WeVerse fan platform) (HYBE, 2024). This co-ordinated approach, creating standalone Solutions and Platforms divisions, embeds technology as a part of core operations and is notably different from that of Western music companies. In comparison, the corporate structure of Universal Music group remains aligned with its core business of music publishing, consisting of regional and country-specific divisions (Universal Music Group, 2024).

Current evidence also indicates a changing role for creative workers, as AI becomes increasingly embedded in production. One scenario is the total replacement of human artists by virtual artists who are created and controlled by a team of creative and technical workers. Although this is an extreme case, it has occurred, as shown by Naevis. Ultimately it is unlikely that virtual artists will completely replace human performers, but some kinds of labour undertaken by human artists may be replaced, or augmented, by AI, such as voice-over work. For songwriters, AI may replace parts of the compositional process; songwriting may become a process of selecting and editing AI-generated content, combined with traditional methods. Concomitant with this is a changing technical literacy required for songwriting.

A pressing area of future concern is that of copyright. At present, music copyright exists in the music recording, and in the underlying song (i.e. melody) and lyrics. AI's ingestion of (often) copyrighted material to produce new content that may resemble, but does not technically reproduce, copyrighted material is one as-yet unsolved problem. Furthermore, musical copyright currently protects recorded works and songwriters, but does not currently provide strong protection outside this framework; for instance, regarding vocalists' ownership of their vocal characteristics. AI has been a "dominating" topic at CISAC's (The International Confederation of Societies of Authors and Composers) annual summit in

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Seoul; although the summit addressed AI "a top priority that must be accompanied with an effective remuneration regime for creators" (CISAC, 2024), the mechanism for ensuring this is as yet undetermined. Solutions have been proposed (such as enforcing 'opt in consent' for materials used in training data sets), but none have yet been meaningfully adopted. The crux of the problem is that no AI detection technology yet exists, and its use will be (and has been) invisible and unknown, in many cases. For instance, the different ways that AI can be wholly or partially applied in music production compound the problem; for lyric generation, melody generation, audio generation, voice synthesis or cloning, and image/video. Nonetheless, the music industries are likely to diversify from the core business of protecting copyright in musical works, to one of creating, protecting, and policing artist IP more broadly.

CONCLUSION

Artificial intelligence is both a technology and a discursive tool that stakeholders employ for distinct purposes. By integrating the decades-long datafication and platformisation of music with generative capabilities, AI provides a way for K-pop management companies to reinvent their core business from artist development and marketing, to technologised cultural contents development for a global market. For K-pop fans, AI has different meanings; on the one hand there are concerns that it may be deployed by management companies in a way that is harmful to artists or creative workers; on the other hand, it has been adopted by some as a creative toy. For the South Korean IT sector more broadly, AI opens a pathway to work with and within K-pop, narrativising a demand for its products as competitiveness- and efficiency-enhancing tools. In all, this article has argued that different stakeholders promulgate distinct imaginaries of AI, and that these differences reveal how AI exists within networks of power and capital. These often-competing imaginaries demonstrate how each party sees AI as a future-making technology. This discussion therefore calls for further critical discussion of AI as a socially constructed concept, and for further attention to its use in establishing the future of music.

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