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ARTIFICIAL INTELLIGENCE AND CULTURE:
Perspectives for cultural diversity in the digital age

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CONTENTS

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1   The affiliations correspond to their institutions at the time of planning and development of the study.
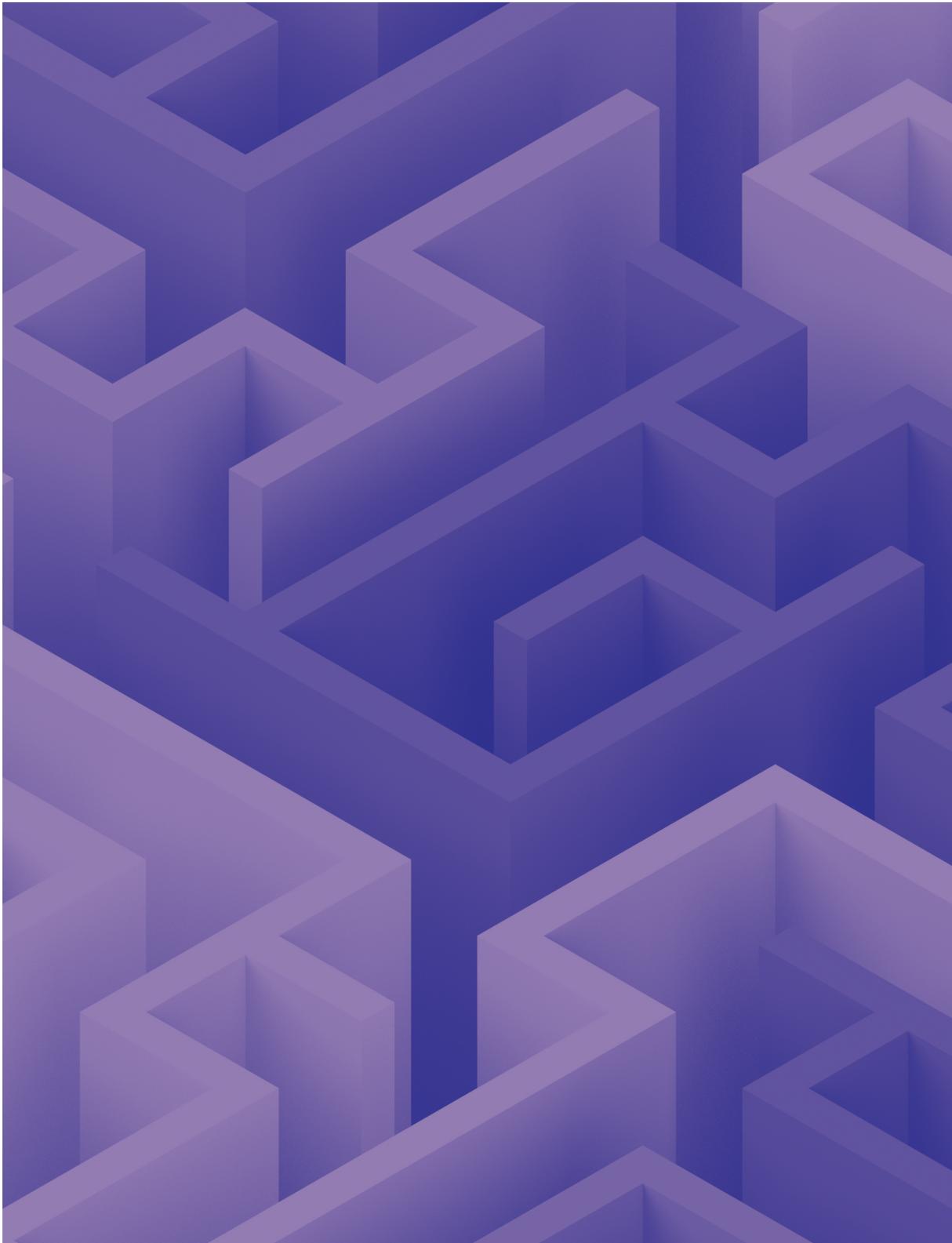
Artificial Intelligence (AI) today is not only completely intertwined with the areas of science and technology, but also with various topics and sectors of society. Although the debate surrounding the subject is not something new, with the expansion of computing power and the current enormous availability of data associated with an inexhaustible storage capacity, the advances have been exponential and unprecedented. Large databases – the so-called Big Data – are used to train the algorithms that make up AI systems, which are then capable of inferring patterns and defining the necessary actions for achieving a specific goal. From health to public safety, from education to culture, AI applications represent an enormous potential for helping humankind with the diverse and complex challenges it faces.

On the other hand, this potential also brings with it countless concerns and demands a closer look at issues related to data privacy, transparency, explainability, and accountability. In addition, the datasets used to train algorithms may also contain biases that increase discrimination and inequalities.

Originally designed by humans, machina learning (ML) techniques and its subset, deep learning (DL), enable machines to "evolve" by themselves and improve automatically through experience. Examining the impacts of these applications requires a holistic and comprehensive view that considers ethical and human rights principles.

The agenda regarding the ethics of AI is currently one of the main topics of discussion internationally. According to a survey by the Inter-American Development Bank (IDB),[1] in 2019 more than 90 documents on AI principles had been published by governments, enterprises, international organizations, and academic institutions; since then, the debate has only intensified and gained in importance. As an example, take the publication of the Recommendation on the Ethics of Artificial Intelligence from the United Nations Educational, Scientific and Cultural Organization

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1   More information available at: https://publications.iadb.org/publications/english/document/Artificial-Intelligence-for-Social-Good-in-Latin-America-and-the-Caribbean-The-Regional-Landscape-and-12-Country-Snapshots.pdf

(UNESCO).[2] By establishing principles and guidelines for a human-centered approach to AI, this document became the first multilaterally negotiated global instrument to guide countries with regard to the development of their regulatory frameworks, in the eventual need for regulation, and in the construction of appropriate public policies.

Although this debate is growing and involves multiple actors, there is a lack of a more intense participation by culture in the referential frameworks on AI. There are still few sector-specific documents discussing the impacts of AI on culture,[3] or that incorporate it into this ethical dimension, which is the case of UNESCO's recommendation.

At the same time, AI has become increasingly relevant and is more and more present in the cultural sector, especially because of the proliferation of digital platforms that are used to disseminate cultural content. AI is found not only in algorithm-based content recommendation systems, but also in the creation of artistic works by ML mechanisms, in the production, editing, and adaptation of content, in cultural mediation during guided tours in cultural institutions, in providing services to the public by way of virtual assistants, in the organization and availability of digital collections, in cultural management and data analysis for mapping audiences and developing promotional strategies, among many other applications. Notwithstanding its incidence in culture, there are few political and strategic references on the theme, as well as few academic publications and little research.

In the national context, the Brazilian AI Strategy (EBIA),[4] published in 2021, aims to stimulate research, innovation and the development of AI solutions, and to draw attention to ethical aspects surrounding the use of these technologies. In accordance with the principles for the governance and use of the Internet,[5] the Brazilian Internet Steering Committee (CGI.br) has also been active in promoting initiatives in this

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2   More information available at: https://unesdoc.unesco.org/ark:/48223/pf0000381137
3   More information available at: https://www.europarl.europa.eu/doceo/document/TA-9-2021-0238_EN.html
4   More information available at: https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/transformacaodigital/arquivosinteligenciaartificial/ebia-summary_brazilian_4-979_2021.pdf
5   More information available at: https://principios.cgi.br/

field, such as fostering the creation of Applied Artificial Intelligence Research Centers,[6] with resources from the .br domain register, in partnership with the Ministry of Science, Technology, Innovation and Communications (*Ministério da Ciência, Tecnologia, Inovações e Comunicações* [MCTIC]), and the São Paulo Research Foundation (*Fundação de Amparo à Pesquisa do Estado de São Paulo* [FAPESP]).

Public debates and training on this topic have also occupied several work fronts of the Brazilian Network Information Center (NIC.br). Milestones in this sense were UNESCO's Regional Forum on Artificial Intelligence in Latin America and the Caribbean,[7] held in 2019, and the Regional Workshop on AI and Children promoted by the United Nations Children's Fund (UNICEF), in 2020.[8] The NIC.br Annual Workshop on Survey Methodology has also addressed AI in relation to its interface with data production and statistics. More recently, in 2021, there was support for a new Massive Open Online Course (MOOC) on Artificial Intelligence for the Judiciary[9] developed by UNESCO and The Future Society.

In addition to the leading role it plays in realizing these initiatives, the Regional Center for Studies on the Development of the Information Society (Cetic.br|NIC.br) has encouraged reflections on the theme in publications such as the policy paper *Artificial Intelligence and culture: Opportunities and challenges for the Global South* (*Inteligência Artificial e cultura: oportunidades e desafios para o Sul Global*)*,* which was published by UNESCO in 2021,[10] and the Internet Sectoral Overview (ISO), which addressed AI trends in justice, health, education and childhood, and work.[11] Assessing and measuring the advance of these technologies have also been incorporated into surveys, such as the ICT Enterprises,

6   More information available at: https://www.cgi.br/editais/ver/14/
7   More information available at: https://unesco-regional-forum-ai.cetic.br/
8   More information available at: https://cetic.br/noticia/nic-br-sedia-evento-do-unicef-sobre-inteligencia-artificial-e-uso-das-tic-por-criancas-e-adolescentes/
9   More information available at: https://www.judges.org/ai_and_law/english/
10   More information available at: https://cetic.br/pt/publicacao/inteligencia-artificial-e-cultura-oportunidades-e-desafios-para-o-sul-global/
11   More information available at: https://cetic.br/en/publicacoes/indice/panoramas/

ICT Electronic Government, ICT in Education, and ICT in Health surveys.

This Sectoral Study on Artificial Intelligence and Culture adds to the efforts being made to build this agenda, while dealing more specifically with the applications of AI in the cultural sector and its consequences for the protection and the promotion of the diversity of cultural expressions. Although there are other documents and initiatives in the fields of AI and culture, the interface between the two is not yet much debated. The study, therefore, makes a relevant contribution, by putting this important subject on the agenda, and contributing to the development of possible regulatory strategies and public policies.

Enjoy your reading!

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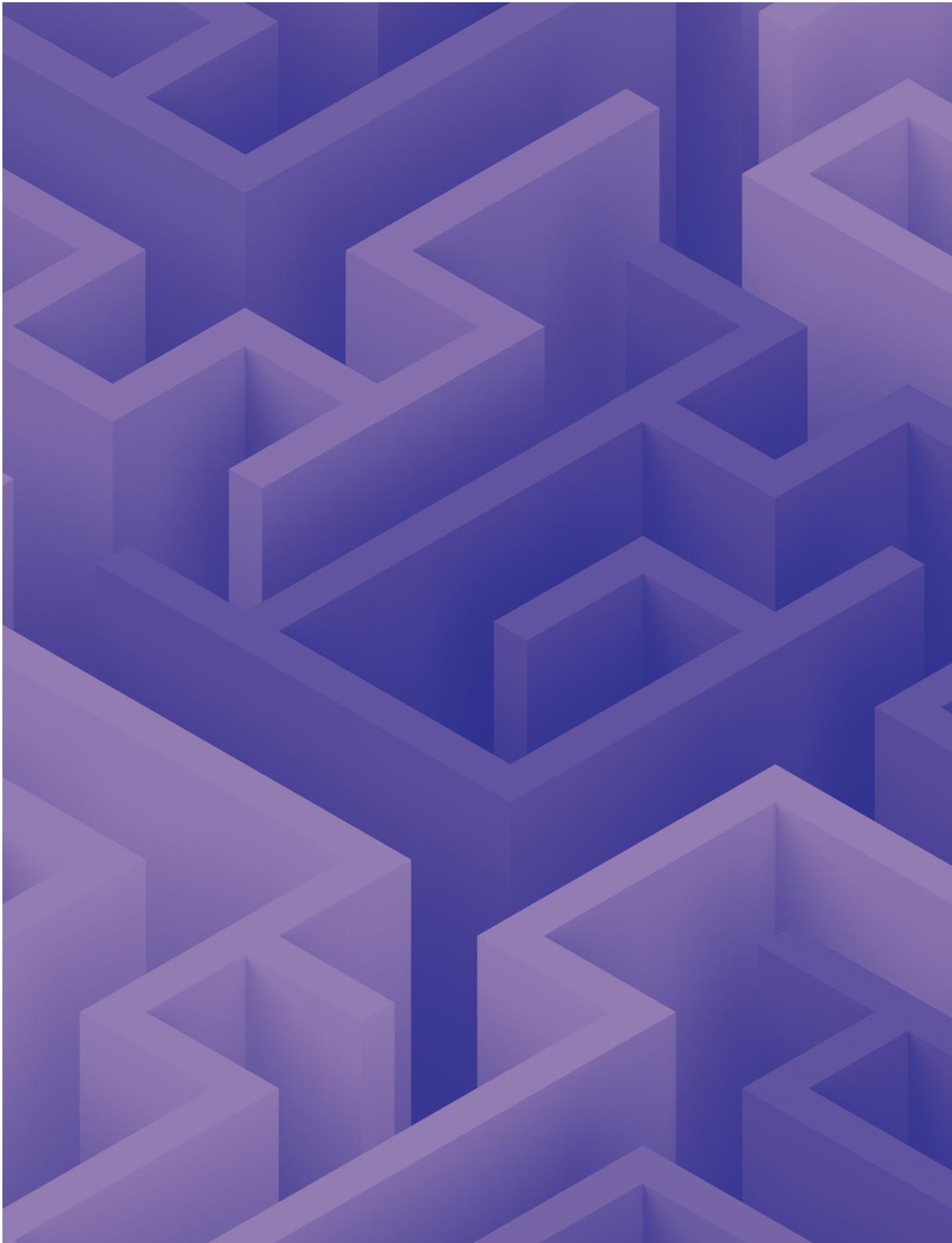
PROLOGUE

Artificial Intelligence and culture: A transformative encounter

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Facilitating the flow of ideas contributes to the promotion of human rights and intellectual property, which is one of the core objectives of the UNESCO. Indeed, recognizing the importance of intellectual property rights is crucial to enrich cultural creativity: to cultivate existing ideas and to create new ones, people need access to the data, information and knowledge, which can be obtained through education, science and culture. They also require the freedom to express themselves, as well as the tolerance and respect to welcome the ideas of others.

History is filled with examples of innovations dedicated to facilitating the flow of ideas, such as writing, the movable type printing press, the telegraph, and television. It was the integration of telephony and computers into a global network, however, that gave origin to innovations in information and communication technologies (ICT) able to facilitate multi-directional, multi-media, real-time, interactive, and immersive exchanges. With them, humanity entered the digital age, in which an idea can spread around the planet in a matter of seconds. Although the rapid development of ICT has presented various challenges, it has also afforded unprecedented conditions for enhanced interaction between cultures. Indeed, ICT facilitate financing and economic opportunities for sustainable development, enable global connectedness and accelerate progress towards the achievement of the 2030 Agenda for Sustainable Development (United Nations [UN], n.d.).

ICT have produced new activities, goods, and services that have revolutionized the most diverse fields of knowledge. In the field of culture, digital transformation has provided an unprecedented creative explosion, which has profoundly changed the way in which we conceive, produce, disseminate, and consume artistic and creative expressions.

Artificial Intelligence (AI) stands out from other ICT by being at the epicenter of the flow of ideas. Defined by the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) as "machines capable of imitating functionalities of human intelligence" (UNESCO, 2019a, p. 1), AI not only captures, processes, and directs human ideas, but may even contribute to new ones. It also stands

out because of its umbilical link with culture, which feeds its algorithms with texts, sounds and images that provide the basis for it to function.

The concept of AI emerged from culture, from which it moved to technology. From antiquity to the modern age, AI appears as the "object" of numerous artistic manifestations, in which artificial beings capable of acting autonomously – cyborgs, automata, and androids – appear as exotic artifacts whose main function lies in their performative nature.

With the advent of the digital age, AI has also become a "medium" of expression. Pioneering artists such as Nicolas Schöffer, Edward Ihnatowicz, Roy Ascott, and Gordon Pask drew on cybernetic principles to create works capable of altering their own state from the computational processing of data streams. In the 1980s, dissatisfaction with the results achieved by "classical AI," which was based on the theories of Marvin Minsky and Seymour Papert on the use of heuristic programming in solving complex problems (Emmert-Streib et al., 2020), led the roboticist Rodney Brooks to propose a "new AI" (Copeland, n.d.). Inspired by the behavior of living beings when perceiving and interacting with the environment, this new proposal catalyzed the development of AI based on Big Data and adaptive algorithms, which learns from past experiences and makes decisions under conditions of uncertainty.

Since then, artists have used AI to create thought-provoking works, many of which illuminate the socio-cultural implications of this technology. *ImageNet Roulette,* a tool developed by Trevor Paglen and Kate Crawford, exposes the subjectivity of data classification processes, as well as the latent biases in AI-based decisions. Joy Buolamwini's *Gender Shades* project highlights the racism and sexism underlying facial recognition systems, whose algorithms, trained on databases composed of mainly white male faces, are inaccurate when it comes to identifying black women. Lydia Kostopoulos' *The Magic in Between* questions the opacity of AI by demonstrating that examining processed data and the decisions that flow from their processing is not enough to understand the logic of algorithms. Philipp Schmitt ironizes the "techno-solutionism" proposed by AI by employing them to design objects that resemble chairs but offer no support

to the human body. Artist Lauren McCarthy examines social relations under conditions of surveillance and automation, with a performance in which she becomes a "human Alexa," using smart devices to remotely control her users' homes while observing their behaviors and preferences.

Recent technological advances have also made AI a "subject" of cultural expression. AARON, an algorithm created by artist Harold Cohen, creates original drawings. The screenwriter of the short film *Sunspring* is an AI self-named Benjamin, who poetically defines himself as a "scientist of the Holy Spirit." A Generative Adversarial Network (GAN) signs the *Portrait of Edmond Belamy*, while the *code2pixels* algorithm generates digital images. Botto and Sophia are painting robots. The *Amper Music* application composes, mixes, and performs music from parameters provided by its users. The first musical composed by AI, *Beyond the Fence*, was brought to the stage by Andrew Lloyd Webber.

A new milestone was reached when intelligent technology started to create culture. However, the real change that stems from the encounter between AI and culture is seen in the transformation of the social relations that create and support artistic and creative processes, starting with the way cultural expressions are captured and encoded as inputs for AI, and ending with AI being used to produce and disseminate new expressions. Throughout this circular process, AI alters the relationship between creators and their communities by innovating ways of engaging, producing, and sharing ideas; dissolving boundaries along the entire value chain of the arts and creative industries; and bringing about the emergence of dynamic, accessible, and interactive cultural ecosystems that are, however, isolated in echo chambers (Sunstein, 2001). The results of this encounter are also reflected in the acculturation processes inherent in contacts on a global scale that transnational platforms both rely on to extract Big Data and intermediate at instantaneous speed, in the ethical questions that their use raises, and in the weakening of the working conditions of creative agents. Both the UNESCO Global Report *Re|Shaping Policies for Creativity* (2022b) and the UNESCO Recommendation on the Ethics of Artificial Intelligence (2022a) recognize the potential – and challenges – of AI in culture.

It is recognized that culture contributes substantially to socio-economic development and needs to be incorporated as a strategic element in national and international development policies, as well as in international development cooperation. The arts and creative industries sector, with annual revenues of USD 2.25 trillion (UNESCO, 2017), represent 6.1% of the world economy and generate nearly 50 million jobs (UNESCO, 2022b), besides playing a key role as a catalyst for innovation, competitiveness, entrepreneurship, resilience, and social inclusion. Its main value, however, is intrinsic, as a dimension of human dignity and a means of expressing values and identities. The Convention on the Protection and Promotion of the Diversity of Cultural Expressions, adopted by UNESCO member states in 2005, affirms that "cultural activities, goods and services have both an economic and a cultural nature, because they convey identities, values and meanings" (UNESCO, 2005, p. 2) and provides a basis for the formulation of cultural policies and their adaptation to the technological changes that have transformed artistic and creative ecosystems. The report *Re|shaping Cultural Policies* (UNESCO, 2015) reflects on how to monitor the relationship between large digital platforms, Big Data, AI, and diversity of expressions at all stages of the cultural creation process. In this sense, a humanistic perspective on AI should favor cultural diversity and empower human creativity.

The *UNESCO Framework for Cultural Statistics* (2009) defines the value chain of the cultural sector based on its processes of creation, production, dissemination, exhibition/reception, and consumption/participation. Thus, AI has been introduced in all steps of the cultural value chain and has changed and amalgamated the roles assumed by cultural agents.

AI transforms cultural creation and production processes by facilitating innovation in the supply of goods and services and reducing the time spent by creators on mundane tasks, as well as their dependence on expert collaborators. In the visual arts, AI is used to automate the search for images, their recognition (including facial), analysis, pattern identification, classification, retouching, and editing. In music, meanwhile, low-cost applications allow creators to take over the functions previously performed by studios, sound engineers,

and distributors, while in video games, AI is used to create a dynamic and purposeful behavior in artificial players. AI has given rise to a huge range of new cultural products and services: digital art, virtual performances, interactive games, "influenciation," and even purely digital versions of real products for avatar use on gaming platforms.

Innovations in AI-based cultural generation have also raised questions with regard to authorship: to whom should it be attributed, especially when algorithms use databases, the contents of which are expressions of other creators? What about videos in which deepfakes of deceased musicians sing songs generated from their compositions when alive and owned by others, as with Kurt Cobain, Jimi Hendrix, and Amy Winehouse?

Nevertheless, in some countries, digital creation has become possible thanks to innovations in the legal field. The US, China, and Australia have revised their laws to allow for the non-profit use of digital databases by small start-ups, universities, and research centers for training classification, generation, and recommendation algorithms. Many databases are owned by those who created them, and include content by artists and creators, such as texts, music, paintings, photographs, films, and even their voices, faces, and bodies. There remains, however, the issue of royalties for licensing data in the production for commercial purposes, and this has been the subject of intense discussion.

Countries are also moving towards attributing copyright to digital and even artificial creators. The French national association of musicians has granted composer status to *Artificial Intelligence Virtual Artist* (AIVA), a music composition tool, thereby removing the barrier for its users to hold copyrights on the works generated with its help. Recognition algorithms have been adopted to manage the rights of digital content to prevent unlicensed use, but this poses risks to freedom of expression in cases of parody or creative adaptation.

Intellectual property rights are also uncertain. For most economic sectors, the main advantages of digital information are its infinite replicability and its insignificant cost of sharing. For cultural creators, these characteristics represented obstacles to the monetization of their creations, until the

emergence of the Non-Fungible Token (NFT), a smart certificate, the publication of which in a blockchain generates verifiable digital scarcity by identifying a file as being the original, attributing its ownership to the creator and facilitating its commercialization. Auction houses and museums offer NFT to their audiences, and festivals that use NFT have recently been introduced in Europe and Asia. In Brazil, football clubs, samba schools, and independent artists have incorporated NFT into their product lines. Research indicates, however, that one in three NFT is sold for less than USD 100 (Parker, 2021; Carter, 2022), an amount which, after deducting the fees charged by their trading platforms, provides a negative remuneration, on average. The publication of an NFT – with its high environmental cost – is not always done with the creator's permission, and there are even automated hacking bots. Many NFT platforms are also start-ups, and if they disappear, the NFT published on them will also disappear.

Even if there is an improvement in the remuneration of creators, the replacement of human tasks by AI may reduce employment opportunities for skilled technicians. It can also have a negative effect on the quality of cultural content by depleting skills that could be the starting point for creative expression, or by reducing human intervention in the selection of inputs and their processing, or in the filtering of results. By automating complex tasks, AI renders creative decisions opaque, and can hide discriminatory biases that harm social groups by affecting their inclusion and sense of belonging. Thus, ethical considerations become of paramount importance for an accurate, inclusive, and fair portrayal of societies by the artistic and creative sector.

Digital technologies have also revolutionized the distribution and consumption of cultural goods and services by reducing costs, diversifying dissemination and sales channels, and providing personalized content, especially through the use of AI. Besides, they increase the resilience of the cultural sector to the closure of traditional channels in crisis situations, by providing ways of maintaining visibility, promotion, and business, thus mitigating the financial losses incurred by creators and traditional intermediaries. During the COVID-19 pandemic, 300 Chinese museums began offering virtual tours;

the Egyptian Ministry of Culture created a YouTube channel for the dissemination of cultural performances; and the Japanese *#MusicAtHome* initiative provided digital stages for young musicians, connecting them to their audiences. Around the world, e-commerce and online cultural learning have exploded, with virtual galleries opening and streaming services.

Personalized experiences have been eliminating the boundary between the distribution and the consumption of cultural products. This is the context in which AI transforms narratives (a central element in cinema, games, and literature): they change from linear to experiential, immersive, and multimedia, an environment in which participants interact with media content in different formats and on different platforms, choosing the sequence, the point of view and the pace in which the narratives develop.

With the use of AI, the digital games' market has become the largest in the entertainment sector. The recent growth in its global revenue has largely occurred by way of micro-sales of complementary products to the 2.8 billion players worldwide (Clement, 2021). The average time gamers spend online has also grown, increasing the risk of addiction, which is now recognized as a disease by the World Health Organization (WHO).

Narratives have also been adopted by traditional intermediaries – museums, galleries, libraries, heritage sites, public media (such as newspapers, government TVs and radios), among others – to promote and disseminate their cultural collections to ever-larger audiences. These intermediaries also use AI: to manage these collections, by identifying patterns and connections between creative objects of different styles and from different eras and facilitating their curation; to maintain and restore physical and digital collections; and to personalize the experience of visitors and users, giving rise to the concept of a "participatory cultural repository." Digitization and the opening up of collections via websites and databases have also expanded opportunities for analysis, research, and education.

The entry of non-traditional intermediaries – which, in general, consist of search, recommendation, and social media systems – has changed the way artistic and creative information, goods, and services reach the public, and altered the power relations between creative agents. The use of AI in distribution

and consumption is an important lever of the market power of intermediary platforms, as they hold and "mine" the Big Data captured from interactions between agents and generate concerns about privacy and data protection. Their algorithms decide which users will receive offers from which creators, raising questions of ethics, freedom of expression, access to information, and of cultural diversity because of the opaque and partial way they promote the discoverability of certain cultural content over others.

Social media offers creators not only direct access to a potentially global audience, but also a means of continuous and optimized contact before, during, and after the visit or purchase. These media facilitate the offering of complementary products and experiences, and research and other marketing schemes that contribute to the value of cultural goods. Platforms allow not only for experiences to be personalized, but also for audiences to be turned into co-creators by making tools available, such as TikTok's Duets and Dots, or Twitter's threads, that encourage social creativity, in which one user comments on, or continues another's comment. This engagement is very valuable – as demonstrated by the South Korean music group, BTS, being valued at USD 1-2 billion (Gwang-deok, 2019) because of the loyalty of their followers on social media. On the other hand, there are also financial and emotional costs involved, because artists and creators are required to devote time and resources to self-promotion on platforms, thereby exposing them to torrents of micro-abuse, harassment, and other forms of online violence.

The impacts of recommender systems are complex, as exemplified by the rise of Amazon and the introduction of e-readers, which has encouraged reading but also led to the closure of independent bookstores, disrupted traditional used book sales' processes and library services, and opened up huge scope for new authors by making print-on-demand services available. Concentrated markets such as event ticketing, led by Ticketmaster; music streaming, where the latest data allocate 46% of worldwide sales to Spotify and Apple (Mulligan, 2022); or movie and series subscription streaming, which is dominated by Netflix, are characterized by powerful intermediaries that not only set the prices and service fees

applied to creative products, but also reduce remuneration for creators and traditional distribution channels. They sometimes also demand exclusivity over content; limit the supply of complementary products and access to the market for small creators; prevent sponsorship and absorb advertising revenues; and keep customers in "walled gardens" that have an impact on their right to discover and enjoy alternative cultural goods and services, thus threatening the preservation and promotion of cultural diversity.

Because the market power of intermediary platforms is enormous, creators have increasingly prioritized them and devoted their talents to these media over traditional channels. Platforms seek to keep their audiences engaged for as long as possible, which has led to the growth of expressive forms of "emotion curation" and the emergence of performances that are formatted especially for social media, such as short videos. By deepening the use of AI, intermediary platforms went beyond their role in facilitating the sharing of stories among users, into sharing their users' histories with agents interested in influencing their attitudes and behaviors. This evolution, from advertising to predictive analytics, has a profound impact on people's autonomy and agency; raises important questions about regulation, transparency, and accountability; and reinforces the need for investments to strengthen users' media and information literacy (MIL).

On the other hand, due to the growing expectation of consumption anytime, anywhere, on any device, AI has been used to broaden access to cultural content for persons with disabilities, the elderly, and international audiences, either by generating subtitles and sign language, or automating text and speech translation. Dozens of countries, mainly developed, have adopted laws to require accessibility to digital audio-visual content, to stimulate applications for this purpose and to expand the digital culture market.

With so many considerations for the development of AI and its use in culture and other sectors, UNESCO recommends the application of the ROAM-X principles (human rights, openness of systems and markets, accessibility, multi-stakeholder governance, and cross-cutting issues such as gender equality and user safety) (UNESCO, 2019b) as a framework

for analyzing AI's impacts and formulating policies for its development. The Recommendation on the Ethics of Artificial Intelligence (UNESCO, 2022a), adopted by UNESCO Member States in October 2021, can contribute to identifying AI's social benefits while mitigating its risks, by addressing issues of transparency, accountability, and privacy, and offering action-oriented policies on education, culture, work, economy, communication, and information.

While the potential of AI has encouraged innovation in all countries, there are still many differences in terms of infrastructure availability and institutional and human capacities for the development and governance of these technologies in order to optimize their benefits and reduce any potential harm. UNESCO's survey conducted with 32 countries on the African continent (UNESCO, 2021), for example, identified several needs concerning policies and regulatory mechanisms for AI governance, especially with regard to data protection, fostering innovation, inclusive capacities for research and development (R&D), and ethical issues. Rights and freedoms – of expression, access to information, privacy, and participation in public spaces – are essential for both AI and cultural policies.

The encounter between AI technologies and culture is transformative for both sectors. Many countries – including Benin, Brazil, Canada, China, France, Ireland, Japan, Kenya, Malaysia, Mexico, New Zealand, Saudi Arabia, South Korea, Tanzania, Thailand, Uganda, the United Kingdom, United States, Vietnam, and Zimbabwe, among others – are considering or already promoting policies and regulatory reforms that impact the diversity of cultural expressions online. These address elements such as: cybercrime, algorithm accountability, platform transparency, the promotion of local and national content, or resources for digital creation, including by minority groups. It is essential that such reforms are promoted in a multi-sectoral manner in order to foster the active participation of ethnic communities, women, the young, and cultural actors.

The development of strategies, policies, and regulations for supporting the arts and creative industries sector in the digital environment benefits from robust evidence that underpins these measures. The *Culture in Crisis* report

(UNESCO, 2020), however, warns that cultural information and statistics, the reference source for cultural policies for 50 years, are threatened by the lack of access to data on cultural participation in the digital world. Producing knowledge about the role played by digital technologies in the culture field thus becomes fundamental and a priority. When considering how strategic these sectors are for economic and social development, such a reflection becomes even more relevant in the Latin American context. This publication results from the efforts undertaken by the Regional Center for Studies on the Development of the Information Society (Cetic.br), department of the Brazilian Network Information Center (NIC.br), for filling this gap, with an emphasis on the transformations brought about by the use of AI and its impacts on the protection and promotion of the diversity of cultural expressions. The decision to carry out in-depth qualitative research in this area is, therefore, extremely urgent and important, both for Brazil, which will immediately benefit from its results, but also for other countries that may be inspired by it.

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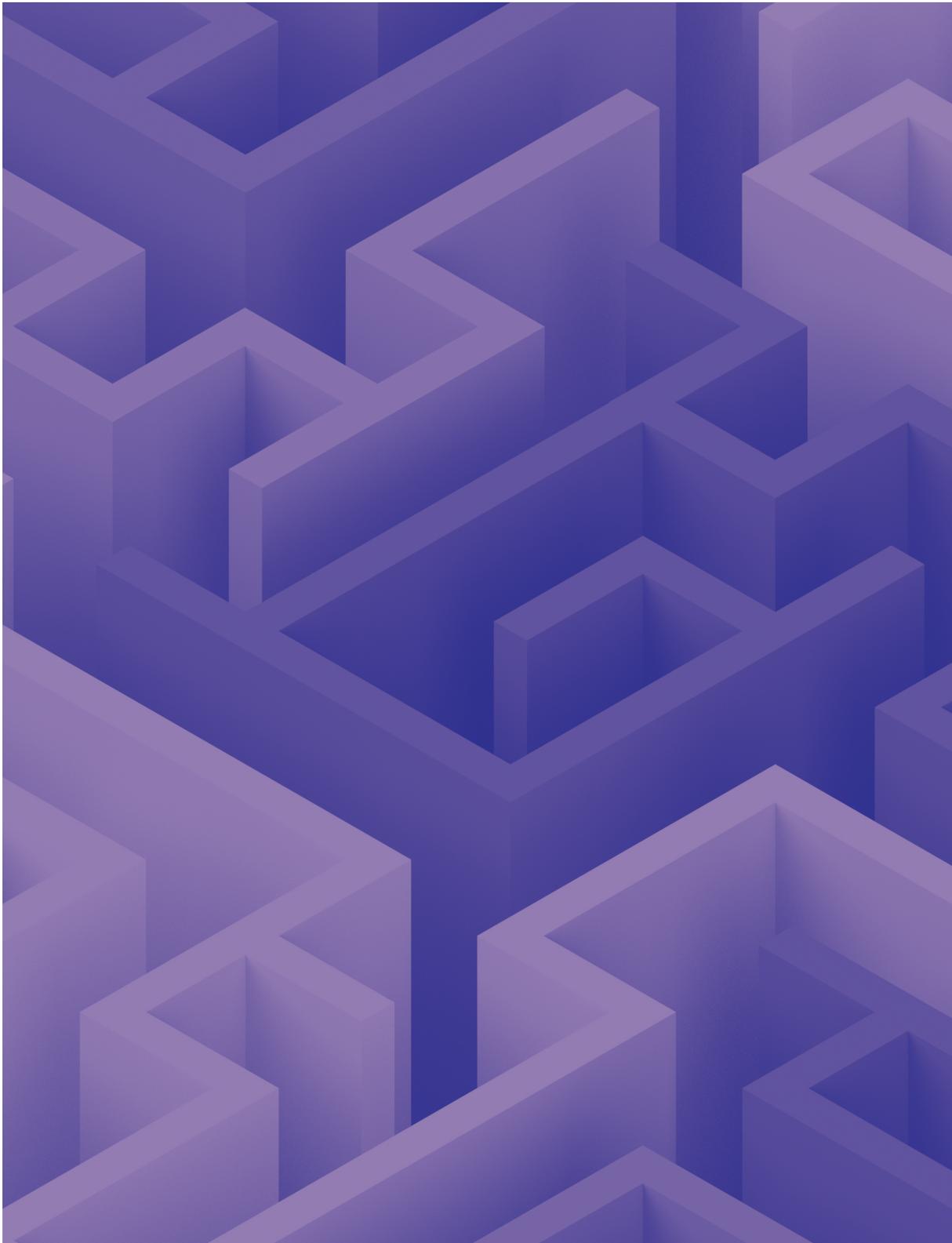
Part 1
ARTICLES

Culture, platforms, and machines: The impact of Artificial Intelligence on the diversity of cultural expressions[1]

Octavio Kulesz[2]

INTRODUCTION

*Any sufficiently advanced technology
is indistinguishable from magic.*

Arthur Clarke

Artificial Intelligence (AI) is dominating the headlines at the present time. This technology promises to revolutionize areas as wide-ranging as transportation, medicine, education, finance, defence and manufacturing. When it comes to evaluating its long-term effects, the general consensus is that AI and automation will create more wealth and simplify a vast array of industrial processes, but at the same time could lead to an increase in inequality, discrimination and unemployment (UNESCO & World Commission on the Ethics of Scientific Knowledge and Technology [COMEST], 2017).

However, in international forums, the impact AI might have on culture is rarely discussed. This omission is inexplicable, particularly if we consider the fact that AI is already being used to produce songs, stories, and paintings – often of surprising quality which raises important questions about the future of art, the remuneration of artists, and the integrity of the creative chain, among other issues.

The disconnect that persists between AI and culture in such debates is all the more striking given that cultural expressions play a key role in the way in which current algorithms and automated applications work. Although, as a scientific discipline, AI has been around for decades – having been formally introduced by Alan Turing in the 1950s – the current hype focuses on a specific branch of AI known as machine learning (ML). This tool is used in countless everyday applications, such as search engines, online translation services, spam blockers, and virtual assistants. In the ML model, the machine is fed with enormous amounts of data – the input – which it processes using algorithms, to enable it to recognize patterns, make predictions

or execute an action – the output.[3] Now, a huge portion of the data that serves to train these machines is the fruit of human creativity, namely: millions of songs, videos, texts, and photographs. The machines' diet, then, is largely made up of cultural expressions.

Moreover, it should be noted that the true pioneer in AI and automation has been culture, rather than science. Already in the *Iliad* there were mentions of automatic tripods, fashioned by the god Hephaestus to carry out his tasks. The word "robot" in the sense of a humanoid device appeared for the first time in the satirical drama *R.U.R.* (1920), by Czech playwright Karel Čapek. Then came *I, Robot*; *2001: A Space Odyssey*; *Terminator*; and *The Matrix* along with hundreds of other works that envisioned different aspects of the relationship between human beings and their creations. A conflictive relationship, in which technologies are not content with playing the subordinate role assigned to them – indeed, it is worth pointing out that in Czech, "robot" means "slave," and nowadays we call our computers "servers." In fact, since we are talking about meanings, it should be noted that the very etymology of many words associated with AI – and technology in general – bear the unmistakable imprint of culture: "artificial" literally means "made with art," while "technology" comes from the Greek "*téchne,*" which refers to the skill of the artisan.

Far from settling for a marginal role in the discussions on AI, the creative sector must, then, claim its place with greater vigour. If it fails to do so, the negative consequences would affect not just the sector itself, but the entire social fabric. It is precisely when culture is excluded from the equation that control is lost: it is at that point that the "servers" to whom we delegate our data become too powerful. We are not referring here to the machines themselves, which in reality are devoid of will, but to those who control them. Ultimately, the challenges posed by AI – at least in its current configuration – have nothing to do with machines magically coming to life, but rather with the possibility of the big tech players wielding too much influence.

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3   For a brief introduction to the evolution of AI since the 1950s, see National Science and Technology Council (2016).

In this article, we will examine the impact of AI on culture, focusing on the situation as it relates to artists, the creative industries, and the public, in both the Global North and South, at a time when the large Internet platforms are taking over bigger chunks of the value chain. What changes will ensue for artists, creative entrepreneurs, and the general public? What will happen in terms of the diversity of cultural expressions, gender equality, and fundamental rights? What role do governments, the private sector, and civil society organizations need to play in order to consolidate a rich, diverse and plural cultural ecosystem?

The UNESCO Convention on the Protection and Promotion of the Diversity of Cultural Expressions (UNESCO, 2005) and all the work carried out by its organs may provide an essential framework for the consideration of these issues. In particular, the Operational Guidelines on the Implementation of the Convention in the Digital Environment[4] and the 2015 and 2018 editions of the UNESCO Global Report *Re|Shaping Cultural Policies* (UNESCO, 2015, 2017a) offer an invaluable conceptual basis for structuring the analysis.

This presentation will be divided into three parts. First, we will begin by examining the impact of AI on the cultural value chain, in order to identify opportunities and challenges, particularly the possibility that the large platforms may exploit AI to create a "perfect bubble" around users. We will then go on to describe the current state of play on AI at the global level, to highlight the salient points arising from the national strategies and point out a number of risks, such as the emergence of a "creative divide" between the North and South. This will be followed by a discussion of several aspects related to the ethics of AI, in particular the question of bias and the need to incorporate new stakeholders with a view to developing public policies on AI. Finally, in the conclusion, we will provide a series of recommendations and closing remarks.

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4   Adopted by acclamation in June 2017, these operational guidelines offer clear principles and practical recommendations for designing and developing policies and measures to promote and protect the diversity of cultural expressions in the new technological environment. A highly dynamic and changing context, which today is marked by AI, but tomorrow may be dominated by the Internet of Things, blockchain, quantum Internet or any other technology (UNESCO, 2017b).

AI AND THE CREATIVE CHAIN

As suggested in the 2018 Global Report, the widespread incorporation of digital tools, and in particular the emergence of large digital platforms, have profoundly transformed the structure of the cultural value chain (Kulesz, 2017). We are seeing a shift away from a pipeline-like system, in which each link – creation, production, distribution, access – processes a good or service and passes it on to the next, toward a network- or platform-type model, in which the set of nodes interact in real time. In such an arrangement, an innovation like AI will tend to exert a simultaneous influence across the entire chain, rather than just affecting a single link. We will now move on to describe the main opportunities and challenges that may emerge as a result of introducing AI throughout the creative chain.

MACHINE LEARNING: HUGE ADVANTAGES FOR ARTISTS, THE CREATIVE INDUSTRIES AND THE PUBLIC

Experimentation with ML is currently on the increase and shows the enormous potential offered by this modality in the field of music, film, and literature. For example, in 2017, the American artist Taryn Southern presented her album project *I am AI*, put together with the aid of various ML tools – AIVA,[5] Amper,[6] Google Magenta,[7] and IBM's Watson Beat.[8] In a similar vein, in 2018, the musician Benoît Carré released the album *Hello World*,[9] the fruit of collaboration between fifteen well-known artists and the Flow Machines system, developed by Sony CSL.[10] Algorithms have even been involved in the creation of movie scripts, as in the case of *Sunspring* (2016), directed by British filmmaker Oscar Sharp. Also, in March 2016, a short novel co-written by Hitoshi Matsubara – a professor at Future University in Japan – and a machine made it past the first round of a national literary prize (Jozuka, 2016).

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5 More information available at: https://www.aiva.ai
6 More information available at: https://www.ampermusic.com
7 More information available at: https://magenta.tensorflow.org
8 More information available at: https://www.ibm.com/case-studies/ibm-watson-beat
9 More information available at: https://www.helloworldalbum.net
10 More information available at: https://www.flow-machines.com

As a number of these artists have recognized, AI does not necessarily replace human beings. In fact, works produced in a purely automatic fashion tend to appear a little odd to the public, who fail to establish empathy with a machine devoid of intent. Hence the need for a degree of manual intervention to ensure the work is aesthetically accomplished (Corbett, 2018). This would appear to indicate that the most effective formula is collaboration between human being and machine: so, far from doing away with artists, AI can enhance their capabilities.

Another point to be highlighted is that AI lowers entry barriers and makes it possible for many more people to compose symphonies, make movies, and write novels – even without too much expertise in any of art forms. Taryn Southern puts it like this:

> For songwriters who don't play instruments or who have to work with a human collaborator, it can be quite freeing and liberating to do this, because you don't need any knowledge of instrumentation to make a great song — you just need to have a good ear. (Plaugic, 2017, para. 12)

Furthermore, AI enables the creators of the past to be brought back to life. *The Next Rembrandt*[11] project – the product of collaboration among ING, Microsoft, the Rembrandt House Museum, and other institutions – set about digitizing the works of the Dutch master and, thanks to the application of AI, was able to "distill the artistic DNA from his work" (PlugIn Magazine, 2017, para. 3) in order to then create a new painting that could well have been done by the artist himself.

In addition, works produced using AI may represent a new source of remuneration for their creators. Indeed, the painting *The Count of Belamy*, generated using algorithms by the French collective *Obvious Art*[12] went on sale for 10 thousand euros and was acquired by the collector Nicolas Laugero-Lasserre (Escapasse, 2018).

AI can also constitute an advantage for the creative industries, especially when it comes to reducing costs and increasing efficiency. A film production company, for instance, could

11   More information available at: https://www.nextrembrandt.com
12   More information available at: https://www.obvious-art.com

save hundreds of work hours by incorporating ML into special effects retouching.[13] AI can also be used by publishing houses that need to assess the narrative impact of a novel[14] or by fashion companies seeking to produce personalized models for each of their clients.[15] In terms of distribution, automatic algorithms can also help online stores to recommend products more effectively.

If we take into account the fact that AI technologies are easily scalable, we could see an unprecedented explosion of artworks take place in the next few years. This could benefit the public, who would thereby be able to access a far wider range of cultural goods and services.

AI, CREATIVITY, AND THE LARGE PLATFORMS: THE RISKS OF THE "PERFECT BUBBLE" AROUND USERS

However, the use of AI is not without its challenges. To begin with, the system for registering artistic compositions – which is still carried out manually in many countries does not appear to be ready for the exponential increase in the number of works that new technologies may bring about.

In addition, although these tools can encourage the entry of new creators – in particular those that dominate programming and digital media – traditional artists, who do not usually have the technical knowledge to experiment with ML, are left worse off. At the same time, the growing role played by AI as a creation tool could even end up making those artists who are familiar with such innovations more dependent on third-party information technology (IT) solutions.

Successive improvements in AI-assisted creation could also lead to increasingly perfect works and make it impossible for the public to know whether they have been thought up by a human being, a machine, or a combination of the two. This could spur a rapid increase in "fake art" and works that are devoid of identity, values, or meaning.

In fact, the large platforms are already investing in projects to create cultural expressions using algorithms on a large scale.

13   For example, thanks to the software Arraiy.
14   By using tools such as StoryFit, available at: https://www.storyfit.com
15   As Stitch Fix does, available at: https://www.stitchfix.com

In mid-2017, Spotify hired François Pachet – a global expert in the application of AI to music production, who had previously worked on the Flow Machines system. In response to this news, sector analysts wondered whether Spotify might not be planning to offer its users automatically generated music, which would save the company a fortune in royalties (Ingham, 2017).

Questions also arise with regard to copyright: Who owns a work created using AI? The first answer might be: the artist who came up with the idea – like Taryn Southern, in the case of *I am AI*. It is undeniable that this person should be recognized, particularly if they had any manual involvement in the output produced by the machine. But what about the programmer who designed the algorithms? Sometimes it is the artists themselves that develop the software, but very often that software belongs to other people or companies. And what about the original works that served as input for the machine? In the case of a classical painter like Rembrandt, whose works are already in the public domain, extracting his creative personality and translating it into algorithms that will enable new pieces to be created does not seem to pose too many problems in terms of copyright or royalties. But what happens in the case of contemporary artists?

In some instances, these issues have been settled by assigning AI itself the status of composer, as the Society of Authors, Composers and Publishers of Music (*Société des Auteurs, Compositeurs et Éditeurs de Musique* [SACEM]) has recently done with regard to the algorithm AIVA (Lauder, 2017).[16] However, this approach opens up new challenges of its own. For a start, it is difficult to grasp how a machine could be a copyright holder, if by definition it is incapable of benefiting from its creations – something that only individuals or companies could do. Ultimately, giving an AI the chance to register its own works merely enables private companies – the owners of the AI or the data that served as input – to become *de facto* authors of works of art – something that until now has been a right exclusive to individuals. In terms of creativity, this would make companies the

16   Along similar lines, Saudi Arabia granted nationality to a robot in 2017, while in New Zealand a robot ran for prime minister in 2020 (Soudoplatoff, 2018).

ones that dominate the scene, through automata artists with the potential of a Borges or a Picasso, and mean that flesh and blood individuals would play second fiddle or, worse still, serve simply as new input for machines.

When it comes to the creative industries, there are really very few that have the in-house skills to take advantage of these innovations. So, as happens in the case of individual artists, we must ask ourselves whether the creative industries might not lose autonomy, since key parts of their internal functioning and their productivity would be overly dependent on often far more powerful third parties, with whom they would be unable to negotiate.

The fact is that, while AI may encourage the emergence of independent start-ups in the new applications market, it is the large platforms that have the best chance of seizing control of this segment. These technological giants are financially robust enough to be able to offer services at very low prices, or even free of charge. At first these services are used by a certain link in the chain, but then later, thanks to the data collected and the application of AI, that link gets gobbled up by the platform itself. This would have a severe destabilizing effect on the traditional creative sector in terms of jobs.

In the medium and long term, AI may allow large platforms to intervene simultaneously in all nodes of the creative chain and generate works based on user behaviour, in order to maximize consumption. These technological players would not only create their own songs and novels, but physical goods as well, such as articles of fashion – a sector that the Web giants have taken very seriously indeed. Amazon and IBM are developing tools to create and produce clothing designed using AI (Bain, 2016; Del Rey, 2017; Knight, 2017). And as part of its Arts & Culture division, Google has launched the project *We wear Culture*,[17] which is a searchable archive composed of tens of thousands of fashion items digitized in collaboration with over 180 museums and other institutions – a database that in the future could prove indispensable when it comes to designing new garments.

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17 More information available at: https://artsandculture.google.com/project/fashion

If this trend were to continue, the stage would be set for a "perfect bubble" around users, which would lead to an unprecedented level of concentration in the creation, production, and distribution of cultural goods and services. In such a scenario, cultural expressions would have economic value, but they would convey neither identity nor meaning. There would no longer be any place, then, for works that are conceived with future generations in mind or for great artists that are misunderstood in their own time. Art would become just another disposable consumer good and the sum of individual creativities would end up in the hands of a just few companies that are global leaders in AI.

AI: A NEW CARTOGRAPHY

In the previous section, we looked at the impact of AI within the creative chain. However, the effects of these changes are not felt in the same way in different regions of the world. We will now briefly present the main forces at play, focusing on both the countries of the Global North and South. These trends will have a long-term effect on both culture as well as the possibility of achieving sustainable development.

THE MAJOR POWERS

At present, the global leaders in AI are, unquestionably, the United States (US) and China. In the case of the United States, the energy of its tech companies – particularly Google, Amazon, Facebook, Apple, Microsoft, and IBM – the vitality of its university research and the abundant availability of private capital have all been key factors in making the country a pioneer in the field. Although this process was undertaken without the need for direct state intervention, since at least 2016 there have been voices calling for greater coordination, without which it will be difficult to maintain the current leadership position.[18]

18   See, for example, National Science and Technology Council (2016) or the parliamentary proposal – introduced in late 2017 – to create a Federal Advisory Committee on the Development and Implementation of Artificial Intelligence (Future of Artificial Intelligence Act of 2017) (Delaney, 2017). Eric Schmidt himself, the former director of Google (Alphabet), urged the United States to "get [its] act together as a country" to develop an AI strategy that involves both government and private industry, in order to be able to compete against China (Vincent, 2017).

The reality is that, for the United States, that early mover advantage is already being eroded due to the great strides made by China. The Asian nation has its own innovative tech giants – Baidu, Alibaba, Tencent, among others – a large network of research laboratories and extensive access to capital – both private and public. In July 2017, the Chinese government presented its plan to make the country the first global centre for AI by 2030 and build a market worth USD 150 billion, in areas such as health, defence, surveillance, and transportation (Ding, 2018).

The European Union (EU), for its part, can boast important research centres, plenty of AI start-ups, and an active policy aimed at consolidating the digital single market. However, no digital titans comparable to those in the United States or China have so far emerged on the continent, owing, among other reasons, to lower availability of private funds. Faced with the risk of "missing the train," the EU released a communication on AI in April 2018 (European Commission, 2018a), containing various recommendations for leveraging opportunities and tackling the challenges posed by this technology, which – according to the document – will transform society and industry as profoundly as electricity did. The proposals seek to shore up the European data ecosystem, modernize the education and training systems, prevent a brain drain, mobilize new investments, and establish an ethical and legal framework for AI that is aligned with European values and the EU Charter of Fundamental Rights. In addition, May 2018 saw the entry into force of the General Data Protection Regulation (GDPR) (EU, 2016), which sets up a framework for the collection and conservation of personal data and, among other matters, establishes the right for European citizens to be informed of the logic underlying the algorithms used to process their data (Article 15.1.h) and prohibits decisions affecting them from being taken in a purely autonomous manner by a machine (Article 22.1).

There are several countries in Europe that have designed their own AI strategy.[19] France, for example, presented its

19   An overview of the main initiatives carried out by the countries of the continent can be found at European Commission (2018b).

plan, entitled *For a Meaningful Artificial Intelligence,* in March 2018 (Villani, 2018). The core aims of the program are to: reaffirm the role of the State in preventing Europe from becoming a digital colony of the global platforms; apply AI to health, ecology, transport, and defence; foster data commons;[20] invest in creating interdisciplinary AI institutes and in supercomputers; increase the number of experts and set up an ethics committee to examine the effect of this technology on society.

Also in 2018, the United Kingdom (UK) House of Lords published its national policy document *AI in the UK: ready, willing and able?* (House of Lords, 2018). Based on the fact that it would not be realistic to aim for global leadership in a context clearly dominated by the United States and China, the report highlights the opportunity for the UK to become a key player in the ethical use of AI. Among other recommendations, the text proposes setting up an AI Council, launching initiatives to prevent automation from perpetuating social inequalities, organizing international conferences on the ethical implementation of AI, promoting research and training, facilitating data exchange and proactively reviewing the use and potential monopolization of data by large platforms operating in the UK.

Other countries that are highly dynamic in terms of AI include Israel – which has 40 times more AI start-ups per capita than the US (Asgard, 2018) and important research centres; Canada – which in March 2017 launched its pan-Canadian AI strategy, endowed with 125 million Canadian dollars (House of Lords, 2018); Japan and the Republic of Korea – which are promoting robotics in order to improve productivity, mobility, and health (House of Lords, 2018).

THE COUNTRIES OF THE SOUTH: HEADING TOWARDS A "CREATIVE DIVIDE"?

Now, in a context in which even major powers such as France or the UK recognize their limitations vis-à-vis the rise of US and Chinese tech companies, what will become of the countries of the South?

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20   That is, the availability of data shared by the entire community.

In an era dominated by AI, it is clear that the development models implemented by these nations in the past will be unlikely to work for much longer. Indeed, if the new raw material is data, and if jobs are lost to automation, then being blessed with abundant natural resources or boasting low labour costs will prove less decisive in the in the future (Web Foundation, 2017).

India is perhaps the only country in the South that has announced an explicit AI agenda (National Institution for Transforming India [NITI], 2018): dubbed *AIforAll*, the strategy seeks to focus on applications related to health, education, agriculture, smart cities, and smart mobility, as well as encouraging public-private collaboration and consolidating a data marketplace. As highlighted in the Indian report, this approach could be replicated in other developing nations, which face similar challenges when it comes to using AI: the lack of a long-term strategy for investment in AI, poor connectivity, a low level of government engagement in AI research, a constant brain drain, a shortage of data, and reduced commercial viability for domestic start-ups.[21]

In such a context, there is an urgent need for the countries of the South to draw up a strategy to actively adopt AI. This is a point made by Kathleen Siminyu, a data scientist at Africa's Talking and co-organizer of the Nairobi Chapter of Women in Machine Learning and Data Science:"We need to make sure that Africans are not just recipients of advances in Artificial Intelligence but shapers and champions as well." (Siminyu, 2017, para. 15).

Countries that do not invest in AI or do not have their own strategy will simply end up using the services provided by large global companies, without any possibility of implementing their own solutions. The technological concentration and the "perfect bubble" described in the previous section would see the artists and producers of the South gradually lose their autonomy and capability. If that were to happen, the future designers of African clothing would not be Cameroonian or Nigerian creators, but rather ML experts living in Silicon

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21   See, for example, Endeavor (2018, p. 5), which focuses on the situation in Latin America.

Valley or Tianjin. The North/South digital divide would then become an irreversible creative divide.[22]

AI, CULTURE, AND SUSTAINABILITY

That said, it should be pointed out that AI strategies are necessary, but not sufficient in themselves. Strikingly enough, culture plays no role at all in any of the current national agendas – in either the North or the South. The imperative of economic growth and geopolitical competition means that no region wants to "miss the train" and that efforts to integrate AI at all costs are concentrated in those areas considered most urgent such as health, agriculture, transport, education, defence, finance, and manufacturing.

While it is true that these agendas attempt to take into account local priorities and values – which in a sense reflects cultural concerns – in no case do they consider the impact AI will have on music, literature, and film, the needs of local artists and creative entrepreneurs, or the risk that may be posed by societies having to import all of their culture. The problem is that, even if a country adopts a state-of-the-art policy on robots, smart mobility, or drones, if it fails to include culture in the equation, then it would create an unsustainable state of affairs. Put simply, technologies solve problems, but they do not provide meaning – only culture can do that. And, in terms of social cohesion, what will be the impact for countries – in both the North and South – of having no cultural expressions of their own?

AI, ETHICS, AND PUBLIC POLICY

As we have seen in the previous two sections, AI is an extremely powerful tool, whose effects will be increasingly felt in the creative value chain and the development strategies of all countries. In this third section, we will examine the possible impact of AI on ethics, fundamental rights, and the public sphere.

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22   The expression "creative divide" is used here to denote a – hitherto unseen – situation of increasing inequality between the North and the South in terms of the possibilities open to artists and creators.

THE IMPORTANCE OF CREATING AN ETHICAL FRAMEWORK FOR AI

Ethical considerations are playing an increasingly important role in the debate on AI. The fact is that automated applications are becoming more prominent in all areas of social life and there is a growing risk that, due to the way they have been built, these systems will make decisions that could negatively affect a great many people. Indeed, the design of the algorithms, and even the selection of the data that make up the input for the machines, can conceal gender, race, and other biases and thus amplify the prejudices of those who designed the application. This could lead to discrimination against certain groups or to selective censorship of content.

A case in point is the international beauty contest *Beauty.AI*, which in 2016 invited participants from all over the world to send their photographs to be judged by an automatic system: out of a total of more than 6,000 people from 100 countries, almost all of the 44 winners turned out to be white – only one was dark skinned. This merely showed that the dataset used to train the machine did not contain enough people of colour and, therefore, was biased (Levin, 2016).

Algorithms can also reinforce gender stereotypes. This is quite obvious in the case of automatic translation systems, many of which operate based on ML. If we translate the expression *"O bir bilim adamı"* – which in Turkish means "he/she is a scientist", without defining the gender – into English, Google Translate comes up with "he is a scientist". Now, if we translate *"O bir hemşire"* – "he/she is a nurse" – Google gives us "she is a nurse". So the machine appears to believe that certain occupations and jobs are carried out by men and others by women. We can also find gender biases in search engines: for example, if we Google "successful person," the images section will show mostly photos of men celebrating, and very few women (Vleujgels, 2018).

In recent years, these types of challenges have been extensively debated. It has been private foundations and even the large platforms that have insisted on the need to draw up an ethical code covering AI application programming, in order to prevent biases and other dangers. The most noteworthy declarations and manifestos in this area include the Asilomar

Principles (Future of Life Institute [FLI]),[23] the Toronto Declaration (AccessNow Foundation),[24] the Global Initiative on Ethics of Autonomous and Intelligent Systems (Institute of Electrical and Electronics Engineers – IEEE),[25] the tenets of the Partnership on AI (a foundation made up of large platforms),[26] Google Principles on AI,[27] and the DeepMind Ethics and Society principles.[28] The general agreement is that AI must be designed in the most transparent and explainable way possible,[29] while maintaining a human-centric, non-discriminatory, and socially beneficial approach.

IS IT POSSIBLE TO CREATE AN ETHICAL FRAMEWORK FOR AI WITHOUT MENTIONING CULTURE?

However, this consensus view on what needs to be done from the ethical standpoint may be somewhat simplistic. First of all, in a sense, biases are impossible to completely eliminate. For a start, the input data are by definition limited and therefore the selection will always show a bias, no matter how abundant the information available. Moreover, any technology serves to solve a specific problem for a particular group of people, and – like culture – necessarily bears the mark of its creators. Therefore, by calling for programmers themselves to be proactive and eliminate all possible biases from IT developments, many codes of ethics are asking for something that is unfeasible. Indeed, leaving aside intentionally malicious biases, no one can be fully aware of their own stereotypes, whether personal or cultural – unless they are pointed out to them by a third party.

What is more, in the ML variant known as deep learning (DL) – which operates using artificial neural networks – it may prove extremely difficult, even for the computer scientists who designed the technology, to understand how and why the machine has reached a certain output. Consequently,

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23   More information available at: https://futureoflife.org/2017/08/11/ai-principles/
24   More information available at: https://www.accessnow.org/cms/assets/uploads/2018/05/Toronto-Declaration- D0V2.pdf
25   More information available at: https://standards.ieee.org/develop/indconn/ec/autonomous_systems.html
26   More information available at: https://www.partnershiponai.org/tenets
27   More information available at: https://blog.google/topics/ai/ai-principles
28   More information available at: https://www.deepmind.com/about/ethics-and-society
29   A system would be transparent if it allows experts to understand how it works. And it would be explainable if it is capable of describing how and why it came up with a particular output.

many of these systems end up becoming veritable black boxes whose functioning may prove to be opaque and unpredictable. In such cases, there is very little that could be done in terms of transparency and explainability, and another type of control is clearly called for.

In addition, the risk of discrimination and censorship does not derive solely from the way in which AI systems have been designed or fed, but also from the way in which companies integrate them into the user experience. For example, it is quite telling that virtual assistants tend to have women's names, such as Cortana, Alexa, or Siri. This has nothing to do either with the algorithms or the data or the programmers. Instead, it has to do with the gender stereotypes prevalent in the tech industry – in this case, with women being seen as little more than glorified secretaries, in a male-dominated sector.

Once again, what may be missing from the discussion is a cultural perspective. Besides a few fleeting references to "cultural diversity" that can be found in the texts of The Global Initiative on Ethics of Autonomous and Intelligent Systems (IEEE, n.d.) and the Asilomar Principles (FLI, n.d.), documents on ethics for AI tend to overlook the variable of culture, which means that the directives contained therein are more often than not mere declarations of intent without concrete application in a world characterized by heterogeneity. Indeed, how are we to understand the expression "socially beneficial AI"? According to what values? For what groups of people? Under what conditions? And at what time? Would an application that in the short term makes users' lives easier but in the long term leads to supply concentration be considered beneficial or not? In short, who would define what constitutes this social benefit, on the basis of which algorithms would have to be designed? At any rate, if culture – in all its richness and diversity – is not explicitly included in the equation, then what ends up happening is that it reappears in the form of biases.

IT IS NOT JUST AN ETHICAL FRAMEWORK THAT IS NEEDED BUT ALSO PUBLIC POLICIES

This is not to say we should give up trying to achieve better AI. However, we have to acknowledge that the debate about the ethics involved should not just focus on the concerns put

forward by private foundations and the large platforms but must also incorporate the views of a broad spectrum of local stakeholders, from all sectors, in both the North and South. And instead of being limited to abstract recommendations, declarations on AI should include concrete proposals, many of which have already been outlined by multilateral organizations. In that regard, the principles and objectives of the 2005 UNESCO Convention (UNESCO, 2005), as well as the Operational Guidelines on the Implementation of the 2005 Convention in the Digital Environment (UNESCO, 2017b) and the United Nations (UN) Sustainable Development Goals (UN, n.d.) could serve as an exceptional guide.

If such a path is not followed, there is a risk that the debate on AI and fundamental rights will be monopolized by private interests. Many of the current declarations seem to presuppose that the large platforms will be able to self-regulate and self-limit – despite the fact such a hypothesis is unrealistic, particularly in light of the Cambridge Analytica data scandal (Harris, 2018). The codes of ethics proposed by the large platforms may serve as a set of basic guidelines for the work done by their programmers, or as a presentation of their corporate values, but they are nowhere near sufficient to establish solid, sustainable and culturally diverse governance of AI.

At this point, it is essential that we introduce the factors of auditability and accountability – which has to do not only with ethics, but also with the legal and public interest-related aspects of AI. While transparency and explainability are difficult to achieve in cases such as that of DL, what could be developed are mechanisms to audit the outputs of an AI, in the same way that the effects of a new drug are measured before launching it onto the market.[30]

At any rate, we should avoid falling into the trap of thinking that the algorithms themselves are responsible for any unintended consequences. If it would be strange to pay an AI royalties, as we saw in the first section, then it would not make much sense either to hold it accountable for breaches

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30   One possibility would be to send successive inputs to measure the type of outputs produced by the machine, as one programmer did to obtain metrics about the political videos recommended by the YouTube algorithm (see Lewis & McCormick, 2018).

of ethics. In any case, what kind of punishment could be meted out to a machine?

The guilty parties are never the technologies but rather the people that exploit them. So, instead of being limited to a mere code of ethics – which at best can provide a partial list of good practices, but not accountability – in the future, it will be vital to create multi-stakeholder processes that enable the formulation of policies and measures to safeguard the public interest and establish clearer degrees of responsibility in cases where the use of technology produces unintended consequences.

CONCLUSIONS

AI is an extremely powerful tool, but the initial optimism aroused by any new technology should not lead to false hopes. It is true that AI can help to empower numerous creators, make the cultural industries more efficient, and increase the number of artworks, which is in the interest of the public. However, there are still very few artists and entrepreneurs that know how to use tools such as ML. In addition, the commercial logic of the large platforms may lead to increasing concentration of supply, data, and income and to the impoverishment of cultural expressions in the long term. In such a context, the public sector will be in danger of completely losing agency on the creative scene.

Furthermore, in a tech world dominated by the US and China – and to a lesser extent by Europe, Israel, Canada, Japan, and the Republic of Korea – there is a risk of fomenting a dual divide, technological and creative, which would result in the increasing decline of the countries of the South. In addition, the lack of inclusion of culture in national AI strategies – in both the North and South – could mean that countries no longer have any cultural expressions of their own, which would end up damaging the social fabric.

On top of this, many private foundations and even the large platforms have promoted ethical declarations and principles on AI, in order to reduce the algorithmic biases that harm certain groups of people and to achieve the greatest social benefit. However, these efforts raise a number of problems. First of all, pursuing total transparency and

explainability in the DL variant may prove to be an extremely complex task. But the most serious challenge is that the perspective of culture does not play a central role in these ethical declarations, which makes it difficult to move forward in a specific direction – indeed, a "socially beneficial AI" is often a nebulous concept with no concrete application. Given that any technology is applied in order to fulfil the purposes of a particular group of people, it will not always be possible to eliminate biases, since they are really part and parcel of cultural differences. Such biases and stereotypes are not only embedded in the data or in the algorithms, but also in the way in which companies and users interact with the machines. Therefore, it will be essential to develop strategies that go beyond a merely abstract code of ethics and design public policies to ensure that AI systems – and the actors that exploit them are auditable and accountable.

Many of the risks posed by AI can thus be explained by the failure to factor into the equation the perspective of culture. Indeed, if local creativity, the cultural industries market, the viewpoint of actors from the South, the plurality of voices, and meanings, among other key aspects, are not incorporated, then the difficulties will only increase.

In order to tackle the above mentioned challenges, it will be necessary to implement a comprehensive and coordinated strategy, which could be organized around the four core themes detailed below:[31]

STRENGTHENING THE CULTURAL VALUE CHAIN

In order to consolidate the value chain in an era dominated by AI, it will be useful to address each one of its links or nodes, as well as the data ecosystem as a whole.

First of all, in the area of **creation**, it will be necessary to design policies and measures to:
- Strengthen the skills of artists, in AI and related disciplines.

- Provide spaces dedicated to digital creativity and innovation in AI that enable artistic experimentation and collaboration such as incubators and laboratories.
- Encourage debate on copyright in the AI era, in order to ensure fair remuneration and adequate recognition for artists.
- Rethink the status of the artist in the age of AI, in order to bolster it.
- Provide a more agile process for electronic legal deposit systems, for artists to register their works produced on a large scale using AI.
- Ensure women's participation as creators of AI.

In terms of **production**, it will be essential to:
- Promote training and research & development (R&D) for creative industries working with AI.
- Prepare an AI toolkit for the creative industries.
- Encourage the emergence of economically viable local AI start-ups, and prevent the formation of monopolies or oligopolies in this field.

To strengthen **distribution**, it will be necessary to:
- Promote the development of a new market for art made with AI.
- Make sure that AI and automatic algorithms guarantee sufficient visibility and discoverability for local cultural goods and services.
- Update antitrust laws in the digital environment and monitor mergers and acquisitions that place the diversity of suppliers at risk.

With regard to **access**, it will be helpful to:
- Encourage public cultural institutions to use AI tools to provide better access to diverse cultural expressions.

As an issue that cuts across the entire chain, the consolidation of the **data ecosystem** is one of crucial importance. It would therefore be advisable to:
- Strengthen the capacity of States to produce data and cultural statistics, in cooperation with local and

international organizations such as the UNESCO Institute for Statistics (UIS), the International Telecommunication Union (ITU), World Wide Web Consortium (W3C), and the Web Foundation.
- Promote an open data policy, designed to supply statistics and other relevant information to local players.
- Create mappings of AI projects in the national territory, especially those focusing on culture and the arts.
- Put in place prospective studies to analyze the impact of AI in the creative economy, not just in aggregated terms – rise in productivity, new business being created – but also in more detail: which jobs will be most likely to disappear or will be at risk, in which creative industries, when this may happen, what the transition will be like, among other issues.
- Ensure that large Internet platforms and AI projects (national and international) contribute to the sustainability of the cultural ecosystem, for example through data sharing.

BALANCED FLOW OF CULTURAL GOODS AND SERVICES

Bearing in mind that the wide-scale application of AI may bring about a "creative divide" and thus an imbalance in the flow of goods and services between countries of the North and South, it will be important to:
- Include the perspective of the countries of the South in the international forums on AI.
- Encourage cultural projects dedicated to AI, through the International Fund for Cultural Diversity (IFCD).

INTEGRATION OF CULTURE INTO SUSTAINABLE DEVELOPMENT FRAMEWORKS

If culture is not included in national AI policies, the sustainability of development may be at risk. It thus becomes essential to:
- Incorporate the principles and objectives of the 2005 UNESCO Convention into national AI plans.
- Involve ministries of culture in discussions on AI strategies.

FUNDAMENTAL RIGHTS, ETHICS, AND PUBLIC POLICY

In order to promote diversity and respect for fundamental rights, it will be vital to:

- Foster a high-level debate – governments, private sector and civil society – on the way in which algorithms, the datasets used as input and the wide-scale integration of AI- based solutions may affect equality of opportunities, particularly in terms of gender, race, and religion.
- Guarantee that AI ethical frameworks take into account the principles and objectives of the 2005 UNESCO Convention, as well as the UN Sustainable Development Goals (UN, n.d.).
- Go beyond just issuing declarations on ethics and develop a public policy framework to ensure that AI applications with an impact on cultural and social life in general are auditable and accountable.

Technology will never offer a magic solution to anything, because, however much we insist on the intelligence of machines, they have no will of their own. The fact is that it is not machines that bring about change but rather the people who use them. If the cultural sector fails to act quickly, other players will step in to take its place – as the large platforms are already doing. If this trend continues, the current problems will only intensify. Culture will then run the risk of becoming, once and for all, just another commodity – lacking in identity, values, and meaning. And such a shift may shake the foundations not just of the cultural sector, but of society as a whole.

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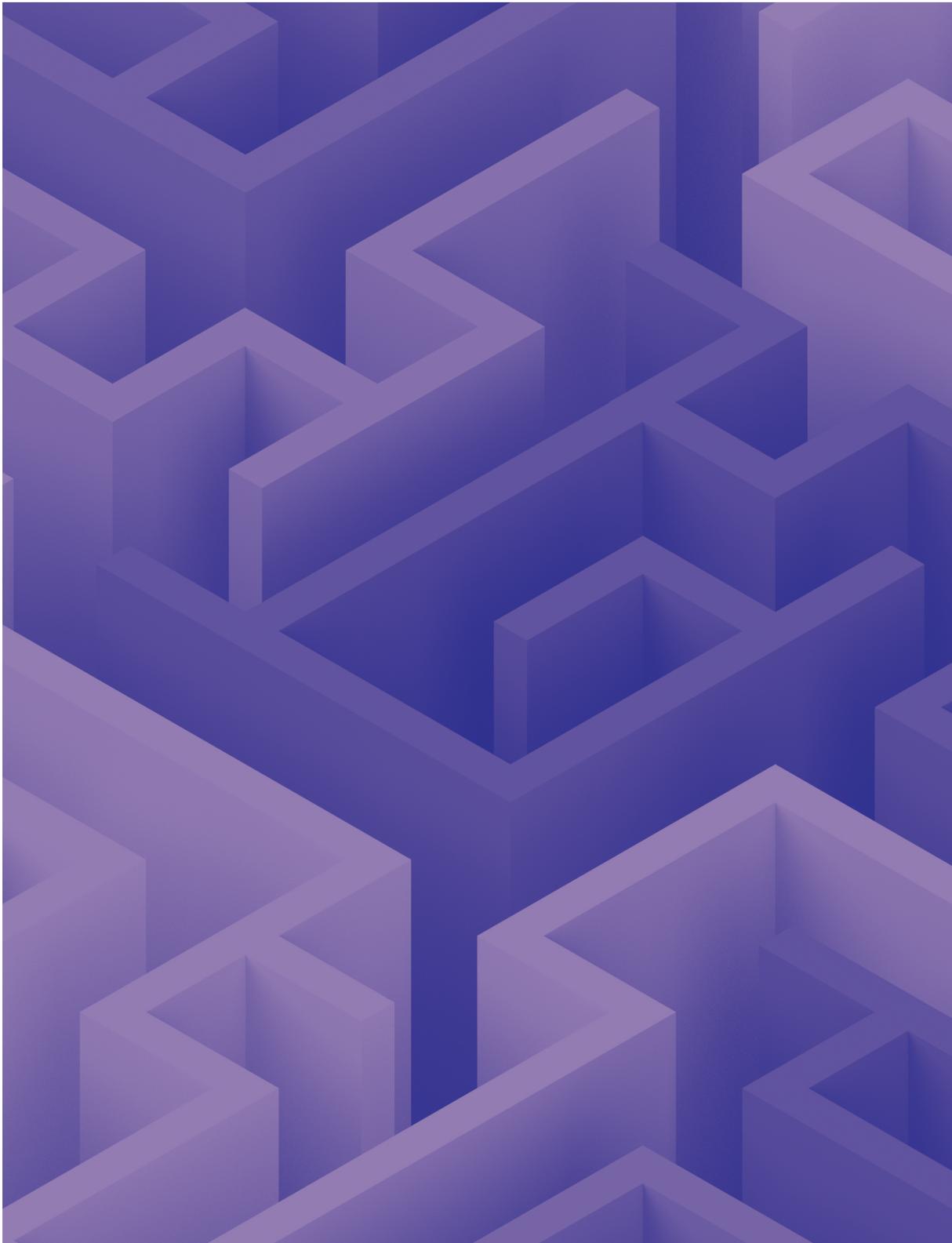
Artificial Intelligence and culture: Opportunities and challenges for the Global South[1]

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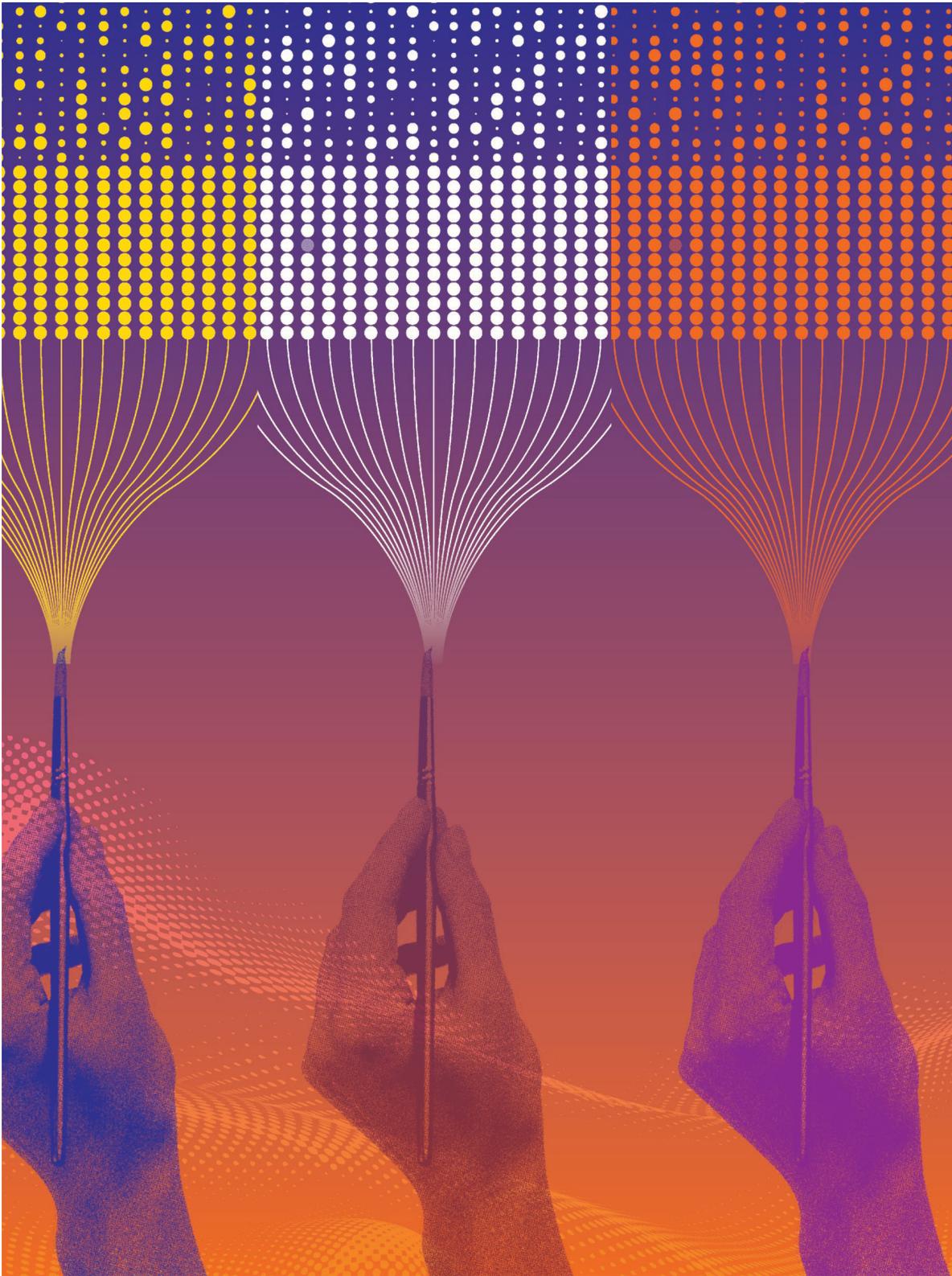
INTRODUCTION

As of the 2000s, UNESCO documents have become increasingly alert to the continuous, mutable, and flexible character of culture, which is defined in such a way as to encompass the multiplicity of new forms of cultural expression (UNESCO, 2005) in a world increasingly permeated by digital technologies. The revised version of the UNESCO *Framework for Cultural Statistics* (UNESCO, 2009) emphasized the cultural transformations brought about by new digital technologies. In fact, the speed with which new phenomena of participation on the Internet developed highlighted the expansion of new cultural products and services, which called for a taxonomy that was very difficult to classify and, even more difficult to measure, evaluate, and compare (UNESCO, 2014). In this scenario, the recent rapid expansion of social networks and user-generated content, the explosion in data production, the complexity of distribution models, and the proliferation of connected multimedia resources in the hands of users have had a huge impact on all sectors of society, including the cultural and creative sector (UNESCO, 2017).

In the current context of the increasing availability of large volumes of data (Big Data) that feed the large platforms – the so-called Big Techs, the technology companies that dominate the market (Amazon, Google, Facebook, YouTube, Spotify, Netflix, etc.) –, the multiplication of transmedia platforms,[3] the spread of applications, and the symbiosis with Artificial Intelligence (AI), the complexity of contemporary issues caused by AI in all production and human activity fields cannot be minimized. A massive explosion of new trends in machine learning (ML) and deep learning (DL) has occurred in the last eight years.[4] Notwithstanding

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3 Transmedia refers to the transmission of a message or story through various media, which focuses on the story being transmitted. In this sense, media platforms are defined as the experience of creating the different parts of a narrative in a distributed way across different platforms of video, film, games, etc.
4   Unlike traditional computing, both ML and DL, which get the computer to act without prior programming, need to be fed a very large amount of data. Briefly, the former uses statistical techniques that allow the computer to progressively improve its performance with regard to a given task, while the latter refers to a subset of ML that uses more sophisticated neural network algorithms and, in simple terms, can be understood as the automation of predictive analytics.

these advances, we are only at the stage of weak AI, so called because it has not yet crossed the threshold of human intelligence, while strong AI would correspond to the moment when it will advance beyond the possibilities of that threshold (Chalmers, 2010).

In light of the challenging paradigmatic changes in cultural dynamics brought about by AI and its repercussions in Latin America and the Caribbean (LAC), this article outlines how AI has operated in culture and discusses possible implications for the region. It starts by mapping AI application trends in different cultural cycles and domains, the aim being to indicate where and how it has operated in culture, and what benefits it brings. The operating logic of the large platforms is then highlighted, as are the impacts they have on society, with a particular emphasis on culture, and the great challenge that this poses for current societies, considering the overconcentration of data being monitored by AI. Finally, the implications of this scenario for the Global South are discussed from the perspective of LAC, in view of the digital and creative divide[5] that will tend to deepen between the Global North and South. The conclusions lead to recommendations for possible strategies for addressing the challenges and risks identified, which act as a warning to the public and private sectors and to civil society in LAC. The methodology is based on the tracking of information gathered from specialized literature and official documents and from reports on the subject, from which inferences are drawn as a basis for our analysis.

THE ABSENCE OF CULTURE IN OFFICIAL DOCUMENTS AND REPORTS ON AI

Increased computational scalability, the operational expansion in neural networks and the advent of Big Data have resulted in AI rapidly evolving to become even more autonomous and to engage in human-like cognitive activities, such as natural language processing and computer vision, among others. Algorithms are increasingly dispensing with supervision in order to work, and in some cases they are able to rewrite parts of their own code. In view of this, far from being only a

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5   According to Kulesz (2018, p. 9), the creative gap corresponds to the "increasing inequality between the North and the South in terms of the possibilities open to artists and creators."

matter for research in institutes and closed laboratories, AI has increasingly invaded all activities and aspects of our lives, including our cultural practices, either through book suggestions from Amazon or films and series on streaming services.

It is no coincidence that a wide variety of the aspects of AI today are on the agenda of governments and sizeable international bodies. Simultaneously with the business world's rush towards digital transformation, there is an emerging need to address dilemmas relating to data access, algorithmic bias, ethics and transparency, and the legal liability for decisions resulting from AI.

In this context, which is visibly widened, notwithstanding the extreme importance of the role played by culture in social life, there are few studies devoted specifically to issues dealing with the intersection between AI and culture (Kulesz, 2018). Culture should be prominent in any multi-sectoral discourses (private sector, public sector, civil society, academia) on AI, but this has not yet happened. Unfortunately, the cultural and creative sectors have not been marked as a priority in the official documents and reports that present policy options and recommendations on AI to society (Caramiaux, 2020).

One should regret this absence when it is known that, in recent years, an entirely new logic of automation has prevailed, which affects all stages in culture cycles – creation, production, dissemination, and consumption –, and sets up visible foci of development in the creative economy and the cultural value chain.

AI IN THE CYCLES AND DOMAINS OF CULTURE

AI-based models have been applied not only in relation to various media contents (music, text, images, and videos), but also in the various stages of culture cycles (UNESCO, 2009). Recent reports (Caramiaux et al., 2019; Caramiaux, 2020; Kotis, 2021) and numerous examples gathered from other sources demonstrate that in the Global North, AI has also entered the cultural value chain in several domains.

Culture cycles encompass the different stages of creation, production, dissemination, and consumption of cultural goods. Instead of a successive sequence of steps, digital technologies, the mediators of culture, have increasingly accentuated the complex networked relationships between these cycle stages.

AI, in particular, tends to exert a simultaneous influence on the whole chain, rather than on just one of its links.

Creation is the starting point of the cultural chain that is realized by the objectification of ideas in close connection with the available means of production. Production relates to the tools and processes used to manufacture and materialize the cultural content that is generated at the creative stage. Diffusion places the content produced within reach of consumers. Digital creation and production have brought producers and consumers closer together and often brought them into direct contact. Dissemination often occurs on social media platforms or by way of online posts. Transmission and reception no longer necessarily take place in physical places. Although these continue to exist, reception and consumption often take place in digital interfaces or in hybrid processes between the physical and the digital.

Such interconnections in synchronicities, which are typical of networked functioning, also transcend the boundaries that delimit cultural cycles[6] on the one hand, and cultural domain groups on the other. Digital technologies have caused the dissipation of previously well-demarcated borders. Games, for example, illustrate the hybridization of cultural cycles and domains that were previously segregated and in which cultural memory, storytelling,[7] interactive audio-visual media, production, and consumption mix.

Worth noting, therefore, is the need to incorporate cultural heritage and memory into the dynamics of cultural cycles, as archival issues have come to play major roles in the digital context: without digitized data, AI applications are not possible. Archiving also guarantees the preservation of the creation and production memory. The mapping below shows the interconnected sequence of stages of the cultural cycles and incorporates an inevitable mixture of cycles and domains.

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6   Cultural domains refer to a common set of cultural industries, activities, and practices (UNESCO, 2009).
7   Storytelling is the interactive art of using words, images, and sounds to reveal the elements of a story while stimulating the imagination of the listener. More information available at: https://storynet.org/what-is-storytelling/

CREATION AND PRODUCTION

The creation stage has always been notable for pioneering the use of emerging digital technologies for its creative processes: it is no different with AI. The huge daily creation, production, dissemination, and consumption of texts, images, videos, and sounds on online platforms are substrates for the growth of creations that use AI. This growth is often also supported by open-source software and the low cost of computing platforms.

The extension of human creativity through AI applications has emerged in a plethora of manifestations. The automated creation of context-based content appears in the synthesis of storytelling and personalized music, in the writing of texts, or even in the automated creation of context-based digital exhibitions (Kotis, 2021).

Specifically in the field of the arts (visual, sound, audio-visual, and scenographic), AI has made strong inroads.[8] Artists are able to perform various degrees of creative disciplines using AI techniques: (i) style transfer, using deep neural networks to replicate, recreate, and blend art styles; (ii) transfer to collaboration, with AI as a partner in the conception of the work; and (iii) collaboration to creation, with AI being fed with a huge number of artworks and going on to create works on its own until it arrives at much more complex methods that combine artistic creation with a pedagogical activity aimed at explaining the functioning of ML to its recipients (Santaella, 2021).

 Something similar has been developed in the field of music, by means of a method that is able to learn what the underlying structure is in musical pieces or sounds and, from this, it can generate new content that sounds similar to the musical pieces that were taken as examples (Caramiaux et al., 2019).

Also at the creation stage, digital storytelling is at the center of the new paradigms of contemporary creative industries in the spheres of video, film, TV, and gaming, since the ability to tell stories in multiple formats, on multiple plat-

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8   For creative practice via AI, there is a centre specialized in visual art and AI in Rutgers, New Jersey (Art and Artificial Intelligence Lab). The work it is developing gives an idea of the significance that can be drawn from the creative potential of AI.

forms, and in transmedia creations, has become the order of the day. Data-driven storytelling that is open to the use of ML develops new modalities of interactive and non-linear narratives, as their complex structures take multiple and varied datasets as their basis.[9]

In generative design, the computer graphics tool has developed a rich body of work around the concept of content synthesis. These methods automate parts of the content creation process and help designers in various ways: they automatically fill entire regions with textures or objects; they automatically generate detailed landscapes, floor plans, and cities; and they even generate environment layouts. Algorithms can also cooperate with designers by producing a number of valid solutions (Caramiaux et al., 2019).[10]

There is no way to ignore the exponential growth of ML applications in all domains of the arts (visual, sound, performance, spatial, transmedia, audio-visual, and narratological). Such applications raise crucial, widely discussed issues concerning authorship, ethics, autonomy, and automation, which are discussions that resurface at disruptive moments in art history. The lesson one learns from these examples, however, is: ML and DL procedures have not suddenly come out of nowhere, but are being incorporated into a tradition of innovation in art, science, and technology that is capable of throwing light on essential cultural questions.

The entry of AI into creative processes makes the old boundaries between creation and production porous, because ML and DL work as production collaborators in creative processes. Clear changes have taken place in sound production thanks to the technological tools that allow musicians to work more independently of studios, because AI-based production systems provide ingenious audio solutions. This possible independence

does not deny the benefits that AI can also bring to studio productions, especially in the context of audio engineering.

Another area where AI has been extensively applied is image production in its various modalities, such as image quality enhancement, image editing, retrieval, annotation, and classification. Image retouching gains from AI-based algorithms as they are able to mimic the skills of an expert and automatically reconstruct damaged or missing parts of an image. Image annotation and classification functions, in turn, can be performed from their content being analyzed by AI and DL techniques based on convolutional neural networks.[11]

In the film sector, automated editing is increasingly gaining ground. Even in the domain of intangible cultural practices such as dance, initiatives have been taken, like those by the Forsyche Company[12] in Germany, with its project to archive and annotate all the company's dance material. Another example can be found in the Van Abbe Museum,[13] where visits accompanied by a robot equipped with a camera and a screen are available. Automated journalism has been widely used in Europe with different strategies: for example, Reuters presented a prototype[14] that creates sports reports that are generated directly from videos without any human supervision (Caramiaux, 2020).

DISSEMINATION AND CONSUMPTION

The distribution of cultural goods today surpasses all limits of time and space. The expression "prosumption" has also become commonplace for indicating the digital blurring of the previously well-defined boundaries between production and consumption. In this sense, the AI-enabled automation of procedures brings these two poles of culture cycles even closer together.

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11   Convolutional networks refer to a type of neural network, which focuses on image recognition. Specifically, a convolutional neural network is a DL algorithm that can capture an input image, assign importance to various aspects/objects of the image, and be able to differentiate one from another from a gigantic volume of supervised data. More information available at: https://deeplearningbook.com.br/introducao-as-redes-neurais-convolucionais/
12   More information available at: https://motionbank.org/
13   More information available at: https://www.youtube.com/watch?v=vnKRb-afCKA
14   More information available at: https://www.forbes.com/sites/simonchandler/2020/02/07/reuters--uses-ai-to-prototype-first-ever-automated-video-reports/?sh=31285f907a2a

According to Caramiaux et al. (2019), music consumption is currently a competitive state of affairs that is difficult to face, due to companies offering streaming services that contain hyper-personalized recommendations that are the result of monitoring the user's previous choices using AI tools. In contrast, however, one can expect AI to blur the boundaries between sound production and consumption, given the possibility of music tracks being analyzed automatically to allow the user to create their own, unique tracks.

In the sphere of images, the amount of visual material produced daily makes it extremely difficult for professionals who deal with images, especially journalists, to retrieve and reuse these images. AI, however, can be used to analyze the content of images, and retrieve them according to the user's needs. AI even makes it possible to cross-search images in different sources and from different origins.

AI has also been used for some time in the game production chain. The availability of data and the application of ML have recently been opening the door to more personalized experiences for players. The book publishing sector is also beginning to incorporate AI developments for applications aimed at targeted products.

Pioneering is also AI's contribution to broadening the understanding of cultural heritage and the value of collective memory. The integration of methods, services, systems and the interoperability of different data structures, metadata, and components are key factors for ensuring their preservation and for personalized access to cultural heritage, allowing digital libraries to be built and make them available to users. There are many initiatives in this area and the tendency is that they will grow (Abbattista et al., 2003).

Museums are indeed increasingly publishing their digital collections online and implementing interactive and personalized services on their own websites. Filtering principles and techniques can guide users to objects over a wide area of possible options in a personalized way, and suggest a list of items that fit their interests. To avoid repeating past interests, solutions based on chance are also proposed, allowing the user to find surprisingly unexpected items that otherwise they would not have discovered. Another important trend

is towards smart interfaces, with the user experience being enriched by way of augmented and virtual reality presentations. Fundamental to the educational purpose of museums, Web-based recommender systems integrate 3D components into an immersive environment where it is possible to move from 3D to a hypertext-based visit of multiple exhibits at the same time, with the help of recommender tags. Moreover, ML can also be applied in the field of virtual archaeology (Bordoni et al., 2013).

Although it is by no means exhaustive, the use of mapping presented in this article demonstrates that numerous and varied AI applications are already operating intensely in the cultural production chain, in the various stages of the cultural cycle and in several domains. Box 1 presents some examples of the use of AI in culture. Everything seems to indicate that the significant impact that AI has had on the creative industry represents an alternative to the business models that prevail in platform capitalism (Srnicek, 2017) and surveillance capitalism (Zuboff, 2019), which are characteristic of Big Techs. This is due to the business logic with which Big Techs operate, or rather, their business model is different from the business model (here called alternative) of the creative and cultural value chain. While the former does not create, but only disseminates and determines consumption through recommendations, the latter creates and produces culture, which, consequently, should become the focus of attention with a view to gaining multisectoral support for its development.

More than anything else, cooperation between the cultural sectors and AI-based systems has a key role to play in protecting and promoting cultural diversity and can be of great help in preserving and advancing the massively heterogeneous and rich human cultural heritage.

BOX 1 – EXAMPLES OF ARTIFICIAL INTELLIGENCE IN CULTURE IN BRAZIL

AI IN ARTISTIC CREATION

The use of AI systems in a personalized way for the creation and production of artistic works, using ML, algorithms, and neural networks for classifying, archiving, and processing documents and images taken from institutional databases, social media images, textual searches on the Internet, etc. Examples:

- *Outra 33 Bienal de São Paulo* (*Another 33rd Biennale of São Paulo*), by Bruno Moreschi (2018).
- *Culturas Degenerativas* (*Degenerative Cultures*), by Cesar Baio and Lucy HG Solomon (2018).
- *Calendário Dissidente* (*Dissenting Calendar*), by Didiana Prata (2019).
- *Sentimento da Virada* (*Turnaround Feelings*), by Marilia Pasculli and André Gola (2021).
- *GAIA* (*Grupo de Arte e IA*) (*GAIA – Art and AI Group*).

AI IN MUSEUMS AND CULTURAL INSTITUTIONS MEDIATION

The adoption of virtual assistants and cognitive platforms in face-to-face visits to museums and cultural institutions, which allow the public to interact with works of art by way of audio or video. The adoption of AI also in interactive works that react to the presence of visitors through visual stimuli or inputs from digital platforms, such as social media. Examples:

- *A Voz da Arte* (*The Voice of Art*): Partnership between IBM Watson and Pinacoteca de São Paulo (2017).
- *Café com Santiagos* (*A Coffee break with Santiagos*): Partnership between IBM Watson and Itaú Cultural-SP (2017).
- *IRIS*: Partnership between IBM Watson and Museu do Amanhã (Museum of Tomorrow).
- *Museum of Me – Um mergulho em sua alma digital* (*A dive into your*

digital soul): Centro Cultural Banco do Brasil (Banco do Brasil Cultural Centre) (2019).
- *ToTa Machine*: Museu de Arte Sacra de São Paulo (Museum of Sacred Art of São Paulo) (2020).

AI IN THE ORGANIZATION AND PROVISION OF DIGITAL COLLECTIONS

The indexation of objects and collection items by means of AI and refining searches using software for cross-referencing catalogue data. The creation of applications and platforms for recording, conserving, cataloguing, and making audio-visual material available. The adoption of chatbots to provide virtual assistance in libraries, to answer frequently asked questions, and to provide institutional information. Examples:
- *Acervo de fotos do Jornal Folha de São Paulo* (*Photo collection of Folha de São Paulo newspaper*): Partnership with Google.

- *Centro de Recursos de Aprendizagem e Investigação* (*Center for Learning and Research Resources* – CRAI), Library of the Faculty of Dentistry of the University of São Paulo (USP).
- *Bia*, virtual assistant of the libraries of the Pontifical Catholic University of Rio de Janeiro (PUC-Rio).
- *Lívia*, virtual assistant of the Campus Library of the Federal University of Ceará (UFC).

AI IN CULTURE MANAGEMENT

Using data science and AI to support the monitoring and accountability of cultural projects. Example:
- *SALIC-ML*: Partnership between the University of Brasilia and the Ministry of Culture.

CULTURE ON CENTRALIZING PLATFORMS

Despite the opportunities arising from the use of AI in the cultural and creative sectors, there are numerous challenges to consider in this scenario, particularly because of the over-concentration of AI-monitored data that are in the hands of large platforms. Relying on firmly established mobile technology as the dominant way for accessing, participating in, and sharing on the Internet, the rise of global platforms powered by Big Data and dominated by AI algorithms has been staggering in recent years. By way of data and metadata, algorithmic logic is conquering all industries, regardless of the format of the assets involved, be they digital or analogue. This happens because for the big platforms, data and metadata are not mere by-products, but a new kind of commodity of extraordinary value that can be resold or reused, for example, to optimize algorithms for recommendations and advertising sales. So "Google, Facebook, Amazon and other large platforms are not simply 'online intermediaries,' they

are data companies and, as such, make every possible effort to safeguard and fully exploit their primary input" (Kulesz, 2017, p. 81).

The huge proportion of the data that feeds these companies comes from thousands of songs, videos, texts, photographs, and so on, i.e., human cultural expressions, to which AI models are applied. As data processing and handling capacity increase, machines become increasingly powerful in performing functions, recognizing patterns and making decisions based on predictive models; hence the recommendation systems of platforms such as Amazon, Netflix, Spotify, YouTube, and others. This means that access to media content – images, music, films, videos, and news – depends on distribution by these centralizing platforms, which also condition access to proprietary algorithms developed therein.

Recommendation systems, therefore, are based on algorithmic tracking and monitoring of user accesses to platforms, offering only that which conforms to a fixed pattern of preferences. Under the guise of a service, recommendations, in reality, place users in a hemophilic circle, also called a bubble, an echo chamber or a confirmation bias, i.e., the inability to go beyond a repetitive world view based on biased interpretative patterns. So, the millions of cultural expressions with which the platforms are fed arrive at the pole of consumption reduced to immutable bubbles that stand as barriers to any principles of diversity, both locally and globally (Santaella, 2018).

In view of this, and considering the different stages of the culture cycle, agendas for AI need to be urgently developed in all cultural and creative sectors. While this is already valid in the global context, when considering the contribution that Latin America and the Caribbean can make to preserving and developing cultural diversity, alternative models must be proposed and carried forward for developing a strategic cultural agenda for AI.

THE RISK OF WIDENING THE DIGITAL DIVIDE

There is no question that AI technologies are already progressively playing a prominent role in the creative and production chains of the Global North and are likely to grow rapidly over the coming decades (Kotis, 2021). However, the social, economic, and technological context of the countries of the Global North and the Global South are clearly different.

BOX 2 - DIGITALIZATION AND ARTIFICIAL INTELLIGENCE IN LATIN AMERICA AND THE CARIBBEAN

In Latin America and the Caribbean, the initial issues are linked to the level of infrastructure (Kulesz, 2017b), where inequalities in ICT access, use, and skills persist. With regard to policy formulation, few countries in the region have national strategies that are oriented towards developing AI. In this sense, when AI projects are being developed, consideration should be given to the specific characteristics of the local context in which they are implemented, rather than replicating ready-made models from the Global North.

DIGITAL INFRASTRUCTURE AND ICT USE

Digital infrastructure in LAC is an important challenge for the democratization of AI benefits (Mont et al., 2020). Despite having grown in recent years, the region is in fifth place in fixed broadband subscription penetration (13%) and mobile broadband (73.1%), with proportions that are lower than those of North America, Europe, the Commonwealth of Independent States (CIS)[15], and the Asia-Pacific region (Chart 1).

CHART 1 – WORLD REGIONS: FIXED BROADBAND SUBSCRIPTIONS

Total population (%)

Region	Value
North America	35
Europe	31.9
CIS	19.8
Asia-Pacific	14.4
Latin America and the Caribbean	13
Arab States	8.1
Africa	0.4

SOURCE: ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN (ECLAC, 2021).

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15   The CIS includes: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

CHART 2 – WORLD REGIONS: MOBILE BROADBAND SUBSCRIPTIONS (2019)
Total population (%)

SOURCE: ECLAC (2021).

With respect to the use of digital technologies in LAC, 67% of the population were Internet users in 2019, which indicates that there is still an important portion of people who are not connected (Chart 3). In addition, the lack of ICT skills also continues to be a challenge for more effective use of the Internet. As Chart 4 shows, most of the population has basic skills, while less than 10% has advanced skills (with the exception of Chile).

CHART 3 – LAC REGION: INTERNET USERS (2010-2019)
Total population (%)

SOURCE: ECLAC (2021).

CHART 4 – SELECTED LAC COUNTRIES: ICT SKILLS LEVEL[16] (2019 OR LATEST AVAILABLE)[17]

Total population (%)

Country	Basic	Intermediate	Advanced
Peru	33	21	3
Mexico	33	29	7
Jamaica	16	6	1
Ecuador	28	20	5
Dominican Republic	26	14	7
Curaçao	35	21	4
Cuba	32	22	6
Costa Rica	35	25	4
Colombia	35	26	5
Chile	52	43	12
Brazil	22	15	3

■ Basic ■ Intermediate ■ Advanced
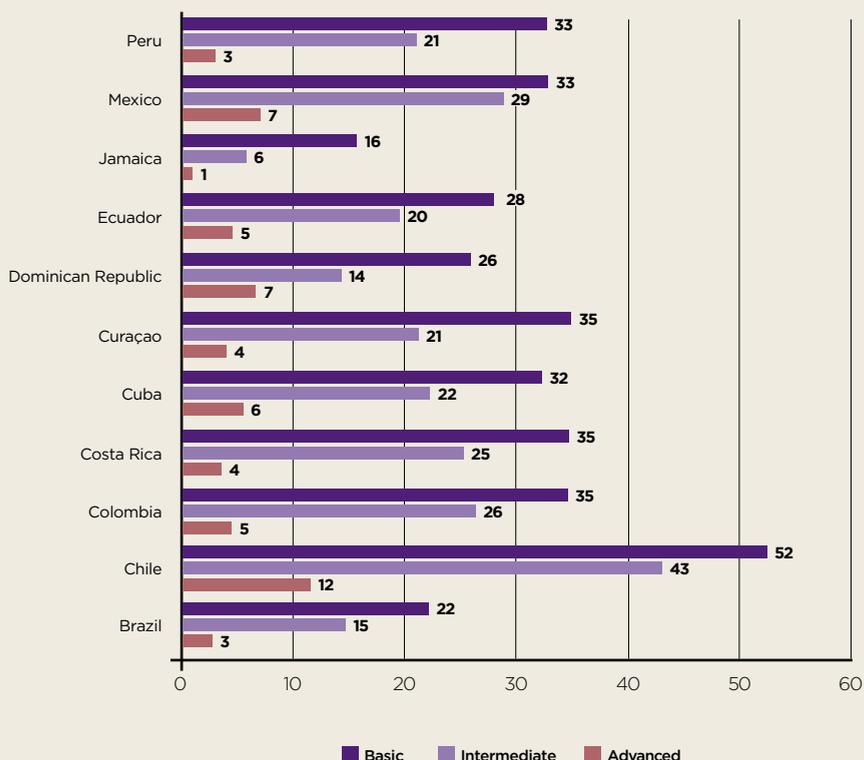
SOURCE: INTERNATIONAL TELECOMMUNICATION UNIO (ITU, 2021).

16   For each country, the basic skills value is highest for the following four computer-based activities: copying or moving a file or folder; using copy and paste tools to duplicate or move information in a document; sending e-mails with attached files; and transferring files between a computer and other devices. The value for intermediate skills is the highest for the following four computer-based activities: using basic arithmetical formulas in a spreadsheet; connecting and installing new devices; creating electronic presentations with presentation software; and locating, downloading, installing, and configuring software. The value of advanced skills is that of writing a computer program using a specialised programming language.
17   The data were collected in different years, as detailed below: Dominican Republic, in 2015; Chile, Curaçao, and Jamaica, in 2017; Brazil and Costa Rica, in 2018; Cuba, Colombia, Ecuador, Mexico, and Peru, in 2019.

NATIONAL STRATEGIES FOR AI DEVELOPMENT

National strategies are important bases for guiding AI development. Table 1 maps the existence of national strategies – digital, data, and AI – in 12 selected countries in the LAC region. All have a digital strategy and an open data plan (with the exception of Trinidad and Tobago). Colombia and Uruguay have national AI strategies, while Argentina, Brazil, Chile, and Mexico are in the process of formulating them.

TABLE 1 - SELECTED LAC COUNTRIES: NATIONAL STRATEGIES (2020)

COUNTRY	DIGITAL STRATEGY	DATA STRATEGY	AI STRATEGY
Argentina	Yes	Yes	In progress
Brazil	Yes	Yes	In progress
Chile	Yes	Yes	In progress
Colombia	Yes	Yes	Yes
Costa Rica	Yes	Yes	No
Ecuador	Yes	Yes	No
Mexico	Yes	Yes	In progress
Paraguay	Yes	Yes	No
Peru	Yes	Yes	No
Dominican Repulic	Yes	Yes	No
Trinidad and Tobago	Yes	No	No
Uruguay	Yes	Yes	Yes

SOURCE: MONT ET AL. (2020).

As it was pointed out, it is a well-known fact that culture is absent from most agendas. However, official documents are starting to appear, that identify a plethora of initiatives in the Global North involving the use of AI in the cultural production chain (Caramiaux et al., 2019; Caramiaux, 2020; Kotis, 2021), an alternative chain that is not overwhelmed by the domination of the Big Techs.

In view of this, the risk of a deepening in the digital divide separating North and South is evident. It is a well-known fact that the creation and production of cultural goods in the Global North take place in societies that operate in the new paradigm of the knowledge economy, which is governed by advanced sciences and technologies that are increasingly under the tutelage of AI. This strongly signals the pressing need to design active AI adoption strategies in LAC that highlight the role AI should play in the cultural value chain.

The risk of Big Techs dominating cultural services is evident if there is no fertile counterpoint to them in cultural production that is creatively autonomous. This counter po-

sition is already occurring in the Global North, because AI has provided the means for such initiatives to be developed.

Today, countries that do not invest in having their own AI culture strategies that are guided by their local conditions, priorities, and values, that do not meet the needs of their artists, producers, and investors in culture, will find their own culture being stifled. This asphyxia comes not only from the hegemonic cultural dissemination and consumption that are promoted by large companies, but also from the mere imitation of creative models that are alien to local factors of infrastructure, legislation, and language (Kulesz, 2017a, 2017b). Given the speed with which AI has been incorporated into culture in the Global North, it is crucial to prevent the risk of a deepening digital divide in time, in the looming version of a cultural and creative divide that is caused by the increasing advances of AI tools. The gap in the production and cultural value chain between North and South must be reduced, since it harms the basic principles of UNESCO that aim to guarantee diversity in cultural expressions and stifles the fundamental characteristics of Latin American and Caribbean culture, which are precisely its diversity and hybridism (Canclini, 1997).

CONCLUSIONS

Although the inclusion of AI tools in all cycles and domains of cultural production is recent, its tendency to grow and multiply is evident. Considering the specific impacts of Artificial Intelligence on culture, there are at least three main aspects. The first are the changes in cultural creation and production with the use of ML and DL for creating assets of extraordinary value in various languages and cultural domains. The second concerns the possibility that the growth of such manifestations and their alternative business models may generate a necessary counterpoint to the productivist logic of the big technology companies. The third refers to the fact that cultural data feed Artificial Intelligence, i.e. algorithms learn from cultural expressions, such as images, music, texts, and videos, with culture being used as an input. This heralds countless opportunities for the development of the cultural and creative sectors due to

advances in productivity, the customization of products or contents, and the generation of qualified jobs and creative possibilities. Although culture is a key area in this debate, it has unfortunately not played the role it deserves in statements of principle and AI strategies.

Despite the possibilities that are opening up, it is necessary to flag some of the warning signs in terms of the obstacles and threats in the use of AI. Artists and cultural producers, generally speaking, do not have comprehensive knowledge of the use of ML, and there is still a lack of data from cultural ecosystems. Copyright regulations also create problems in terms of defining ownership and jurisdictional applications and with respect to who is the creator (artist or machine) and the copyright holder. Economic concentration also affects traditional actors operating in the field; it is possible that the digital and creative divides will deepen, and there are concerns with regard to the production of biased content.

AI is often mistakenly considered to be neutral, especially when its benefits are brought to the fore. Although AI is considered to comprise solidary mechanisms for task optimization, it is based on data that are represented by video-graphic, sound, image, and textual expressions that are contextually marked and subject to bias.

For some time now, the issue of ethics in AI has been on the agenda of official documents and institutional concerns. Since at least 2016, the alarm has been raised with regard to the results of AI applications. The data that machines are fed can have discriminatory biases, and worse, the results obtained by AI processing can boost their effects (Cortiz, 2020). Therefore, care must be taken with regard to the discriminatory risks of data in all fields and activities in which AI is employed.

The issue of AI in culture is a new topic that has only very recently begun to occupy the concerns of experts and official agencies. As we stand today, this paper seeks to put forward for discussion two major challenges that surround AI in LAC culture. First, the brutal omnipresence of the business model of the big platforms, which, through recommendation systems that are monitored by AI, have become dominant in cultural dissemination and consumption. In

counterpoint, the growing trend in the Global North to use AI tools in alternative chains of cultural creation and production points to an antidotal type of functioning that does not allow itself to be suffocated by the economic hegemony and cultural exclusivism of the big platforms.

Although competition may seem unfair in the face of the recommendation systems used by large companies, AI in the arts and creative industries is still growing and multiplying. To do so, it can and must take advantage of the innovative tools that large companies provide under certain conditions. However, it is precisely this growth, which is manifested mainly in the Global North, that points to a second challenge which, in LAC, becomes even tougher when added to the first challenge: the imminent risk of a widening of the digital divide. With both challenges in mind, the following recommendations are guided by the principle of diversity, so that initiatives to incorporate AI into alternative creative and cultural production chains in LAC achieve significant growth momentum. This requires multi-sectoral encouragement and public policies that are able to trigger the initiatives that are already emerging, but in an atomized and still incipient way.

RECOMMENDATIONS[18]

(i) Including AI in the socio-economic development of the region

LAC countries need to continue with and mature their strategies with regard to the use of AI in the socio-economic development of the region, by formulating public policies that promote investments in AI, partnerships with leading private sector companies, academia, and global partners, and encouraging the development of the new skills that are required by the workforce and academia for AI. Intersectoral dialogue should be encouraged to assess the potential benefits and challenges of AI, considering its effectiveness in the region.

18 This section is based on the recommendations resulting from the Regional Forum on Artificial Intelligence in Latin America and the Caribbean, jointly organized by the UNESCO, NIC.br, and the Brazilian government through the Ministry of External Relations (MRE) and the Ministry of Science, Technology, Innovations and Communications (MCTIC). More information available at: https://unesco-regional-forum-ai.cetic.br/pt/

(ii) Inclusion of culture in AI development strategies

It is important to recognize the impacts that the extremely disruptive nature of digital technologies, powered by AI algorithms, are having on culture. Agendas dealing with AI in culture need to gain momentum in LAC. Culture needs to be included among the concerns and acquire a force that is equal to that of ethics, which is rooted in culture. Unfortunately, documents on ethics for AI tend to ignore the "culture" variable, which means that their directives may be mere declarations of intention but without any concrete application, in a world characterized by heterogeneity in all its spheres, especially the cultural sphere.

(iii) Promoting cultural diversity on major platforms

New developments using AI have an impact on guarantees for cultural diversity, for which the role played by LAC is key. Today, cultural expressions are mainly accessed and consumed by way of large technology companies, which are infused by data created in the cultural production chain, monitored by AI and disseminated to hyper-segmented audiences. From this it is possible to conclude the importance of the role that AI plays in boosting the development of the cultural production chain in LAC, in order to prevent Big Techs from being fed exclusively by data coming from the Global North production chain.

(iv) Creating local data ecosystems

The region's capacity for producing cultural data and statistics needs to be strengthened. The first step towards this will be to digitize collections in all culture-related institutions: without digitized collections there are no data for use by AI tools, which depend on a local data ecology, with a view to promoting an open-source policy with the potential to provide statistics and other information bases for local developers. Since the use of AI in the cultural production chain also involves the collection, management, and use of data, it is essential that projects developed in LAC are guided by an ethical framework for AI that considers ethics by design. In other words, ethical issues, transparency, trust, and, above all, diversity must be taken into consideration in the models and at each stage of their design.

(v) Mapping actors and networking

Little can be said about the presence of AI in LAC culture without a survey being conducted to map existing initiatives in both the arts and creative industries in the region. It is not only a question of mapping trends, but it is, above all, a basis for establishing a pilot program for the development of AI in LAC culture. This mapping can help stimulate both local strategies and networks of local and global interconnections.

(vi) Promoting research and capacity building

Advancing the AI and culture agenda should also consider initiatives aimed at training and research, including the following activities: bringing AI closer to those with less access to it, and who know little about its tools; making AI more inclusive, usable, and interactive; addressing the needs of local artists and creative entrepreneurs; investing in both training activities that help them experiment and create partnerships with AI, and in platforms and apps that contribute to the visibility of local producers; and implementing AI-focused programs in universities, research centers, and other non-profit institutions.

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Part 2

QUALITATIVE RESEARCH ABOUT ARTIFICIAL INTELLIGENCE AND CULTURE
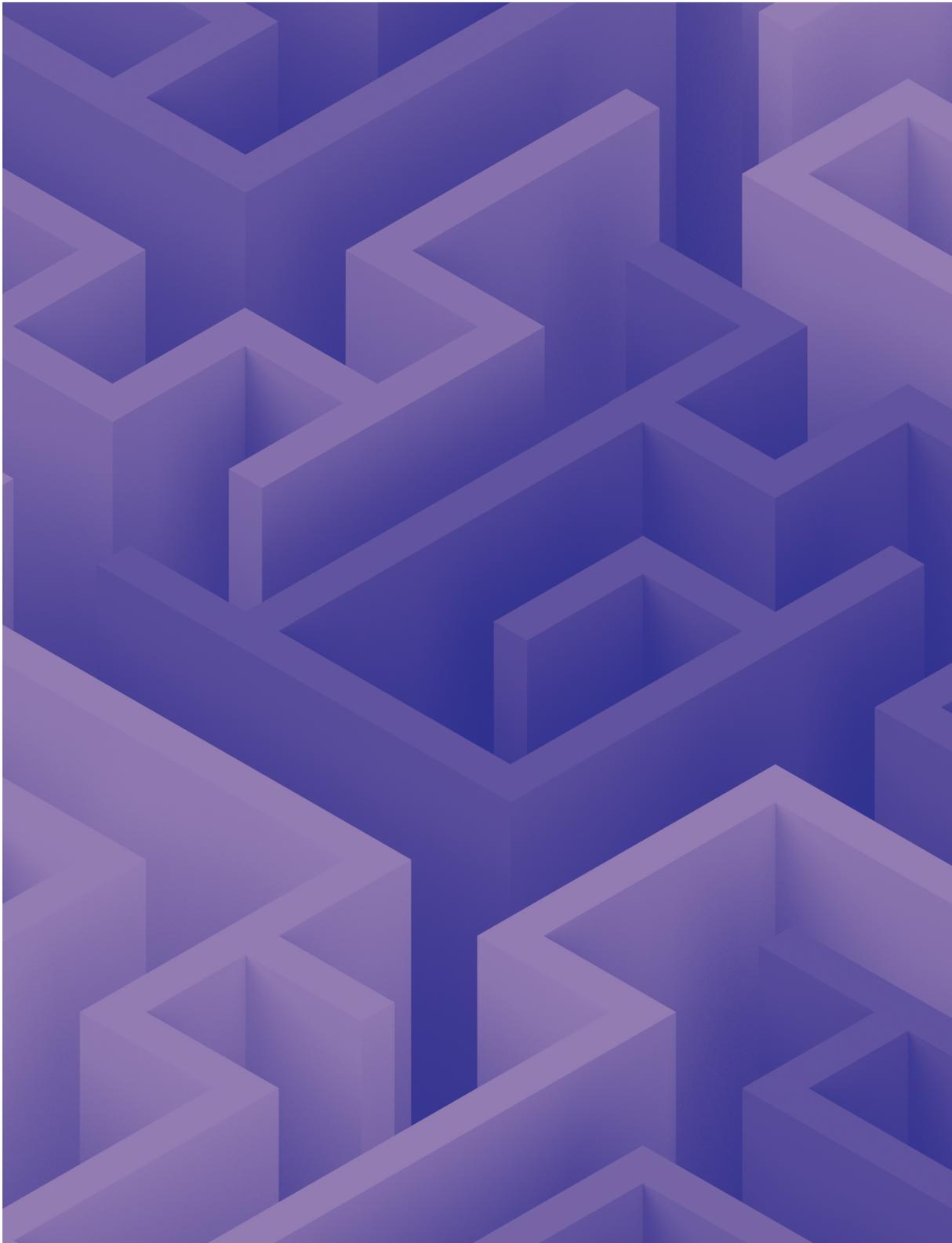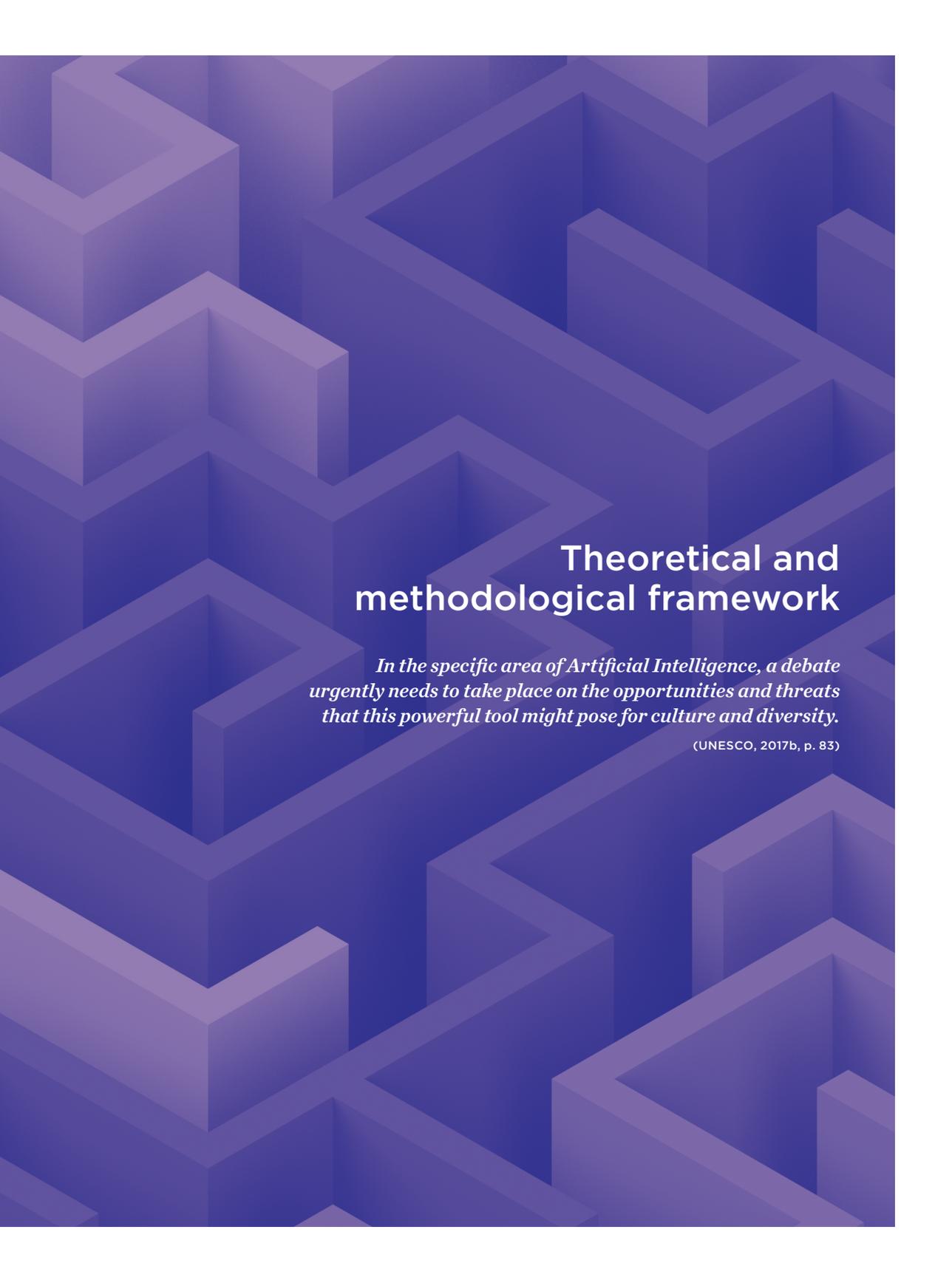
Theoretical and methodological framework

In the specific area of Artificial Intelligence, a debate urgently needs to take place on the opportunities and threats that this powerful tool might pose for culture and diversity.

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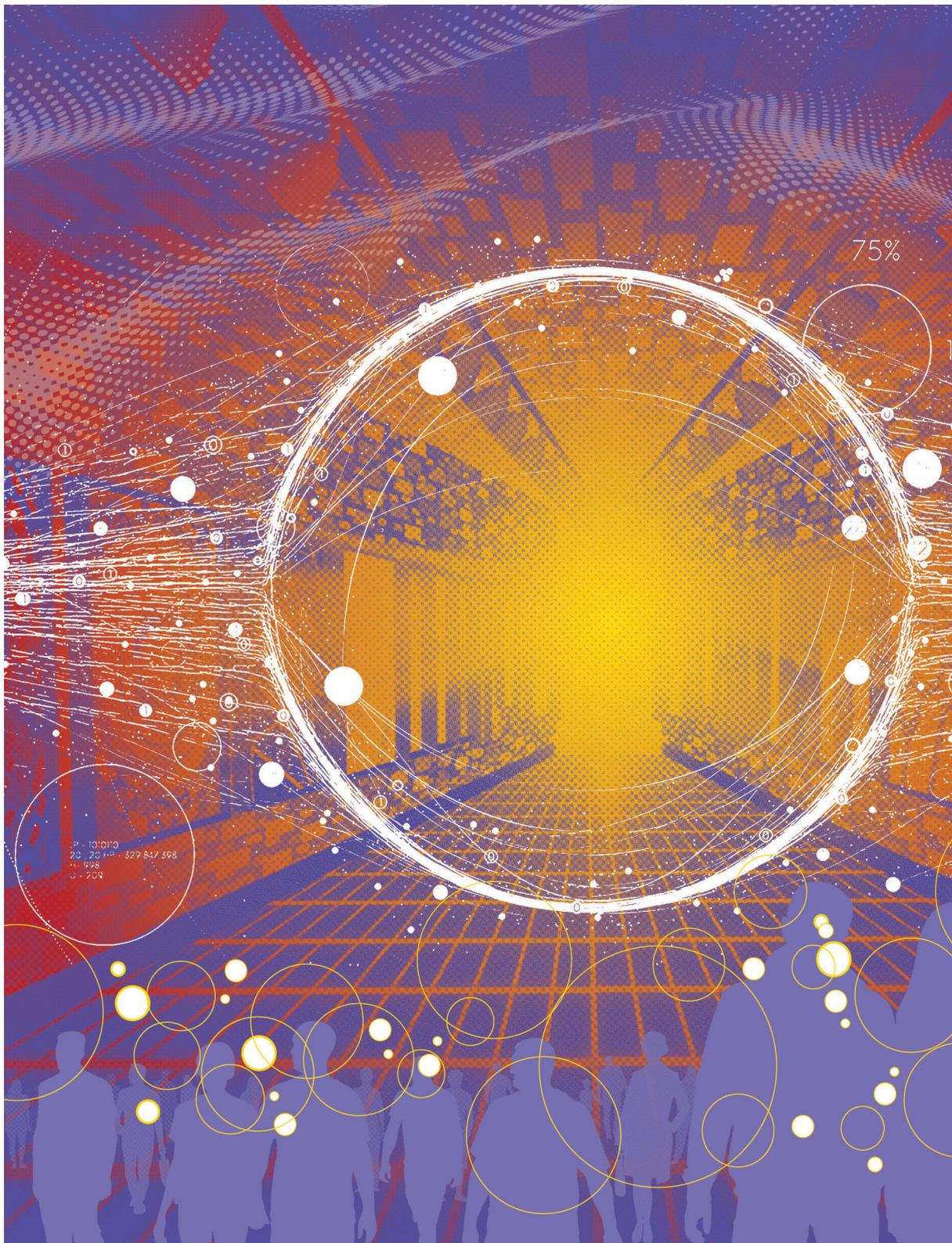
INTRODUCTION

With the objective of understanding the use of Artificial Intelligence (AI) in the cultural sector and its implications for protecting and promoting the diversity of cultural expressions in the Brazilian context, the Regional Center for Studies on the Development of the Information Society (Cetic.br), department of the Brazilian Network Information Center (NIC.br), designed a qualitative research project to look at AI and culture. The research addresses aspects related to the application of AI in the various stages of the cultural value chain that involve both the creation and production processes, and the diffusion and transmission of cultural goods. It also considers its effects on the cultural practices of the population. The study presents an overview of the adoption of AI in culture in Brazil and discusses the opportunities and challenges that arise, based on the perspectives of important actors that are involved in this field, including cultural agents, cultural institutions, and digital platforms.

The Convention on the Protection and Promotion of Diversity of Cultural Expressions (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2005), which was adopted in 2005 by UNESCO, is one of the most important frameworks for cultural policies at the international level.[1] This issue arises in the context of globalization, and in the face of the supposed threat of cultural homogenization with the intensification of flows made largely possible by information and communication technologies (ICT) (UNESCO, 2009b).

Although the technological dimension is dealt with in that document, it only entered the agenda in a more effective way after more than a decade, with the approval of

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1   According to the Convention of 2005, "'Cultural diversity' refers to the manifold ways in which the cultures of groups and societies find their expression. [...] Cultural diversity is made manifest not only through the varied ways in which the cultural heritage of humanity is expressed, augmented and transmitted through the variety of cultural expressions, but also through diverse modes of artistic creation, production, dissemination, distribution and enjoyment, whatever the means and technologies used." (UNESCO, 2005, p. 13).

the Operational Guidelines on the Implementation of the Convention in the Digital Environment (UNESCO, 2017b). By focusing on the cultural goods and services that are created, produced, disseminated, consumed, and stored by electronic means, the incorporation of digital technologies in this debate is noted in an embryonic way, in the face of an increasingly digitalized scenario.

At the same time AI has become increasingly more important and is being applied in various sectors. It has been used in culture to create, edit, and adapt the content of artists and producers working in the field of visual arts, music, and literature. Among cultural institutions, such as libraries, museums, and culture centers, AI systems have also been used for cultural management and mediation, whether in the development of strategies for reaching their audiences in a more effective and extensive way, or for interaction and service by way of automated tools. In the sphere of memory and heritage, it is used for managing information and cataloging collections, via automatic indexing and the qualification of metadata. Furthermore, it is widely used, especially by the digital platforms that make content available on the Internet, whose recommendation systems have also become decisive, not only for the enjoyment of culture online, but also for the production chain, and in particular that of audiovisual content and music.

At the intersection between these topics, the application of the Convention in the context of AI only explicitly appears in 2019, when it was written that: "The 2005 Convention is technologically neutral. Its objectives and guiding principles apply to all new technologies, including Artificial Intelligence" (UNESCO, 2019). AI is dealt with in that document as one of the challenges to diversity of cultural expressions in the digital age, to the extent that it is presented as a monopoly of large platforms. The promotion and the protection of the diversity of cultural expressions are central in the cultural agenda at the international level, which, in an incipient way, is just beginning to incorporate the dimension of digital technologies and, in particular, of AI.

Despite the centrality of this agenda, research dealing with the adoption of AI tools in the cultural field is still incipient,

as is the discussion of its effects on the production and consumption of cultural goods. This research, therefore, aims to reflect on AI in the agenda of cultural policies and to give visibility to the dimension of culture in digital strategies and AI. Based on the particularities of the case of Brazil, it is hoped that this research makes its contribution to the international debate, especially considering the promotion of cultural diversity and the development of possible regulatory strategies and public policies.

THEORETICAL FRAMEWORK

In constant development, AI and culture, as concepts, adopt multiple approaches, and so definitions are necessary in this scenario for locating and contextualizing them within the scope of this research.

AI comprises a set of technologies with the capacity to process information in such a way as to reproduce intelligent behaviors that are based on a combination of data, algorithms,[2] and computing power (European Commission, 2019a, 2020). AI applications consist of systems that use a large volume of data to classify and analyze them in order to arrive at specific decisions.

In the wide spectrum of methods that go to make up the universe of AI, machine learning (ML) systems, which also include a subset of deep learning (DL) techniques, will be considered in particular (Figure 1). In this area, algorithms are trained to infer and extract patterns based on large datasets, which means that machines learn by themselves and automatically improve through experience, in order to determine the necessary actions for achieving a certain objective (Caramiaux, 2020; European Commission, 2020).

2   Algorithms can be defined in a summarized way as "a series of steps or procedures that the computer is instructed to follow" (Broussard, 2018, as cited by Jin, 2021, p. 16), that is, they correspond to predefined and codified instructions to be executed by the machine.

ARTIFICIAL INTELLIGENCE
Any technique that enables
computers to mimic human
intelligence, using logic, if-then rules,
machine learning (incluiding DL).

MACHINE LEARNING
A subset of AI that
includes abstruse statistical
techniques that enable
machines to improve at
tasks with experience.

DEEP LEARNING
The subset of ML composed
of algorithms that permit
software to train itself to
perform tasks, like speech
and image recognition,
but exposing multilayered
neutral networks to vast
amounts of data.

SOURCE: MOORE (2019, AS CITED BY JIN, 2021, P. 17).

In view of the investigation into the adoption of AI systems, particularly in the cultural field, this study will use the following definition of:

> AI as the simulation of human intelligence through computers supported by and connected with Big Data and algorithms, to not only 'intermediate' human-machine interactions but also 'mediate' production and consumption of media and culture through the convergence of intelligent technology and human creativity. (Jin, 2021, p. 21)

In turn, the concept of culture can also be understood in different ways, which range from the universe of the arts and humanities to systems of values, identities, and the ways of life of different social groups (UNESCO, 1982). Recognizing the importance of a concept that is, at the same time, both encompassing and operational, cultural activities, goods, and services are considered as vehicles of identity, values, and meanings "which at the time they are considered as a specific attribute, use or purpose, embody or convey cultural expressions, irrespective of the commercial value they might have" (UNESCO, 2005, p. 13-14).

The research, therefore, takes a sectoral approach that starts by analyzing the cultural value chain at its different stages, from creation and production to distribution, access, and participation in cultural activities (UNESCO, 2017b). Even though differences may be found in the nomenclature and definition of these stages, the study understands: creation to be the process that gives origin and authorship to cultural goods; production to be the realization process of reproducible forms of these goods; distribution to be the stage when cultural goods and services are disseminated to reach their public; and, finally, access and participation to be stages that involve the public enjoyment and appropriation of these goods and services, and their involvement in cultural activities (UNESCO, 2009a, 2012).

Starting with the cultural value chain, we also consider the transformations that resulted from the emergence of digital technologies, which substantially altered its functioning from a pipeline model to a network model (Figure 2). Instead of each of the stages following on and adding value to a product or a service in relation to the previous stage in a continuous way that is distributed over time, the digitalization promoted the creation of points of intersection in each of these processes, which interact with each other concomitantly, based on an exchange of data (UNESCO, 2017b).

FIGURE 2 – CULTURAL VALUE CHAIN MODELS

'Pipeline' model

'Creation' → 'Production' → 'Distribution' → 'Access' → 'Participation'

Network model
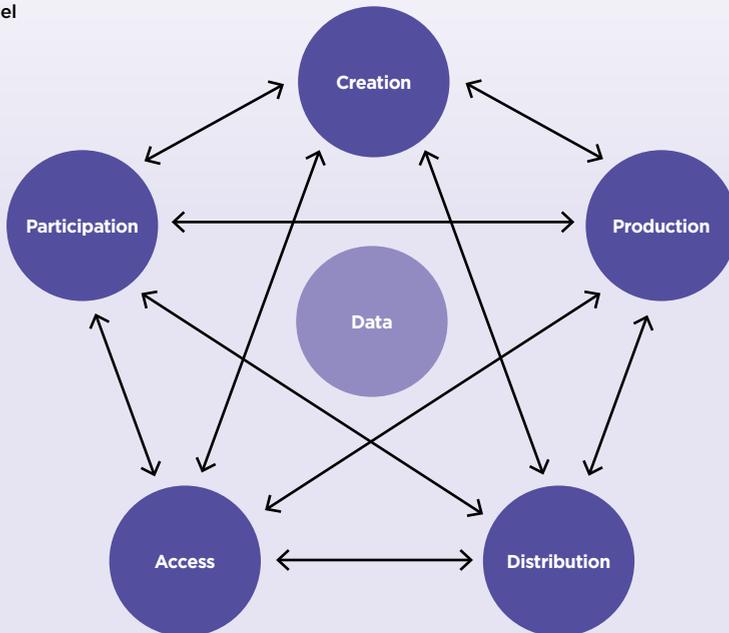
SOURCE: UNESCO (2018, P. 76).

Although digitization has meant this reconfiguration of the cultural value chain, discussion and theoretical production of this subject are still based on the different stages of the cultural cycle, considering the transformations that result from the use of digital technology (Kulesz, 2017; UNESCO, 2017a, 2017b), and more specifically from the use of AI (Caramiaux, 2020; Kulesz, 2018; Rehm, 2020;

Santaella, 2021). These stages, therefore, were the basis of the survey, systematization, and presentation of the research results, although sometimes one stage refers to another in the analysis of certain phenomena.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

To establish a basis for this study, the literature review process tried to identify references at the interface between AI and culture topics. By mapping out concepts, research areas, and existing gaps, this process revealed the state of the field of theoretical and documentary production relating to these topics, and enabled the researchers to locate, direct, and substantiate the scope of this research (Webster & Watson, 2002).

The focus on mapping out the applications of AI in the cultural sector and the implications for the diversity of cultural expressions led the research to undertake a selective review[3] in the search for studies that present this broader sectoral overview and, at the same time, help define its scope. From this literature review, institutional reports and academic publications were found in the fields of both AI and culture.[4]

It is important to note that most of the references identified in the literature review have been published in the last five years, that is, this is an emerging theme that has recently entered the international debate agenda. Furthermore, practically all references provide perspectives centered on countries in the Global North (Caramiaux, 2020; Coalition for the Diversity of Cultural Expressions [CDCE], 2018; Davies et al., 2020; European Parliament, 2021; Rehm, 2020; World Economic Forum [WEF], 2018): few references were found relating to the Global South or, more specifically, to the regional context of Latin America (Kulesz, 2017, 2018; Santaella, 2021).

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3   At the start of the project, a search was carried out in academic databases (Web of Science, Ebsco, Scopus, and ProQuest), which searched for the terms "Cultur*" and "Artificial Intelligence." When analyzing the results by the title of the articles, it was noticed that these publications dealt with specific topics or areas of culture, which would not help when it came to drawing up a broader overview of the debates on AI and culture. A selective review was chosen, therefore, which included an approach that allowed for greater thematic cover, even if this compromised the depth of each of the areas or domains of culture.

4   For further information on the literature review process, see Lima (in press).

On the one hand, starting with the discussion about AI, references were mapped out that indicated ethical recommendations for adopting "trustworthy AI" (European Commission, 2019b) in different contexts. In these cases, diversity is shown as a value or an ethical principle, which reveals a concern with how different cultural matrices and values affect the stages of development and implementation of AI systems (European Commission, 2019b, 2020; UNESCO, 2022). On the other hand, references in the field of culture deal with its relationship with digital technologies in a broader way (Kulesz, 2017; UNESCO, 2017a, 2017b, 2019, 2020) and, in particular, with including AI in cultural production, which results in both benefits and risks for the diversity of cultural expressions (Caramiaux, 2020; CDCE, 2018; Davies et al., 2020; European Parliament, 2021; Jin, 2021; Kotis, 2021; Kulesz, 2018; Pfeiffer, 2018; Rehm, 2020; Santaella, 2021; Santini, 2020; WEF, 2018).

From this point of view, the incidence of AI in culture is presented in a general way, which involves mapping out the uses and implications of adopting AI in the cultural value chain. The documents that were analyzed are structured in the stages of the chain, or mention them generally, and discuss opportunities and challenges of the insertion of AI systems in these processes (Caramiaux et al., 2019; Caramiaux, 2020; Kulesz, 2018; Rehm, 2020; Santaella, 2021; WEF, 2018). They also present the topic and analyze its impacts, both from an economic and cultural point of view, and make recommendations in terms of regulations and public policies (CDCE, 2018; European Parliament, 2021; Kulesz, 2018; Rehm, 2020; UNESCO, 2017a; WEF, 2018).

From the methodological point of view, the topic of AI in culture has been addressed mainly through documentary research and the contributions of specialists (Burri, 2020; Caramiaux, 2020; CDCE, 2018; Kotis, 2021; Kulesz, 2018; Santaella, 2021; WEF, 2018), while empirical research with this approach is also just beginning (Pfeiffer, 2018; Rehm, 2020). Because this study deals with topics that are still not firmly consolidated by conducting qualitative research with actors in the area, it introduces an approach that seeks to identify the opportunities and challenges of adopting AI in

culture from a Global South perspective, with an emphasis, in particular, on the implications for cultural diversity in Brazil.

Based on the literature review and the contribution of specialists (see p. 111), the conceptual framework of the research (Table 1) summarizes the main issues that were identified in relation to the adoption of AI in culture, considering the different stages of the cultural value chain. Since some of these stages overlap, they were aggregated into two dimensions: creation and production, which are closely linked to the origin and conception of cultural works and content; and distribution, access, and participation, which are associated with its dissemination to its audiences, whether by way of digital platforms or in person, and its reach. Although these stages are interlinked in the digital environment (Figure 2), the generation processes of the transmission and reception processes of cultural goods and services are differentiated.

Based on a general overview of relevant topics revealed by stages in the chain, the opportunities and challenges offered by AI applications in the field of culture are highlighted. These two perspectives are at the center of the investigation, because they provide an analytical framework for the objective of the research. Based on this framework, the main discussions identified in the theoretical mapped-out reference, which consisted of the specific topics to be investigated, are presented below.

TABLE 1 – CONCEPTUAL FRAMEWORK

STAGE	TOPIC	OPPORTUNITIES	CHALLENGES	MAIN REFERENCES
Creation and production	Democratization and inequalities	• Democratization of production • Process optimization and less time and costs due to automation • Reduction in entry barriers for creators	• Inequality in the access to technologies • Digital skills and technology appropriation by culture professionals • Segregating digitally marginalized cultural segments	Caramiaux (2020); CDCE (2018); European Parliament (2021); Kulesz (2018); Pfeiffer (2018); Rehm (2020); UNESCO (2017a).
	Innovation and creativity	• Experimentation possibilities	• Homogeneization of creation and production • Regulating copyrights	Caramiaux (2020); CDCE (2018); European Parliament (2021); Kotis (2021); Kulesz (2018); Pfeiffer (2018); Rehm (2020); UNESCO (2020); WEF (2018).
	Accessibility and linguistic diversity	• Adapting content for accessibility • Content translation and linguistic diversity	• Reducing the use of local dialects and linguistic variations	Caramiaux (2020); CDCE (2018); European Parliament (2021); Rehm (2020); UNESCO (2020, 2022).
Distribution, access, and participation	Availability of content	• Audience mapping and planning cultural activities • Information management and documentation qualification of digital collections	• Concentration of content offer • Presence of content representative of cultural diversity	CDCE (2018); European Parliament (2021); Europeana (2020, 2021); Kulesz (2017, 2018); Lyu (2020a, 2020b); Rehm (2020); UNESCO (2020, 2022).
	Content visibility	• Integrated search and content recommendation • Interactivity and personalization of the experience	• Underrepresentation of local and independently produced content • Homogenizing trends in creation and production • Pricing and creators' remuneration • Dependence on external technological solutions	Caramiaux (2020); CDCE (2018); European Parliament (2021); Europeana (2020, 2021); Kotis (2021); Kulesz (2018); Lyu (2020a); Pfeiffer (2018); Rehm (2020); UNESCO (2009, 2017a, 2017b, 2019, 2020, 2022); WEF (2018).
	Transparency	• Digital literacy and raising social awareness	• Algorithm's opaqueness • User control of the parameters of the recommendation systems	Caramiaux (2020); CDCE (2018); European Parliament (2021); Kotis (2021); Kulesz (2018); UNESCO (2017a, 2017b, 2022); WEF (2018).

SOURCE: PREPARED BY THE AUTHORS.

It is important to mention that the conceptual framework served as a starting point for collecting and analyzing the empirical data of the research. The topics listed were revisited and/or complemented throughout the data collection process, especially considering the particular context in which the study was carried out, which presents a view from the Global South based on the Brazilian experience.

METHODOLOGY

METHODOLOGICAL STRATEGY

The great strength of qualitative research is its understanding of multiple and contemporary phenomena in all their complexity. Among the different qualitative strategies that exist, the choice was to undertake in-depth interviews with actors who have experience in the field. The research carried out an initial survey of AI applications in the Brazilian cultural sector and discussed their implications for the diversity of cultural expressions from the perspectives of agents who work in this sector. This is, therefore, an exploratory, qualitative study that seeks to analyze a phenomenon, about which little is still known or studied, and that is quite incipient in some scenarios.

Based on the interdisciplinarity and actuality of this scenario, two meetings were held by videoconference with culture and AI specialists to ensure that the various sectors and topics that go to make up the study were represented. The first meeting took place at the beginning of the project in February 2021 and had nineteen participants. Its objective was to look for aspects that should be considered in the research. The purpose of the second meeting, which was held in December 2021 with twenty-six people, was to present the conceptual framework of the research resulting from the literature review, validate the topics to be addressed, obtain suggestions from the experts, and get to know something of their experiences using AI and culture in Brazil before data collection started. In addition to the discussions during the meeting, written contributions were received from experts. Scientific coordinator, Marlei Pozzebon (HEC Montreal and São Paulo School of Business

Administration at Fundação Getulio Vargas [FGV EAESP]), and the field management team, Guilherme Varella and João Brant (Instituto Cultura e Democracia), took part in designing and developing the research.

Considering the different degrees of institutionalization that exist in the sector, initiatives that use AI tools in different areas of culture were addressed in order to consider a broad and introductory perspective of the subject. The research was carried out, therefore, with the following classes of respondent: (i) cultural agents; (ii) cultural institutions; and (iii) digital platforms. This definition tried to consider different institutional contexts that range from individual artists and cultural producers who use AI in their creative processes, to traditional institutions that work predominantly in person and are developing their digital strategies, and digital platforms that operate in the online environment and have technology at the heart of their operations.

Data were collected by way of in-depth interviews with representatives of these three classes of respondents who use AI in their work and organizations. Three interviews were also conducted with specialists, with the aim of better understanding some of the specific topics that were little explored in the other interviews, such as copyright and accessibility. This is, therefore, an intentional sampling strategy based on the learning opportunities presented by the observed experiences, which rather than mere representativeness, seek the potential for collaborating with the research objective and understanding the phenomenon in question (Creswell, 2012; Stake, 2005); in other words, representativeness is replaced by the competence of the interviewees in the topic under investigation.

DATA COLLECTION

In order to provide an overview of the adoption of AI in the Brazilian cultural sector, the research sought to understand the phenomenon in greater depth based on multiple perceptions. Between February and June 2022, twenty-five remote interviews were carried out that were evenly distributed between the three classes of respondents.

Starting with the respondent's competence based on accumulated experiences and knowledge about AI and culture,

which was the most important selection criterion for the study, the recruitment strategies initially mapped out those initiatives that use AI in culture in Brazil and looked for those responsible for its development and/or implementation. In the case of institutions and platforms, the organizations themselves indicated the person they considered most able to talk about the topic.[5] It was not necessary, however, to be an institutional spokesperson, as the interviews were desidentified to preserve the confidentiality of the responses and the privacy of the interviewees.

Even so, several entities refused to participate in the research, especially in the case of international platforms that operate in the country. In addition to reasons of confidentiality and lack of authorization to address the topic, the reasons mentioned included a lack of professionals able to talk about AI in Brazil (especially due to the work being done by development teams outside the country), a lack of response from the central teams, and processes of mergers and redefinitions in the organizational structure that prevented participation at the time of the request.

The profile of interviewees, presented below (Table 2), uses the grouping of people interviewed based on broader characteristics. Although considered relevant when they were being recruited, additional information about the profile of the respondent, such as the size of the institution (small or large), public or private, Brazilian or international, its business model (commercial or independent), is purposely not presented, with the aim of preserving the confidentiality of the responses.

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5   The diversity of the experiences that were mapped out was also reflected in the diversity of the profiles interviewed, which involved professionals in the public relations, public policy, communication, marketing, legal, information technology, innovation, AI, Big Data, product design, operations, content, programming, dissemination, research, documentation, collection, and executive board areas, among others. In some cases, more than one professional was indicated, and the interview was carried out collectively.

TABLE 2 – PROFILE OF THE INTERVIEWEES

CLASS OF RESPONDENT		CHARACTERIZATION
Cultural agents		5 visual artists
		3 music producers
Cultural institutions		2 cultural centers
		4 museum institutions
Digital platforms		4 audiovisual platforms
		2 information platforms
		2 music platforms
Thematic	Accessibility	1 developer
	Copyrights	2 researchers

SOURCE: PREPARED BY THE AUTHORS.

The interviews were complemented by documentary research, which aimed to go into certain experiences that were considered relevant to the study in more depth. The search for information about projects and works of art that had been developed using AI, institutional documents and reports that addressed initiatives in this area, and even corporate policies that dealt with the topic resulted in greater inputs for the research. This occurred throughout the entire collection process and was able to help in preparing the interviews, in complementing them based on key points mentioned by the interviewees, and in the data analysis. The triangulation process for a comprehensive and rich understanding of the use of AI in culture, therefore, occurred through dialogue with different actors in the cultural sector, and the information being complemented by multiple forms of data collection (Creswell, 2012; Stake, 2005).

RESEARCH PROTOCOL AND INTERVIEW SCRIPT

A semi-structured interview script was prepared based on the conceptual framework. This script worked as a list of questions to be addressed during interaction with each interviewee, with the possibility of adapting and exploring the topics according to what emerged in each interview (Patton, 2002).

Considering the different contexts in which AI is adopted in culture, the project included general questions that are common to the three classes of respondents, and questions that are aligned more with the reality of each of these audiences. The script, therefore, was unique and started with a general introductory section on the uses of AI, which was applicable to all the interviewees. It was divided, however, into specific sections that were to be gone into in more detail depending on the profile of the interviewee and the corresponding stages of the application of AI: creation and production, and/or distribution, access, and participation. Finally, it ended with questions related to ethics and the development of AI.

The interview was organized into four major modules of topics that addressed the following issues:

1. **The use of AI**
    The purposes of AI and its application areas, the main benefits and difficulties encountered, the professionals involved, and the skills required.

2. **Creation and production**
    Opportunities for experimentation, innovation and creativity, copyright, and content adaptation for accessibility in other languages.

3. **Distribution, access, and participation**
    Content curation, parameters of the search and recommendation systems, the effects on production and on creators' remuneration, and data analysis for action planning.

4. **AI ethics**
    Processes for the development, training, and review of AI applications, documentation, transparency, and initiatives for raising social awareness.

The focus of the interviews could vary depending on the class of respondent being interviewed, aiming to identify common threads and peculiarities in the analysis topics and categories. Considering this indication, pilot interviews

were carried out with cultural agents, institutions, and digital platforms, the objective being to verify the suitability of the script, given the different realities, and implement any necessary adaptations.

The interviews were conducted via videoconference and lasted approximately one hour. The recordings were transcribed in order to analyze the data in a detailed and in-depth way. To carry out the interviews, and motivated by the ethical principle followed by Cetic.br|NIC.br when undertaking research, the interviewees agreed to the Term of Consent for participating in qualitative research. The legal basis on which the collection and processing of personal data was based[6] when conducting this study was the Brazilian General Personal Data Protection Law (*Lei Geral de Proteção de Dados Pessoais* [*LGPD*]) (2018), so all individual responses were kept confidential, as was the identity of the interviewees.

DATA ANALYSIS

The data were analyzed using a thematic coding process that identifies segments of the transcripts with labels that help synthesize and systematize the data into concise categories (Charmaz, 2006; Miles et al., 2014). This process took the conceptual framework as its starting point and added new emerging topics, that is, it was an abductive process of interaction between the provisional labels inspired by the conceptual framework and the emerging labels produced from the empirical material (Alvesson & Sköldberg, 2009; Miles et al., 2014). Using ATLAS.ti, a qualitative data analysis software, data were coded in two stages: the first stage was based on the categories that were pre-defined by the conceptual framework, while the second stage objective was to identify new categories that might have emerged during the rigorous and structured analytical process. The first stage identified recurring themes and perspectives that dialogued with the literature that had been previously identi-

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fied, while the second stage sought to list new perspectives and relevant themes that were found, based on the specific context of the research, namely, the applications of AI in culture in the Brazilian scenario. With this, it was possible to analyze to what extent this scenario endorses the issues discussed in the Global North, and to what extent the Brazilian context imposes new questions and themes from the Global South, with their respective opportunities and specific challenges.

The results of the research represent, therefore, an effort of analytical generalization very important for the construction of knowledge in AI and culture in Brazil. It is worth reinforcing that this is one of the great properties of qualitative research: to offer analytical categories that, by allowing the understanding of social phenomena, play a fundamental role in the construction of knowledge.

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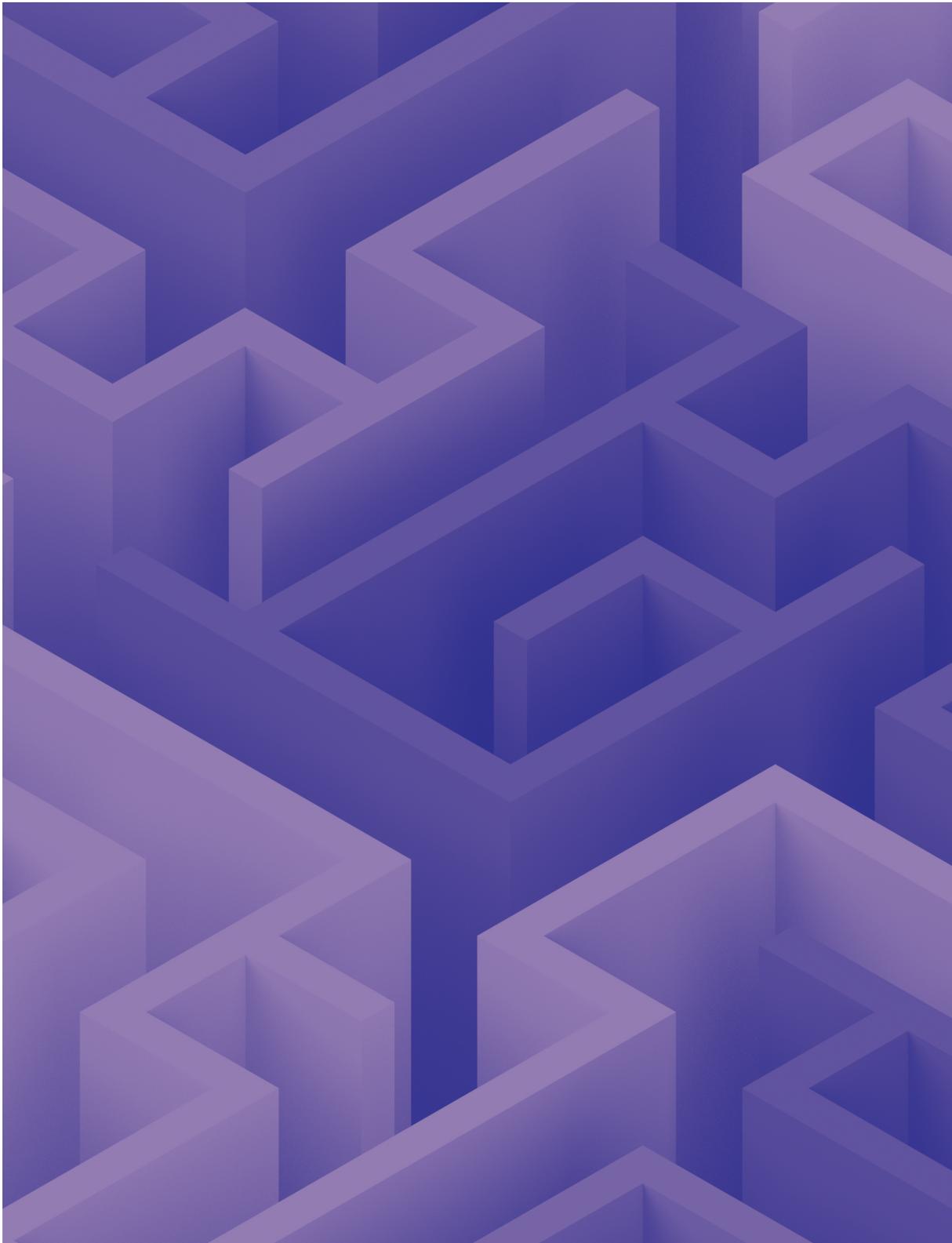
An analysis of Artificial Intelligence uses and its implications for cultural diversity in Brazil

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INTRODUCTION

The growing use of digital technologies in the cultural sector has substantially altered the cultural value chain at all its stages, from creation and production to distribution, access, and participation in cultural activities (European Parliament, 2018; World Economic Forum [WEF], 2018). In addition to the transformations caused by information and communication technologies (ICT) in general – such as reducing the costs of producing and spreading content, and diversifying offer vis-à-vis the classic cultural industries (NIC.br, 2017; Santini, 2020) –, the adoption of Artificial Intelligence (AI) in culture has amplified trends in the sense of segmenting and personalizing access to goods, services, and cultural activities, expanding global offer and, at the same time, restricting it according to the users' preferences and previous choices. Such changes affect not only the cultural habits and practices of the population, but also the forms of production and distribution, in a scenario in which these stages are increasingly interconnected (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2017b).

Although there are numerous aspects to be explored in this regard, the incidence of AI in culture is generally presented in the literature based on the mapping of the uses and implications of the adoption of AI in the cultural value chain (Caramiaux et al., 2019; Caramiaux, 2020; European Parliament, 2021; Kulesz, 2018; Rehm, 2020; Santaella, 2021; WEF, 2018). In this sense, the qualitative research conducted by Cetic.br|NIC.br to understand the use of AI in the Brazilian cultural sector, frames the stages of the cultural chain in two major dimensions: creation and production; and distribution, access, and participation. The former encompasses the processes of conception and realization that give rise to cultural goods; the latter, in turn, deals with their transmission, since distribution enables the connection between creators and producers and their audiences, whereas access and participation concern the reception by these audiences and their involvement in cultural activities.

Based on these two dimensions, this chapter brings the results of this research, offering a preliminary understand-

ing of the use of AI in the Brazilian cultural sector and discussing its implications for the protection and promotion of cultural diversity. The analysis seeks to map out AI-based applications in culture and understand the opportunities and challenges that arise from the perspective of three classes of respondents: cultural agents (artists and producers), cultural institutions, and digital platforms that offer cultural content.[5] Thus, the chapter describes in a non-exhaustive, but preliminary and indicative manner, a panorama of uses, opportunities, and challenges involving the presence of AI in the Brazilian cultural sector.

CREATION AND PRODUCTION

In the creation and production stages, AI-based applications are being used directly in the design of works in various languages (such as music, audiovisual, visual arts, and literature) and in the adaptation, editing, and translation of content, whether images, videos, audios, or texts (Caramiaux, 2020; Coalition for the Diversity of Cultural Expressions [CDCE], 2018; European Parliament, 2021; Kotis, 2021; Kulesz, 2018; Pfeiffer, 2018; Rehm, 2020; WEF, 2018). Through automation, pattern identification, and optimization of repetitive tasks, AI has collaborated with cultural agents in their creative processes, for example, in the use of software for video editing, image manipulation, or music mastering.

Although the use of AI is still limited among Brazilian cultural agents, the research mapped out experiences that are of great interest to the discussion about the implications of AI when it comes to creating and producing cultural goods, especially in music and the visual arts. Cultural agents have been using AI in their creative processes **operationally** – in intermediate procedures, such as editing, mixing, and mastering – and **aesthetically**, in which it appears as the very final object of artistic creation.

The popularization of AI-based applications at these stages has enabled **processes optimization**, and **democratization of production**, thereby reducing the entry barriers to new professionals joining the cultural sector. Such opportunities are limited, however, because of the **digital inequalities** that exist in accessing and appropriating technologies in Brazil. From the point of view of creativity, the adoption of AI also introduces new possibilities of **experimentation** for an innovative aesthetic creation, at the same time that it poses risks, given the potential for **homogenization and standardization** of the works that are created (Figure 1).

FIGURE 1 – AI USED BY CULTURAL AGENTS IN CREATION AND PRODUCTION

SOURCE: PREPARED BY THE AUTHORS.
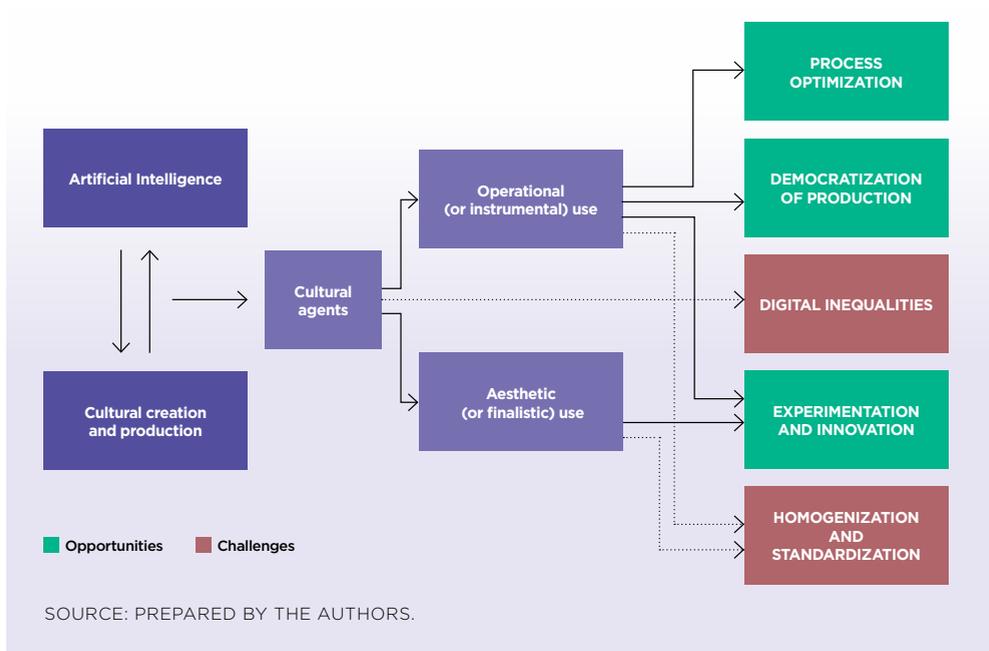
CULTURAL AGENTS

Whilst AI can help empower many creators, making CCS [cultural and creative sectors] more prosperous and driving cultural diversity, the large majority of artists and entrepreneurs may not still be familiar with AI tools.

(European Parliament, 2021, p. 29)

In the creation and production stages, AI uses relate primarily to artists and cultural producers, broadly referred to as cultural agents. Understood as individuals who develop their own cultural productions, the interviews conducted for the research included professionals from the cultural sector and new creators who use AI in the performance of their work.[6]

In this aspect, cultural agents make the instrumental handling of technology or take the very elements of AI (algorithmic programming and machine learning [ML]) as the object of the aesthetic and creative process. Thus, it was possible to categorize the different uses of AI-based systems at these stages into two types: operational (or instrumental) and aesthetic (or finalistic).[7] The first type comprises the use of AI as an ancillary tool for the execution of artistic making and characterizes it as a catalyst in certain production processes, for example, in editing and mastering images, videos, and audio. In the second type, aesthetic, AI merges with the artistic object itself, becoming a platform of creative language for the final creation of works, especially by visual artists.

Operational (or instrumental) use

The literature on the use of AI in culture points to efficiency gains and cost savings due to the automation of repetitive tasks (Kulesz, 2018; Pfeiffer, 2018; Rehm, 2020). In the Brazilian context, AI-based applications have been used in music, audiovisual, and visual arts as instrumental tools in the optimization of intermediate processes, such as editing, processing, programming, or finalizing. This type of use allows the automation of certain processes and the simplification of complex tasks, which makes it possible to reduce production time.

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6   The research did not address the use of AI applications by the general population, although this occurs to a large extent, for example, in image editing and use of popular filters on social networks. Such a scope also focused on cultural agents who make use of AI in their creations and productions, which allowed for a deeper understanding of the adoption scenario of these tools, but not to explore barriers among those who do not use them.
7   The typification of AI uses by cultural agents corresponds to a simplification for analytical purposes, since the boundaries are blurred and such uses sometimes overlap, as indicated below. Still, these help to understand the different purposes of adopting AI in creative processes.

"[...] is a tremendous process accelerator. Recently, I had to make two records at the same time [...], I was getting crazy, I had 10 days to deliver everything, everything was already recorded, and I had to mix it. Then I discovered a plugin package and instead of me taking each instrument, equalizing, compressing, preparing, you throw it in there, [the AI-based system] detects which instrument it is and prepares it for you. So, it made the process 10 times faster."

(MUSIC PRODUCER)

The use of such process-facilitating tools also implies cost reduction and allows technical work to be performed in environments that are not necessarily professionalized. In the music industry, in a specialized way, the use of editing, equalizing, mixing, and mastering tools enables new forms of independent work.

"But the thing is that nowadays I do it here at home, I send it to the Internet, the system does it and actually delivers it to me very well done, and for a ridiculous price. Not ridiculous, it's expensive, but [...] it's ridiculous compared to what mastering would cost."

(MUSIC PRODUCER)

Another example of the operational use in music is that of separating the channels of a music track (phonogram) by means of AI, which allows voices and instruments to be separated into different frequencies so that they can be individually edited. This type of resource is used to break down arrangements, orchestrations, and "mock-ups" of songs so that they can be performed remotely.

"[...] when it comes to audio separation, this stuff saves my life two or three times a week. Sometimes someone sends me a demo on WhatsApp, guitar and voice, and I separate guitar from voice and start working. It doesn't matter, the guy didn't come here. I play the guitar again, then the guy comes and records the voice. So that thing was very life-changing and changed it for the better."

(MUSIC PRODUCER)

EXAMPLE – OPERATIONAL USE OF IA [8]

The Moises[9] app is an example of a tool developed by Brazilians based on AI whose use is in the field of music. A world forerunner, this technology allows the separation of vocals and instruments, speed adjustment, pitch change, and display of chords and ciphers of any song, among other features.

This type of system can be applied in the production of music tracks for remote recording of the different components, but also for new productions of old tracks. With this mechanism, it is possible, for example, to "resurrect" the voice of deceased artists – such as Beth Carvalho and Wilson das Neves – to integrate the records of singers from the new generations.

Another possible application is in the field of music education, where teachers or beginning musicians can use this technology to teach, learn, or practice an instrument.

Potential possibilities for the use of AI in music, fostered by a more sophisticated use of ML, have also been identified, concerning the emulation of sound patterns and recordings. The ability of a computer to process hundreds of hours of audio samples (singers' voices, instruments, entire recorded tracks, speeches, noises, etc.) allows the machine to break them down into a multitude of parameters, to learn patterns, and automatically emulate a particular artist, so that, for example, a singer's voice is singing a song he has never recorded.

"[...] maybe it will come to a point where you can actually say: '[...] I can do that here with Caetano [Veloso]'s voice'."

(MUSIC PRODUCER)

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8   The concrete examples of AI applications presented throughout this chapter are well-known cases and were identified from public sources, such as websites, news, and other types of publications. The information thus presented is not associated with the data collection through the interviews conducted with cultural agents, institutions, and platforms.
9   More information available at: https://moises.ai/en

For now, however, it is an extremely expensive technology, run by computers capable of processing which cost an equally enormous amount – which restricts its presence in countries like Brazil, where investment capacities on these tools are limited.

SECTORAL BOX – AI IN MUSIC

In Brazil, ready-made AI solutions available on the market have been used in music production, especially in editing, mixing, and mastering processes. The technical facilitation and cost reduction of these processes have allowed them to be carried out in less professionalized environments and by less experienced cultural agents.

In online content distribution, commercial digital streaming platforms stand out, whose operating model is heavily based on AI applications for personalized content recommendation. The implications of this model for the diversity of content offered, the format of new works, and the fair remuneration of artists are issues that deserve more attention.

The operational use, in some cases, advances to an aesthetic dimension fostered by innovation, which makes evident, to a greater or lesser extent, a characteristic presented by this type of use of AI: even if the applications are used in an instrumental way in the work of cultural agents, they also contribute to the creative making of the work itself. Producing a music track of a deceased singer with a living artist and performing experiments from the emulation of sound samples represent novelty in creation, widening of the symbolic referential and, to some extent, promotion of original content.

Aesthetic (or finalistic) use

The hybrid – both operational and creative – facet of AI provides a bridge to describe another function in creation and production: its aesthetic (or finalistic) use. In such cases, AI systems also appear as artistic contributions, for example, in the visual arts. AI, in this sense, allows the expansion of data processing capacity and the broadening of creative limits imposed by human capacity.

"[...] first of all, these machines are conceived to expand our ability to process data from the outside world, right? [...] So, that's it, there is an expansion. I think the ability to expand knowledge, to manipulate data, and expand beyond the limits of the human brain, is an evidence."

<div align="right">(VISUAL ARTIST)</div>

From this point of view, the aesthetic use of AI is based on expanding the brain's ability to operate and manipulate a large volume of data and allow *"seeing things we didn't see"* (Visual artist), which bolsters the human ability to produce artistically. Although the operation is technological, it converges to an exponentialized capacity for artistic realization.

In the visual arts, the finalistic use of AI is mostly related to the training of algorithms for the pursuit of aesthetic goals intended by the artist. The algorithmic programming often becomes the very process of research, language development, and aesthetic formatting for the creation of the work.

"So, like, when I work in this sphere, I don't feel that I am working. I am programming. I set the questions and we play together, me and the machine."

<div align="right">(VISUAL ARTIST)</div>

It is noted that the operational uses of AI mentioned usually refer to tools or apps already existent on the market, which fulfill an instrumental function in the development of a work. In the case of aesthetic use, however, the creation of a new, specific application of AI for a particular work can be a decisive contribution to the final artistic process.

"But to do this work, I need to develop a small, very rudimentary Artificial Intelligence system. And I could take ready-made systems, but within the logic that I'm talking about a simulation [...] very simple, taking a thing that is already neuralgically spread in the digital network around the world would be like killing an ant with a cannon shot, right? So, together with a partner, we decided to invent an Artificial Intelligence that will do this [...] within a machine learning logic."

<div align="right">(MUSIC PRODUCER)</div>

The combined use of algorithmic programming and aesthetic formulation seems to emerge as a characteristic of these processes, merging *"the creative work of the artist with the creative work of the developer"* (Researcher). Thus, a common characteristic among artists operating the aesthetic use of AI is the quest to understand programming technically (to gain some minimal – in some cases advanced – handling of algorithm production), which is achieved, for example, through

cooperation with developers. This is a peculiar, functional, and even labor-related attribute, which is an interesting fact about the use of AI, because the resulting work becomes a mixed experiment in programming and aesthetic creation.

EXAMPLE – AESTHETIC USE OF AI

The work *Rituals of Complexity* (*Rituais da Complexidade*) by Fernando Velazquez, is an example of the aesthetic use of AI, in which an algorithm was developed by the artist himself to process the patterns of hundreds of images of African masks and Greek sculptures collected from the Internet and create new ones, which became the objects on display. The text from the gallery that exhibited the work comments on the role of AI in the process of artistic creation:

> Images are created from experiments in Artificial Intelligence obtained by means of algorithms manipulated and trained by Velázquez, where patterns are learned and the machine itself invents other figures that are born from shapeless hybridisms, the product of the encounters between Greek and black-African aesthetics. [...] The algorithm works autonomously, although it needs prior programming, generating its own images and creating elements by itself.[10] (Negreiros, 2021, para. 2)

FERNANDO VELÁZQUEZ/ZIPPER GALERIA. ADAPTED FROM ORIGINAL.

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10   "Imagens são criadas a partir de experimentos em Inteligência Artificial obtidas por meio de algoritmos manipulados e treinados por Velázquez, onde padrões são aprendidos e a própria máquina inventa outras figuras que nascem dos hibridismos disformes, resultados dos encontros entre estéticas gregas e negro-africanas. [...] O funcionamento do algoritmo é autônomo, embora necessite de programação prévia, gerando suas próprias imagens e criando elementos por si mesmo."

Although such experiences are quite limited – since they demand specific technical knowledge –, they provide greater autonomy in creation, since the system development, data production and formatting, and algorithm training are self-owned. In the case of the adoption of tools available on the market, which is characteristic of the operational

use, the technology programming is unknown, and the data is generally given to private companies, even though they are more widely accessible applications and present fewer entry barriers to cultural agents.

> "The fact that I know how to program [...] will allow me to modify a neural network to my liking. Today I depend on programs that make this accessible, the old black box idea [...]. It's a technology [...] that was thought to do the things that those who created it thought possible. So, 'hacking' and exploring the limits of these devices is also a realm of creativity that I don't have, [...] that if I don't know what the intricacies of [AI] programming are, I won't be able to explore that place."
>
> (VISUAL ARTIST)

SECTORAL BOX – AI IN THE VISUAL ARTS

In the Brazilian context, AI-based systems have been used in the visual arts for artistic creation, permeating operational and aesthetic uses. Besides the instrumental use of existing tools for applying filters and editing images, some artists have used AI as a strictly aesthetic element in the creation of new works.

In the first case, in general, ready-made applications available on the market are used. In the second, artistic creation is merged with programming, placing machine learning centrally in the works, generally exhibited in immersive exhibitions.

Democratization of production versus digital inequalities

The democratization of production through the use of AI-based tools presents itself as one of the opportunities identified in the literature on AI in culture. Process optimization, cost reduction through automation, and increased access to these technologies reduce entry barriers for new creators (Caramiaux, 2020; CDCE, 2018; Kulesz, 2018; Pfeiffer, 2018; Rehm, 2020; WEF, 2018). On the other hand, the challenges posed involve a set of concerns associated with digital divides – of access, technological appropriation, and technical knowledge – that prevent a considerable portion of cultural actors from taking advantage of existing opportunities in the use of AI (Caramiaux, 2020; CDCE, 2018; European Parliament, 2021; Kulesz, 2018; UNESCO, 2017a).

In the Brazilian context, the operational facilitation brought by AI emerges as a relevant aspect in the discussion about the democratization of cultural production, since the popularization of AI-based software and plugins makes it possible for new professionals to enter the field. In this sense, algorithmic programming and ML tools, often with computer vision systems,[11] have spread more widely, especially for image analysis and generation. Using free apps in a *"home-made"* manner (Visual Artist), for example, it is possible to edit images with AI resources and create works with your own creative signature. There are concrete cases in which the entrant artist is not a programmer or data engineer, nor an artist with specialized training, but an individual who has entered the art market by combining curiosity and ease of use of AI-based programs with the dissemination of work on social networks.

"I am doing a lot of cool stuff with this Artificial Intelligence, which is bringing me a lot of work. [...] So I use apps that are available to anyone. Sometimes people talk about Artificial Intelligence and see it as something from another world, something that 'I'll never learn, I' have to take courses and courses to learn'. [...] So, this is bearing me good fruit, this thing that I tell you that is simple and is in anyone's hand."

(VISUAL ARTIST)

Access to low-cost applications available on the market decreases individual artists' and small producers' reliance on equipment and expertise, and contributes to production in an independent manner. In the field of music, for example, this makes productions become feasible also outside studios.

"[...] the tools that we have, for example, to talk about music production, [...] studios kind of ceased to exist, they migrated to people's homes. Nowadays, every musician is a music producer [...], even more after the pandemic, everybody learned to record and do music production at home."

(MUSIC PRODUCER)

In cultural production, the use of AI has also made the work of beginning producers easier. Serving as a tool for correction, gap identification, and improvement in techni-

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11   A computer vision system is considered to be that which reproduces the human capacity to process and analyze images, emulating their cognition and ability through techniques capable of apprehending and transforming such images, allowing the machine to make decisions according to the information contained therein (Pedrini & Schwarz, 2008).

cal processes, AI-based applications have acted as a kind of reference framework in editing, equalization, mixing, and mastering work. Many AI-based tools for audio, for example, provide a critical analysis from plugins that indicate missing elements or adjustments to be made. In this way, they guide less experienced professionals to make the necessary edits in their work in order to gain quality in the final result.

"In the old days a music producer was a guy who had a lot of flight hours so he could have a good-sounding final product. What I see happening [...] is that we have, nowadays, tools that somehow replace flight hours. The tool does the analysis of what it is, what kind of sound pattern this guy is looking for, goes there and makes the modifications."

(MUSIC PRODUCER)

Thus, the dissemination of new applications of technical operation AI (audio and image) has enabled the entry of new agents into the market and the catalyzation of the work of beginning artists and producers. The availability of ready-made solutions makes it possible to use AI in cultural creation and production and require less technical knowledge and technological infrastructure for its use. In this sense, for example, there are user-friendly apps that allow processing in the cloud, making it unnecessary for artists and producers to have machines with great computing power.

"[...] part of our mission is to kind of democratize that access, for anyone. This technology, it has existed [...] for years, but it was very inaccessible, we transformed it and democratized this technology. Anyone with an Iphone or an Android smartphone, or even a very simple one that doesn't have a lot of computing power, we can deliver this technology [...] because everything is processed in the cloud."

(MUSIC PLATFORM)

Given the possibilities of using these applications, however, inequalities in access to technologies in general, and AI in particular, must also be considered (CDCE, 2018; Kulesz, 2018; UNESCO, 2017a). The lack of computational resources and digital skills gain prominence to the extent that only few cultural actors can experiment with them through ML tools of their own (Caramiaux, 2020; European Parliament, 2021; Kulesz, 2018).

At this point, it is worth pointing out, in the Brazilian scenario, the peculiar condition of small producers, of popular and traditional cultures, indigenous, Afro-Brazilian, and

other manifestations that make up the spectrum of cultural diversity, since they do not have access to the institutional portion of culture, much less the digital means and technological tools in the field of AI. Although the research did not approach cultural agents who do not use AI in their creative processes, the interviews allowed to glimpse some limitations and barriers, especially in relation to technologies that require greater infrastructure and technical knowledge.

First, the fact that developing AI applications requires the availability of financial resources is a major obstacle for the cultural sector. As a result of the financial limitation, computational power emerges also as a relevant issue and an impediment to the expansion of these technologies among cultural agents more broadly, especially in certain types of use that involve processing large volumes of data and demand a more powerful infrastructure.

"[...] the way Artificial Intelligence has been developing requires a lot of heavy investment and that means an entry barrier and heavy computing power, which is not distributed, it's not something that is accessible to a lot of people."

(INFORMATION PLATFORM)

As a consequence of digital divides existing in Brazilian society, the issue of digital skills is also a barrier, since most cultural agents are not conversant with digital technologies. So, while some tools and applications may encourage the entry of new creators – especially those who are proficient in digital media – artists and cultural producers who are not familiar with technology are worse off, which brings greater segregation of digitally marginalized cultural segments.

"Although the tool is there, it's free, you can install it, there are even some tutorials, the portion of the population that has actually become literate or has the capacity to deal with this kind of knowledge, is minimal."

(VISUAL ARTIST)

In uses that involve the development of self-owned systems and algorithms, the barriers are even more challenging, since the majority of cultural agents do not have the technical knowledge in programming language, for example, to create content through ML mechanisms.

"Now, the other side that you asked about, what are the difficulties for someone who wants to start tinkering with [...] in the field of programming to do something artistic, I think it's the lack of literacy that Brazilians have in relation to programming languages, right? So, it's like something that I have to call someone who knows how to do it. [...] when we talk about generating new things, then we are in that situation where we have few people. I have two, three people to turn to in this market, especially in the arts, right?"

(VISUAL ARTIST)

Experimentation versus homogenization

The literature on the use of AI systems in creative processes signals the expanded possibilities for experimentation and collaboration with digital technologies from the interaction between humans and machines (Kotis, 2021; Kulesz, 2018; UNESCO, 2020; WEF, 2018). On the other hand, several concerns point to the risks of homogenizing creations and discouraging creativity[12], as AI works with detecting and reproducing patterns, with a lesser degree of subversion and disruption (CDCE, 2018; Pfeiffer, 2018).

The aesthetic and operational uses of AI identified in the Brazilian scenario provide insight into this discussion, contemplating complementary views on the phenomenon. From the perspective that values the potential for innovation, AI-based systems are perceived as *"a great catalyst of creation, thus a helper for the artist"* (Researcher). In that regard, AI has been seen as broadening the opportunities for experimentation, in the sense of achieving bolder creative processes from the very elements of algorithmic programming and the informational processing attributes of machines. From this point of view, the detection and apprehension of patterns allow them to be extrapolated so that new creations are possible.

"Intelligence is about the ability to read patterns. So, if I expand my ability to read patterns, I'll observe phenomena that I don't normally observe. And how can I expand it? Through the machines."

(VISUAL ARTIST)

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12   According to UNESCO's preliminary study on the ethics of AI (2019, p. 15), "Creativity, understood as the ability to produce new and original content through imagination or invention, plays a central role in open, inclusive, and pluralistic societies. For this reason, the impact of AI on human creativity deserves careful attention."

Thus, the reading and identification of patterns enables the emergence of new designs, contents, and creative possibilities. AI can therefore be used for new creations that break out of these patterns, or even allow for their deconstruction. With this, the results of creations with AI point to ruptures, bringing, from critical uses of technology, aesthetic gains and conceptual, philosophical, and political reflections.

> "And that's what I think is most fascinating about Artificial Intelligence, when it's able to indicate, to signal aesthetics, practices that don't fit into what we were already doing, and that's where it's culturally interesting."
>
> (VISUAL ARTIST)

EXAMPLE – EXPERIMENTATION AND AI

An example of experimentation with the use of AI is the work *Botannica Tirannica*, by Giselle Beiguelman, exhibited at the Museu Judaico de São Paulo (MUJ) (Arruda, n.d.). The exhibition is the result of a research that developed an algorithm to seize images of plant species whose scientific names have prejudiced, racist, sexist, or colonialist connotations, and from them, process new species, which will combine with each other, forming a continuum of new appearances. Thus, "*judeu--errante*" (Judeo-errant), "*bunda-de-mulata*" (buut-of-mulata), "*beiço de negra*" (nigger´s lip), "*ciganinha*" (little gypsi), "*chá-de-bugre*" (bugre tea) are examples of specimens of the world flora reprocessed from a gigantic image bank that recognizes patterns and recombines them with the use of ML. In the exhibition release, the artist emphasizes this mixed place where art and technology, programming and artistic creation, algorithm and aesthetics reside to break with established patterns:

We stimulate a short circuit in the parameters of AI, in order to review the Western world's systems of patterns, which classify everything into categories, central to taxonomic thinking and the assumptions of AI working methodologies. Thus, while analyzing how aesthetic parameters are created from biases, we use reverse engineering to indicate paths to a next nature, without higher categories dominating lower categories.[13] (MUJ, n.d., para. 15)
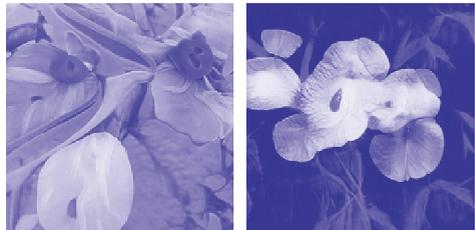
GISELLE BEIGUELMAN/MUSEU JUDAICO DE SÃO PAULO. ADAPTED FROM ORIGINAL.

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13   "Estimulamos um curto-circuito nos parâmetros da IA, de modo a rever os sistemas de padrões do mundo ocidental, que classifica tudo em categorias, centrais no pensamento taxonômico e nos pressupostos das metodologias de trabalho com IA. Assim, ao mesmo tempo em que analisamos como parâmetros estéticos são criados a partir de preconceitos, usamos engenharias reversas para indicar caminhos para uma próxima natureza, sem categorias superiores dominando categorias inferiores."

Although the creative potential of AI is recognized in the creation and production stages, the dissemination of its use provokes another debate, also present in the literature: the tendency to homogenize the works created with AI. Along these lines, the adoption of systems that result in standardized productions would jeopardize individual and collective capacities for innovation and creativity and could ultimately compromise the diversity of cultural expressions (CDCE, 2018).

In this sense, the research identified concerns about the potential for aesthetic standardization brought about by AI applications when used on a large scale. The massive use of certain tools, especially "off-the-shelf" solutions, can generate works with similar aesthetic semblances, similar patterns, and traits easily identifiable as coming from certain applications.

"To talk about these image generators, you look at them and you can already identify that it was done by them, by these services, right? The images are very cool, but you just catch a glimpse and say like: 'It was generated by AI,' right?"

(MUSIC PRODUCER)

In this way, many producers and artists, by using common tools, can indistinctly generate aesthetically similar works, without necessarily being part of related languages or artistic fields.

"So, that starts standardizing things, why? [...] For example, there is an app [...] that is basically [...] a platform that allows you to use Artificial Intelligence without knowing how to program. But without modifying anything, get it? And then you see everybody using the same algorithm and doing the same thing. So, this risk is there."

(VISUAL ARTIST)

The fact that AI tools serve precisely as a baseline for corrections or model achievement, as mentioned, can strongly lead to this situation. This can be a result of the popularization of specific solutions or of the very functioning of AI systems (based on the repetition of patterns that always indicate an equal or similar path), but also of the user's interest and will, who resorts to the tool precisely to give the desired aesthetic effect, usually coming from a successful model in the market.

"Look, currently [the use of AI] isn't promoting diversity, it's creating patterns, it seeks those patterns for standardization – standardization of tastes, of creation, of more palatable works."

(RESEARCHER)

Such models guide the very drawing up of the so-called terms of comparison offered in AI applications. So, for example, if the artist wants their voice, beat, timbre, or certain frequency (bass or treble) to sound as "equal" (or analogous) to some other reference, such as a famous singer, they can use certain AI applications that are known to replicate patterns.

"You record a song and you want to sound like Shakira or Anitta, then you'll get Anitta's song and you'll say: 'the [name of the person] wants to sound just like Anitta'. Then we take the [name of the person's] music, we take Anitta's music, we make a comparison and try to make the [name of the person's] music sound like Anitta's."

(MUSIC PLATFORM)

This aspect points, on the one hand, to the discussion about homogenization as a characteristic sometimes intentionally pursued by the user; on the other hand, to the possible inevitability of this consequence as a result of the use of widespread apps. In any case, the risk of aesthetic homogenization of the works by the use of AI is there. One can say, as a hypothesis, that this phenomenon is not yet widespread because of the very and relative limitation of the use of AI for creation and production in the Brazilian cultural reality. The debate is thus in the realm of the future, but also points to risks that go beyond the dimension of innovation in the artistic field.

"I think this is the greatest risk and it's not only an aesthetic risk, [...] it's a political risk, right? [...] What about everything that falls outside the pattern? Where will it fit in this end-to-end algorithmic world? So, I think there is this huge risk, [...] because we deal, more than ever, with super black boxes and a science of patterns. Artificial Intelligence is pattern recognition and application."

(VISUAL ARTIST)

THEMATIC BOX – AI AND AUTHORSHIP

In the confluence zone between experimentation and homogenization lies the debate about AI and copyright. How to attribute authorship to a work whose creation (or co-creation) is not only human, but also machine-based?

The copyright issue is a strong impasse discussed in the literature on the topic, since the use of AI in the creation of new works involves artists, programmers (for developing the algorithms), original works (used as databases for training the algorithms), and companies that own the AI-based systems, which calls into question the notions of authorship, ownership, and originality (Caramiaux, 2020; CDCE, 2018; European Parliament, 2021; Kulesz, 2018; Wachovicz & Gonçalves, 2019).

In the study conducted in the Brazilian context, the prevailing view is that, in works produced using AI, the authorship continues to be that of the artist or developer, since human agency and decision making, aesthetic- and content-related, precede the machine's further algorithmic processing. However, the literature and the jurisprudence are not in agreement on the subject, as the premises for imputation of authorship of "creative subject" and "creativity" have been questioned by AI, through machinic subjects and autonomous systems with creative attributes. The resolution of this debate is far from being consolidated, and the copyright legislation in Brazil does not deal with protection for works that are the result of AI systems.

DISTRIBUTION, ACCESS, AND PARTICIPATION

The distribution, access, and participation stages comprise the dissemination of cultural works and content to reach their audiences. In these stages, AI has served in different ways the processes of transmission and reception of cultural goods that occur through the physical and virtual spaces of consumption and enjoyment. In this context, the main uses of AI-based systems relate more directly to the personalization of experience and interactivity, with different appropriations between traditional intermediaries – such as cultural institutions – and new intermediaries that operate primarily in the online environment – such as digital platforms.

This interaction, mediated by AI, goes through mechanisms such as virtual assistants and content search and recommendation systems. Moreover, there are also uses of AI in activities related to the management and planning of cultural actions based on data collection and analysis, which have different purposes depending on the contexts of appro-

priation. Since these are quite diverse institutional settings and applications, the analysis is segmented into two parts: cultural institutions and digital platforms.

CULTURAL INSTITUTIONS

Cultural institutions are characterized as spaces that offer access to cultural goods and services through the preservation and dissemination of collections, and the promotion of cultural diffusion activities open to the public. In this way, they represent traditional intermediaries in the processes of cultural distribution, access, and participation. Although most of them are conceived primarily as cultural facilities dedicated to in-person activities, the digitalization and the migration of many of these activities to the digital environment have represented an intense process of transformation, with numerous and profound challenges (Brazilian Internet Steering Committee [CGI.br], 2021).

As part of this process, the literature portrays multiple potential possibilities for adopting AI tools, ranging from the reproduction, cataloging, and availability of cultural assets (European Parliament, 2021; UNESCO, 2020, 2022) to public relations strategies (CDCE, 2018; Europeana, 2020; Lyu, 2020a, 2020b). In view of such possibilities, the use of AI-based systems in the Brazilian scenario is analyzed from its uses for **cultural mediation and audience mapping**, in addition to the **management and dissemination of digital collections**.

In the first case, these uses have enabled **interactivity** between the public and the works and the **personalization of the experience** for visitors, as well as provided data for institutions' **planning of cultural actions**. In the second, in terms of management and dissemination of digital collections, AI has been used in **information management** and **documentation qualification** in an automated way, and for providing **access** through **integrated search** systems.

There are several **institutional barriers**, however, to the incorporation of AI systems, which involve, in particular, the lack of budget and specialized staff. As a result, projects are generally carried out via partnerships with large companies and international platforms, which increases **dependence on external technological solutions** (Figure 2).

SOURCE: PREPARED BY THE AUTHORS.
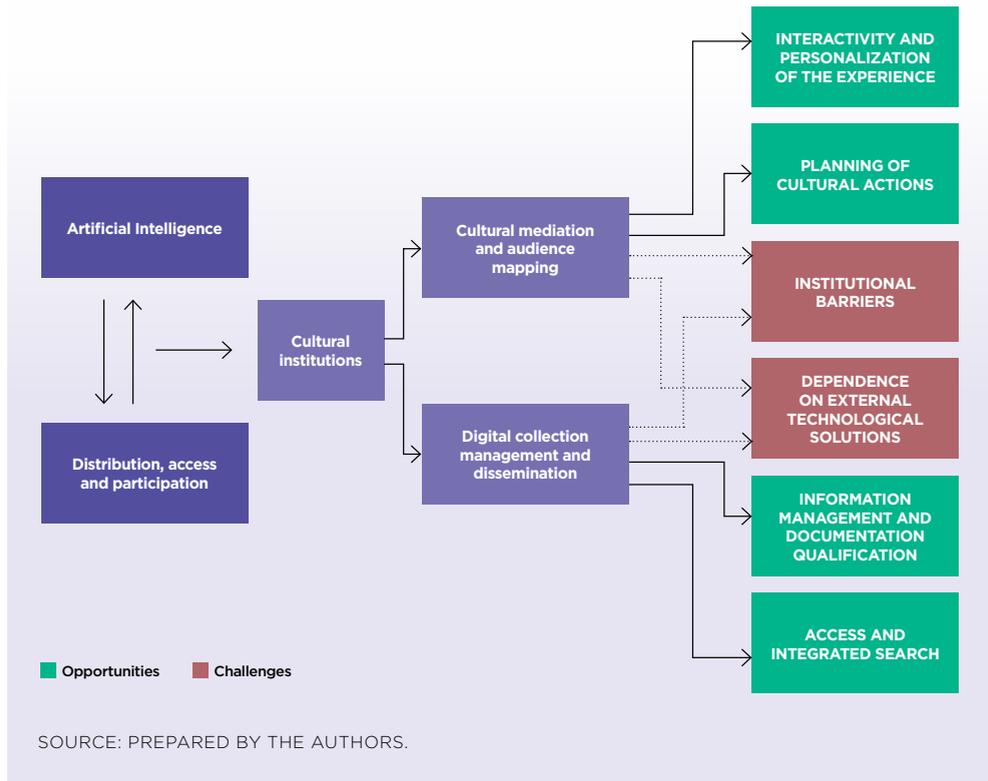
Cultural mediation and audience mapping

In the scope of cultural mediation, AI has been used for interaction with the public and personalization of the experience through automated tools such as chatbots and virtual assistants, promoting individualized exhibitions and narratives for visitors, and immersive art installations, particularly in museums (Caramiaux, 2020; European Parliament, 2021; Europeana, 2021; Kotis, 2021; Lyu, 2020a; UNESCO, 2020; WEF, 2018).

In Brazilian cultural institutions, AI has initially presented itself in processes for the diffusion of cultural goods. First, in the presence and exhibition of works created using AI (mentioned in the creation and production stages) or even

as the thematic object of specific exhibitions. In addition, in a localized way, technology has also been employed in some experiences through virtual assistants and tools offered to the public for cultural mediation.

In the realm of in-person exhibitions, AI-based applications for mediation include the use of systems that interact with the public at the visit, developed from partnerships with technology companies. In these cases, the opportunities presented by the use of AI are centered on the interactivity of the audience with the exhibition, allowing a more active participation in the appreciation of the works and content made available by the institutions.

"So it's not just a contemplation of the work, but I participate, I interact and interfere in it. And AI makes us go to that place."

(CULTURAL CENTER)

This interaction with AI applications also allows for individualized mediation based on the public's preferences and interests. Thus, the exchanges between visitor and technology generate inputs so that the system can devise personalized suggestions for that trajectory, or even for the discovery of other possibilities from the history of interactions. This type of resource can contribute to a better enjoyment of the experience when faced with the breadth of content available, making the visit more attractive.

"[...] it's a smart strategy of maybe bringing greater personalization [...] In terms of surveying public engagement [...] with these initiatives, I know it's been pretty cool. So, I believe it's a strategy that goes in that place of technology, [...] it was the most appropriate strategy to create that engagement."

(MUSEUM INSTITUTION)

EXAMPLES – AI IN CULTURAL MEDIATION

   In the domain of AI uses in cultural mediation in museum exhibitions, an emblematic case in Brazil was the project *A Voz da Arte* (The Voice of Art), by Pinacoteca de São Paulo (Miligrama.mg, 2017). The institution has partnered with IBM so that visitors can "talk" to the exhibited works by asking them questions through the *Watson* cognitive computing technology. In collaboration with curators and educators, classic works by major artists such as Tarsila do Amaral, Lasar Segall, and Cândido Portinari were chosen. The ML process was done by collecting patterns of questions that would be asked by visitors, from the simplest ("who is the painter of the work?") to the most interpretive (beauty criteria, styles, stories, etc.) and formulating possible answers based on books, academic research, educational materials, and catalogs (Chiovatto, 2019).

   Another example of AI-based application related to in-person visitation is *IRIS+*, from the Museum of Tomorrow (n.d.). Also developed in partnership with IBM, in this case, besides answering questions, the cognitive tool also asks visitors about their topics of interest and concerns. Based on the answers, it indicates where those themes can be found in the exhibition itself and in external initiatives in society in general, inciting their engagement beyond the museum experience, after the visit.

   The literature also points to the use of AI in processes of mapping audiences' habits and developing promotional strategies (CDCE, 2018). In the case of museums, for example, AI tools enable the analysis of data from their collections, exhibits, and visitor flow, contributing to the understanding of the public's attendance, behavior, and preferences (Lyu, 2020a, 2020b).

   Thus, the opportunities identified by cultural institutions include the use of AI to generate and analyze data about visits, aiming at the improvement of their actions. In this sense, in the

Brazilian context, the AI-based applications used for the mediation of visits also produce inputs for institutional planning based on the collected data, providing relevant information for the curation of the exhibitions.

"Our research from [the application of AI] directs us [...] also to updates of the main exhibition, and of the temporary exhibitions. [...] So if we see that the public is more interested in a subject, I know that I'll focus on it in the update."

(MUSEUM INSTITUTION)

Despite the recognition of these possibilities, in practice, they are generally reported as potentials not yet fully exploited by Brazilian institutions. In addition, there are other opportunities identified by the institutions, but not yet converted into concrete management instruments. Among them is the effective counting of the public and the identification of internal paths of visitors by the volumetry of cultural spaces, which would guide the architectural layout of the exhibitions and the provision of pre-structured itineraries. From the assimilation of the audience's behavior in relation to the actions offered (reaction and enjoyment time of each work, for example), it would be possible to obtain more reliable data about the visits, to be used to improve the public's experience.

Understanding the audience profile (demographics and interests, for example), would also enable data-driven strategic decision-making processes and better planning of the actions proposed by the institution. Based on these mapped potentials, which cross-reference data from different contexts, such as in-person visits and interactions in digital environments, it is even possible to develop targeted communication actions, linked to digital marketing and engagement in social networks.

"Thinking about shows, spectacles, [...] what is this audience profile? [...] From the moment I know what the [person's] characteristic is, I can trigger their interests [...] So, we can thus be more assertive and propositional in our actions, right?"

(CULTURAL CENTER)

While the various potential uses of AI identified by cultural institutions for audience mapping and planning of cultural actions are not yet fully explored, there is, on the other hand, widespread use of channels and platforms that use AI to engage audiences, such as social media. In these cases, it is the appro-

priation of existing tools that are widely spread in society with the purpose of publicizing the programming of activities and services offered. Such tools serve not only for attracting and reaching the public, but also, in some cases, for monitoring and analyzing social media sentiment, which allows the institution to react in advance based on these perceptions.

"I can, for example, know if we have a potential crisis by using Twitter, Facebook or Instagram tools, monitoring hashtags. And then I can guide my team to produce a mediation content, which will bring some solutions in relation to what the public is saying about us on the networks. In that sense, Artificial Intelligence in social media helps us do that monitoring."

(CULTURAL CENTER)

Digital collection management and dissemination

AI systems have also served the management and dissemination of digital collections. In terms of heritage preservation and dissemination, the literature points to the relevant role of AI within collections – whether in information management processes for the organization of databases through automatic indexing, metadata generation and qualification, and content classification (CDCE, 2018; European Parliament, 2021; Europeana, 2020, 2021; Rehm, 2020), or in access via search engines for online consultation in digital repositories (Caramiaux, 2020; Europeana, 2021; UNESCO, 2017b).[14]

In Brazil, AI is beginning to be used for information management in the daily life of cultural organizations that have huge data sets. There are applications that serve for internal organization of the collections, finding of licensed works, cataloging and classification, management of contracts related to the works, among other functions. Such applications are generally used in internal processes, prior to the dissemination of content to the public. In this sense, one of the experiences mapped out is related to the use of AI to perform searches on the broad set of digitized collections, making it possible to locate content in an automated way.

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14   In a convergent approach, such a perspective is also part of the guidelines of the UNESCO´s Recommendation on the Ethics of Artificial Intelligence (2021, p. 34): "Member States should encourage museums, galleries, libraries and archives at the national level to use AI systems to highlight their collections, strengthen their knowledge and databases, while providing access to their users."

"[...] it uses the Artificial Intelligence tool to find videos [...]: we need a video, a person X passed away, we will put it there and it will search for Elza Soares, and we will retrieve those videos."

(CULTURAL CENTER)

Still within the scope of collections, some applications facilitate the location of information for managing contracts and assigning rights related to digitalized content and works – for example, to locate the expiration date of broadcasting and content rights and to offer alerts regarding the need for renewal, or even to automatically list content based on these criteria.

On the other hand, these examples represent, in the context of Brazilian cultural institutions, exceptional cases. Even in large, privately-owned institutions that are a reference in the sector, collection management is carried out without AI elements, in an analog way, like "*the steady work of little ants*" (Cultural center) or with some "*normal software*" (Cultural center) used to categorize and manage the wide list of works by area, theme, subject, dimension, restoration, exhibition, etc.

In the organization and dissemination of digital collections, the processes of registration, cataloging, mapping, and automatic metadata enrichment play a key role in the search and discoverability of content, and in the possibilities of exploiting digital collections (CDCE, 2018; Europeana, 2020, 2021; UNESCO, 2022). When dealing more specifically with the classification of collections with the help of AI in the Brazilian scenario, it was possible to identify that, although managers of the institutions are aware of these applications, they often appear as something distant, assigned to the hypothetical field of possibilities.

"[...] I've seen experience from libraries abroad that use Artificial Intelligence to classify the collection, to assign subject matter to books, for example."

(MUSEUM INSTITUTION)

In some cases, there are experimental projects under development that include the use of AI for image and text recognition for subsequent data and information extraction, from computational vision systems. In this way, the system recognizes the elements of a work or content, acting to optimize the organization and description of the objects. The literature, however, indicated interoperability and data availability for training as the main challenge in this field, given the need for

the definition of patterns and the creation of uniform databases with appropriate classification schemes that allow for connection between different cultural heritage objects and access by users (European Parliament, 2021; Europeana, 2021).

In the Brazilian scenario, experiences of uses for documentation were identified. These advance slowly and gradually, with inadequate tools and from *"a very rudimentary use"* (Museum institution). In specific situations, such as the migration of databases from old systems lacking information, there is automatic filling of some fields in the databases based on pattern recognition and automation of repetitive activities.

"From the use perspective, as I said, we're still very incipient, we're automating tasks in the field of documentation. Which is a basic level, because it's still, let's say, the engine room of the publishing process of a digital collection. It's also a pre-publication process."
(MUSEUM INSTITUTION)

The process of qualifying the documentation and, more specifically, the metadata is geared towards organizing the digital collections so that they can be published for wider access on the Internet. The formatting of the databases becomes relevant in order for the results of the integrated search to be meaningful, so that, by integrating and making these collections available, the user can find what they are looking for in a more refined way. Thereby, these processes work as internal activities that are, however, prerequisites for the huge amount of materials under the institutions' management – *"gigantic collections, terabytes of videos, of images"* (Cultural center) – to be organized, located and even digitalized, in order to be made available on the Internet.

In this case, strategies for the collections to reach the public have been presented in two ways: by developing their own technologies and publishing the collections through free-licensed tools; or in partnership with large commercial or collaborative platforms that work on the digitization or dissemination of the material. Such strategies represent fundamental differences in terms of the functionalities and perspectives in the use of AI.

"[...] we already clearly see that there is a very big difference from the perspective of you offering your content so that an Artificial Intelligence can act upon it, and, on the other hand, you generate a base so that you can work your own Artificial Intelligence, developed by yourself upon that base, right?"
(MUSEUM INSTITUTION)

In the first case, it is a process done in a smaller scale in an organic way by museums, from the internal structure of the institutions (or in partnership with universities), but which has represented a potential alternative for the development of an AI to be used in the public cultural sector.

EXAMPLE – MANAGEMENT AND DISSEMINATION OF DIGITAL COLLECTIONS

Tainacan is an example of a project for collection management and dissemination, developed by the Federal University of Brasília (UnB), in partnership with the Federal University of Goiás (UFG) and the Brazilian Institute of Museums (Ibram). Resulting from a collaboration between universities and cultural institutions, *Tainacan* is a free software that can be downloaded, modified, and used at no cost. According to the project website (Tainacan, n.d.):

> Tainacan contributes to the preservation, and communication of cultural production on the Internet through the management and sharing of collections. Besides cataloging, organizing, storing, and sharing information, it adapts to the user's needs, allowing you to configure and personalize your collections. To do this, it offers a number of customizable features, such as creating collections, metadata, items, filters, and many others.

Besides the effort to improve the databases and publish the digitized materials, the goal is to create an aggregator and integrated search service for the collections of the various institutions that use the software.

In the second case, the catalogs and collections are hosted on major international platforms – such as the newly created virtual museum *O ritmo de Gil* [Gil's rhythm],[15] launched by Google Arts and Culture to celebrate the singer's 80th birthday. Thus, the partnership between cultural institutions and large technology companies has served to digitize public collections and make them available, mediating user access by AI. Even if it occurs on a larger scale and promotes access to collec-

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15   More information available at: https://artsandculture.google.com/project/gilberto-gil

tions, this strategy brings concerns associated with the lack of transparency regarding licenses and copyrights and because it increases the institutions' dependence on these companies.

"[...] it's [a] paradox, [...] because this museum exhibition that is on Google Arts & Culture has a public benefit, because you, who are in Slovenia, can access and have this open knowledge, for free and so on. And, on the other hand, this is within this [...] big home confinement that is Google. [...] It's a home confinement, things integrate with each other, with tools, so you can't get out of it."

(MUSEUM INSTITUTION)

However, partnership with large companies of a commercial nature does not seem to be the only alternative to ensure the extended reach and diffusion of the collections. The publication of these collections can also occur through widely accessed collaborative platforms, such as Wikipedia. As one of the five portals with the widest reach on the Internet, it is the only one that has no commercial interest.

"[...] I was thinking of [...] the volume of visibility that Wikipedia entries give to museum collections. They are photos of collections that are there illustrating the entry. And from that link, this generates visits that cause more museum visitation than any other source. [...] somehow identifying, by numbers, that this path comes exactly from this non-commercial access, which can be promoted as well."

(MUSEUM INSTITUTION)

SECTORAL BOX – AI IN MUSEUMS

AI is presented in Brazilian museums initially by means of thematic works and exhibitions. Moreover, still on an experimental or incremental basis, museum institutions have adopted AI-based tools for cultural mediation in in-person exhibitions – through automated devices for interaction with visitors – and for data collection and analysis aimed at mapping audiences and planning actions. There are also uses of AI in managing and disseminating digital collections, either for cataloging, automatic indexing, and metadata qualification, or for the dissemination of collections through integrated search engines and digital repositories.

Given the priority challenges of institutional survival (structural, budgetary, programmatic, or functional), in both spheres, with rare exceptions, the initiatives take place through partnerships with large platforms and private companies that have a monopoly on AI applications – thus, increasing the dependence on external and proprietary technological solutions.

Institutional barriers to AI adoption

The agenda of implementing AI-based systems in Brazilian cultural institutions has several limitations, given the financial, structural, and functional circumstances whose order of importance precedes investment in the technology. Thus, amidst the election of administrative priorities, investment in AI is neglected so that scarce resources can be directed to structural conditions.

"I mean, there are much more structural and basic demands to be met. So, for us, [AI] it's a topic that [...] is as an important point of attention, that the museum always needs to incorporate technological tools that are beneficial for its operation, [...] but it has many issues needing our attention upfront."

(MUSEUM INSTITUTION)

"In a country of very fragile cultural policies, where institutions struggle a lot to sustain themselves, [...] how does the institution manage to meet the various dimensions and urgencies it experiences? [...] These are management decisions. And, I think our institutions have very serious structural problems. This is evidenced by the number of museums that have caught fire in recent years and so on. And there is a lot to do. [...] So, I think the incorporation of these tools is slow."

(MUSEUM INSTITUTION)

In this context, budget shortage is pointed out as the main impediment, whether in public16 or smaller private institutions. In addition, the fact that technologies are used in intermediate and not finalistic procedures means that institutions often have to prioritize other expedients linked to cultural and artistic programs, such as shows, festivals, performances, and publications.

"Are you going to stop investing 500 thousand in an educational project, a curatorial project, an exhibition, in short, a new website as a whole, to do this? [...] So, I think it's financial resource, without a doubt!"

(MUSEUM INSTITUTION)

The absence of specialized staff is also pointed out as an important impediment to implementing AI in Brazilian

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16   It should be noted that in public institutions there is also the difficulty of operationalizing resources for internal development or for the purchase of a technology. The hiring of platforms, plugins, specialized advisors, operational structure solutions, technical assistance and even sophisticated machines capable of operating the AI systems is complex considering the bidding procedures and the existing instruments for joint operations.

cultural institutions. It is costly to develop solutions internally and, as a rule, the institutions do not have staff with technical experience on the subject. Public hiring (by public service exams) does not foresee professionals specialized in technology, and, in the private sector, the competition for these professionals makes it difficult to hire them. Training internal teams to acquire skills and knowledge in the use of AI is also reported to be a challenge, as it happens in the international scenario (Europeana, 2021).

"[...] in the beginning [...] we could attract people to discuss this, I'm talking about developers, data analysts. Today, it's very difficult, because, thinking about art and culture, our budget is different, and our resources are not attractive at all to these people, do you understand? [...] And, when you find this guy, he doesn't want to work with art and culture, because, as he's in high demand, he has other salaries, he earns in dollars, this guy. So, in this case, it's complicated."

(CULTURAL CENTER)

The alternative in relation to the limitation of financial resources and professionals is precisely to count on external partnerships, from private companies, in agreements for the development of specific solutions. If, on the one hand, these arrangements make it possible to carry out the projects, on the other hand, they usually terminate at the end of each endeavor, as well as the financial resources for that purpose. As it is difficult for them to have an internal team for this kind of development, the technology and knowledge, in fact, are not permanently incorporated into the institution.

"It was [the technology company] that bankrolled it. And then, in the following years, it was not possible for us to continue with the [technology company], because it could not continue with the project [...] And the following year, they wouldn't fund the project anymore, [...] so we stopped it."

(MUSEUM INSTITUTION)

"We end up working with a partnership model and the challenge we have faced is how to retain knowledge, how to manage this knowledge, how to take the knowledge from vendor A to vendor B in the next project".

(CULTURAL CENTER)

One of the challenges, in this sense, refers to the low level of technological appropriation of the cultural area in Brazil, which does not use such tools to support the management of the institutions and, consequently, does

not have an advanced data systematization. Thus, a limiting factor is the very operation of AI in an institutional environment that has not fully assimilated working with the technologies, nor does it have structured databases available to be used in its development.

"[Name of the institution], like any institution, doesn't have such an organized database, a single base, a single register of things; it has several registers, several old databases, like any institution that works with the Internet today does have."

(CULTURAL CENTER)

Added to these are other problems in the public management of culture, where the innovation agenda itself is a distant or non-priority agenda. The agenda of cultural policies, even less structured than those of other social sectors, has more urgent programmatic and finalistic demands. The policies of promotion, circulation, regulation, development of arts, heritage and memory, popular and traditional cultures, audiovisual industry, among many others, require an institutional energy incompatible with the attention to be given to technological innovation projects. Furthermore, there is still no strategic institutional thinking in this regard and the assimilation of AI as an innovation policy can hardly be achieved in the short term due to the institutional reality of the Brazilian cultural sector.

"Today, we face this additional problem of how to bring this into the institution. [...] The pandemic pushed a number of things, but as with every forceful situation, it will always be a shallow approach. We are not yet deeply involved into all questions of innovation, properly speaking.

(CULTURAL CENTER)

THEMATIC BOX – ACCESSIBILITY AND LINGUISTIC DIVERSITY

AI also presents new possibilities for automating transcription, translation, dubbing, and subtitling of content into other languages (Caramiaux, 2020; European Parliament, 2021; Rehm, 2020). Such applications bring an opportunity to broadly reach diverse audiences, either by local adaptation and expansion of linguistic diversity through content translation or by ensuring accessibility to people with disabilities (European Parliament, 2021; Rehm, 2020; UNESCO, 2020).

In the Brazilian cultural sector, even though the issue of accessibility to content is on the agenda and generates strategic decisions from institutions and specialized platform programs, in general such actions do not involve AI-based applications. The institutions, in addition to the lack of investment in technology, also point out the low offer of tools capable of guaranteeing the process in an auto-mated way and with the necessary quality as a justification. On the platforms, as a rule, there are no AI features for adapting content to the local context or for accessibility. There are occasional initiatives in large transnational platforms that point to a scenario of use of simultaneous translation and automated transcription tools.

More specifically with regard to natural language processing applications – used for machine translation or as voice assistants – there are concerns about the possible cultural impact arising from the use of such technologies, since they do not always contemplate local dialects and linguistic variations (UNESCO, 2022). The study identified experiences that portray this issue, for example, by avoiding regionalisms in application training or even by identifying greater limitations in the operation of some tools in Portuguese than in English.

DIGITAL PLATFORMS

[...] the use of AI in algorithm-based content recommendations on media service providers, such as video on demand services and VSPs, may have a serious impact on cultural and linguistic diversity.

(European Parliament, 2021, p. 21)

Digital platforms can be defined as "large-scale online systems premised on user interaction and on user-generated content" (Jin, 2021, p. 23). According to their areas and purposes, digital platforms can be categorized into social networks (such as Facebook), user-generated content plat-

forms (such as YouTube), and on-demand content platforms (over-the-top [OTT] services such as Netflix).[17] Regardless of their specificity, platforms are powered by data, automated by algorithms, and guided by business models (van Dijck et al., 2018).

When acting as mediators of distribution and access to cultural content, the main issue discussed regarding AI refers to the recommendation systems used by platforms (CDCE, 2018; Kulesz, 2017, 2018; Rehm, 2020; Santini, 2020; UNESCO, 2017a, 2020). Such systems can be understood as:

> classification, organization, and recommendation algorithms for cultural products, which work based on the practices and preferences of the users' network. These systems include big data and data mining technologies not only for the organization of cultural goods and the prediction of tastes, but mainly to offer a kind of automated and at the same time personalized "curation" for cultural consumption.[18] (Santini, 2020, p. 19)

Therefore, the adoption of AI at this stage is based on the construction of algorithms that define the content to be offered to users, based on criteria related to consumption habits, previous choices, and preferences. By listing and sorting titles and categories, and recommending content, platforms have great influence over the visibility of content and ultimately over online cultural enjoyment, becoming new intermediary agents in the distribution of and access to such content (CDCE, 2018; Santini, 2020).

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17   Even though there is controversy as to whether OTTs can be defined as digital platforms – because they are not open and collaborative –, they can be considered so, since they are also commercially data-driven and act as mediators, connecting content providers and consumers (Jin, 2021). The scope established by the survey sought to address the uses of AI by streaming platforms, which involve both those of user-generated content and OTT ones.

18   "[...] algoritmos de classificação, organização e recomendação de produtos culturais, que funcionam baseados nas práticas e preferências da rede de usuários. Esses sistemas incluem tecnologias de big data e mineração de dados (data mining) não só para a organização dos bens culturais e previsão dos gostos, mas, principalmente, para oferecer uma espécie de "curadoria" automatizada e, ao mesmo tempo, personalizada, para o consumo cultural."

There is a significant difference in the way these algorithms are used by the digital platforms that operate in Brazil. AI is a core element of the business model of the large commercial platforms that dominate the market, and that have the highest volume of users, with **algorithmic recommendation systems** being used as the main technology for personalizing their offer of cultural content (especially music and videos). Alternative public or independent platforms, with a lower volume of users, however, use AI applications less, with **human curation** prevailing as a characteristic feature of their operating model, which is the result of the programmatic choices made by the platforms, but also of the **institutional barriers** they face (such as a lack of budget and technical staff).

In this scenario, human curation aims to provide **access to content representative of cultural diversity**, of a less commercial nature and that comes from different segments and cultural and identity matrices, in a way that is not tied to algorithmic recommendations. This, in turn, enables **the personalization of experience**, based on user preferences, but it also reiterates consumption patterns and directs access to popular content, which may lead to the **underrepresentation of local and independently produced content**, and have the effect of **homogenizing trends** towards the creation and production of new works (Figure 3).

FIGURE 3 – AI USED BY DIGITAL PLATFORMS IN DISTRIBUTION, ACCESS, AND PARTICIPATION

SOURCE: PREPARED BY THE AUTHORS.
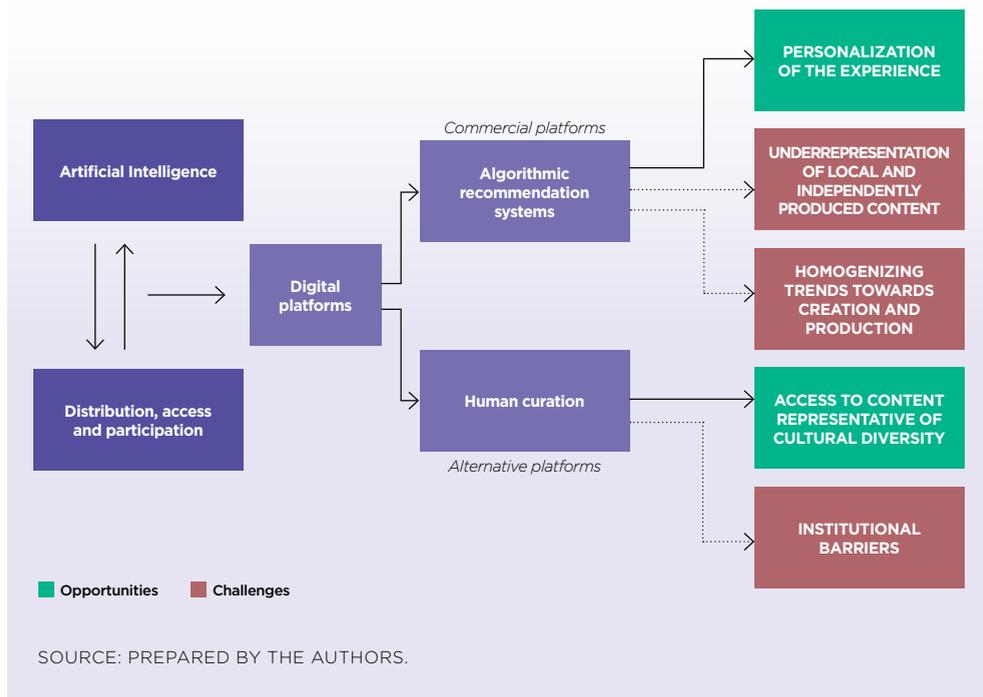
Commercial platforms

As is the case at the international level, in Brazil there is also a market concentration of online content distribution around a few global platforms that tend to accumulate revenues and data collected from users (Kulesz, 2018). In the Brazilian scenario, the largest volume of users and access to content is concentrated not only in the transnational platforms operating in the country, but also in a few large national ones. Given their commercial nature, investment in AI systems is very strong, because therein lies the centrality of digital business.

"[...] if you looked at our revenue-generating products, Artificial Intelligence is embedded in there and is a key factor in our success in [name of the company]'s three main revenue lines, which provide over 99% of revenue."

(INFORMATION PLATFORM)

In this type of operation, the model's supporting pillar is based on individualized content recommendation and personalization of the user experience, because the large amount of data available about the users and the analytical possibilities made possible by AI systems allow segmenting and targeting the offer of content based on behavior prediction models that identify implicit variables that *"humans can no longer see"* (Audiovisual platform). Thus, algorithms influence the discoverability of content through automated recommendations – which suggest to the users new content to be consumed – and also affect, in a personalized way, the results of active searches performed by the users. In this sense, AI has the function of helping you *"find what you are looking for"* (Audiovisual platform), in view of the huge volume of content and information.

Each platform devises its own recommendation algorithm and refines it in the course of use, based on its business model. These mechanisms, in general, use user consumption metrics, either individually – based on their profile, history, and consumption preferences – or from more general trends, from the set of users of the platform. This mix of variables reveals the criteria used to shape the algorithm, which encompass, for example, accessed items, access time, item category, reaction (positive or negative), and also demographic data such as age and location, among other information directly or indirectly provided by the user.

Thus, the more users interact with the platform, the more they grant information that is seized, processed, organized into patterns, and returned by the AI systems in the form of a recommendation for a personalized experience, usually indicating works that reinforce their interests – tending, in turn, to maintain their engagement on the platform. Interaction with the user is therefore at the center of this model.

"Then, you have the user's usage, which, on top of their usage, of their musical taste, the algorithm understands that this person prefers this rhythm, or listens to this more in the morning, or more in the evening. [...] When a person makes a song they favorite, puts the little heart on it, or when they skip it, [...] when they say 'I don't want to hear that song,' all of that helps optimize that person's algorithm."

(MUSIC PLATFORM)

There are also recommendation criteria used by the algorithms that relate to the interactions of the general set of users on the platform, particularly with regard to the popularity of the content. Although there are specificities in the operation of this mechanism on each platform, such criteria can be classified from different strategies used in the recommendation. They involve ranking (most accessed content, recently published content, or content with some kind of filter, mapped out from the accesses); similarity between contents, used to group, "cluster," and recommend similar items based on the metadata associated with each content (title, artist, category, visual components, etc.); and collaborative filtering, based on similarities identified in the users' previous behavior, *"to create the micro-targets there and find people with similar tastes"* (Audiovisual platform).[19]

To a greater or lesser extent, depending on the platform, this dynamic goes through a human curatorial mediation, so as to induce content to be processed by users, who will respond positively or negatively about them, thus instructing the algorithm. In this manner, users modulate the algorithms at the same time as the human editors of the platforms make strategic interventions, stimulating, promoting, curating, selecting, giving visibility, and actively offering certain contents. It is, therefore, a cross incremental enhancement of AI, which combines "external" elements – brought in by the public, by their interests and preferences, including their personal data and browsing tracks – and "internal" elements – characteristic of the company, such as its editorial line.

"We would never cancel the human factor, because it is essential for the Artificial Intelligence factor to work well. I think that pretty much sums up our editorial content and artistic relations side."

(MUSIC PLATFORM)

For this, some platforms work with internal editors and partner editors, i.e., experts with specific knowledge about certain

19   There are also other advanced techniques for optimizing recommendations based on real-time user behavior and on sessions, which identify the paths users have taken on the platform and allow them to predict the next steps, and are particularly useful when a new user starts using the platform and there is not much information about them yet.

genres, who "give weight" to the recommendations. In the field of music, for example, playlists are curated by platforms created from human and algorithmic choices, whose purpose is to increase streaming performance and retain users' attention.

"So, for example, we put an artist's track in an editorial playlist; if the artist already has a certain preeminence, we put it in a higher position, because we know that it'll be good for the playlist's Satisfaction Rate, that it'll generate more streaming."

(MUSIC PLATFORM)

Just like playlists, in the case of audiovisual platforms, there are specific shelves that give visibility to content organized by genre, theme, or type of content, and also function as a kind of curation of the platforms, by creating a segmentation that resembles the idea of editorship. Even though the content offer pervades such editorial choices, the algorithmic recommendation is still based primarily on the user's experience. In this sense, the idea that the greater the user interaction, the better the experience, is quite widespread in the universe of platforms.

"[...] it is important to be clear that the technology is focused on the user's experience. As much as we do all this work of content, of offering different things, of providing playlists, of understanding how this track reaches out, etc., we still have the central factor that is the user's experience."

(MUSIC PLATFORM)

Given the very nature of these platforms, AI applications are geared toward generating revenue and reaching a greater share of the market, with personalization of the experience and user interaction being strategic to accomplish this. There are, however, content recommendations that relate to paid boosting of artists and targeted advertising, a framework that connects directly with the companies' form of governance and market insertion and is configured as a significant part of their income.

In the case of paid boosting, the user consumes the recommendations processed based on their navigation, but also on content offered by contracts between artists (and their managers) and platforms, especially music platforms. Generally, such promotion and positioning strategies are accessible only to bigger, more structured artists with a large audience reach. In the case of contextual targeted

advertising – considered a trivial element of the business model of these platforms –, the applications are gradually improving themselves to generate efficiency in the display and personalization of ads. In this case, AI models also serve to infer information about users in order to ensure higher performance for advertisers.

"[...] the digital world started to generate a huge amount of information and we saw an opportunity [...] to explore a little more this information, which started at first very focused on engagement actions, content recommendation [...]. And then, naturally, we saw that the greater our knowledge about the consumer, the better our performance in our businesses. [...]. So by knowing the user, their interests, their moment, behavior, demographics, I can couple that with demands from advertisers or with demands from our more consumer-oriented businesses."

(AUDIOVISUAL PLATFORM)

Finally, there are also other applications used for monetization, which analyze user data for sales and retention processes, and even for detecting fraud in account sharing, especially in the subscription universe.

Alternative platforms

Although there is a predominance of large commercial platforms in the Brazilian market, it must be recognized that there are alternative models for online content distribution that are not based on user data collection, recommendation systems, and advertisements. Some platforms of a collaborative nature, for example, allow anonymous browsing, so that even the most basic personal data is not seized for processing. This conforms to the very business model of this type of platform: spaces that choose – including politically – not to handle data and, as a consequence, dispense with AI tools that rely on it.

"[...] I think one of the only major platforms on the Internet that doesn't collect data from its users is [name of the platform]. [...] So, that was never in the interest of [name of the platform], creating a recommendation system was never discussed."

(INFORMATION PLATFORM)

The absence of recommendation systems also stems from an institutional choice as to the very curation of content and navigation processes, guided in a non-automated manner and considered *"of high quality precisely because they are curated by humans"* (Information platform). This is the case with

national platforms of a public or independent nature, aimed more specifically at the diffusion of diversified content. On these Brazilian platforms, without the commercial aspect in their main vocation, there is almost no use of AI in the dynamics of the relationship with the user. Without recommendation systems, they prioritize human curation for the choice of content offered on the platform, sometimes understood as *"a programming space"* (Cultural center), and not a repository. Generally, these are the platforms with a greater emphasis on editorial content, with a kind of aesthetic signature (music and movies of specific, more independent genres) or a window for presenting content representative of certain segments (gender, race, LGBTQIA+, for example).

There are several reasons for choosing human editorial curation. In some cases, it is the more militant or activistic vocation of the platform founders themselves, who find in it a less commercial and independent exhibition space. On other platforms, the goal is to fulfill a public function, by using public resources to give visibility to content that would not be accessed but for the state incentive. For this, active human curation, and even a reparative one (in the sense of historical corrections), becomes crucial to provide access to this content.

"[...] I think that, first, it has to do with access, providing this catalog. So first, for us, it was a question of making those movies accessible."

(AUDIOVISUAL PLATFORM)

In other situations, the justification is the institutional culture itself, which aims to maintain control of the decisions regarding the content offer. This is especially the case for platforms housed by larger cultural institutions, such as cultural centers and organizations providing cultural services to the public, whose programmatic action is also often reflected in catalogs and virtual spaces for interaction and enjoyment.

"We have a very strong culture of what we believe the public needs, [...] because, if we take what the market says, [name of the institution] goes a little bit against the grain. [...] 'we don't want the algorithm delivering things,' sometimes we want to deliver what [name of the institution] is thinking about delivering."

(CULTURAL CENTER)

Whatever the reasons, not prioritizing the use of AI is an institutional choice associated with the platforms' editorial

line. Although with different institutional personalities, the focus on human curation seems to be a vocation, a proposal, or even a counter-majoritarian model of offering cultural content. In addition, the adoption or not of AI systems seems to be associated with the volume of available content, which indicates a greater or lesser need for recommendations to personalize the experience.

"[...] we gain a little from this personalization. [...] The caveat is that, for the [name of the platform], that has few works and the works that come in already have a previous curatorship, maybe it's not so rich, right? All the content that is there we already appreciate and like a lot. So, it's an interesting feature, but for the people who were already doing this pre-curation, [...] it's not such a high gain."

(AUDIOVISUAL PLATFORM)

In some of the platforms that make a larger volume of content available, there is the adoption of recommendation mechanisms based on simpler data analysis models that use specific information about the user's profile, such as an anonymous identifier, accessed works, and favored works. From the correlation of static data among the users themselves, a collaborative filtering algorithm is derived to make suggestions based on what the set of users imposes. Despite starting from the processing of certain user data, in these cases there is no training and no ML models aimed at content delivery. Additionally, other challenges are encountered: one of the independent national platforms, for example, has even developed a system along these lines, but it only runs every two months, because a *"beefier machine"* (Audiovisual platform) is needed to draw parallels between users and works in order to promote content recommendation – and in this case, the financial limitation is also evident.

Thus, besides the fact that the nature and objectives of these platforms differ from the large commercial platforms, there are also operational or institutional impeding reasons for not adopting AI. Possible implementation constraints, such as budget resources or lack of technical staff, are also a barrier to the development of AI systems.

"[...] we have budget limitations too, team limitations, it's different, it's hard to compare with a company dedicated to streaming that is consolidated in the market and that has other objectives, which end up being commercial objectives, right?"

(AUDIOVISUAL PLATFORM)

Nevertheless, there is recognition that AI may soon come into use, inevitably changing this relationship. In this sense, there are prospects or projects envisioned for the development of recommendation algorithms which, however, face challenges such as lack of prioritization and difficulties associated with implementation.

"[…] we have a project, we have not implemented the recommendation itself. We have an algorithm designed, with all its scores […] but, given the moment of urgency that we have experienced in the last few years, we have not implemented any of this for the public."

(CULTURAL CENTER)

From human curation to algorithmic recommendation

The different profiles of digital platforms and their respective uses of AI present relevant elements for reflection on the diversity of cultural expressions in the distribution of and access to content. In addition to the challenges posed by the very concentration of content offer and access on large global digital platforms (Caramiaux, 2020; Kulesz, 2018; UNESCO, 2017b, 2018, 2020, 2022), such models focus on the availability and visibility of online content.

In this sense, underrepresentation or discrimination of content in AI-mediated access can occur both by the diversity of the offer in the catalogs and collections available on centralized platforms, and by the selection and prioritization of the recommendation algorithms themselves (Caramiaux, 2020; Lima, 2018). The low presence of local and independently produced works, and the design of proprietary algorithms driven by economic interests thus represent factors of concern widespread in the literature and on the international agenda.[20]

How to ensure that, for instance, a local artist can be discovered on these platforms in the same way as an established artist? […] Local artists or un-

20   This is also addressed by UNESCO's Recommendation on the Ethics of Artificial Intelligence (2022, p. 33): "Member States should engage technology companies and other stakeholders to promote a diverse supply of and plural access to cultural expressions, and in particular to ensure that algorithmic recommendation enhances the visibility and discoverability of local content."

der-represented cultural and creative content are unlikely to appear in suggestions provided by these systems if these artists' works or performances are insufficiently profitable. (Caramiaux, 2020, p. 7)

In terms of the diversity of content made available by the platforms in the Brazilian context, there are different scenarios, with varied implications for the presence of local, regional, independently produced works, or works representative of different segments and cultural and identity matrices.

In the scope of national platforms that are smaller and alternatives to the large transnational streaming companies, the curatorial work for the content offer is, in several measures, focused on diversity, without including AI as a mediating device. In this way, these platforms are focused on the availability of content that does not fit into the marketing clipping of the streaming platforms.

"[Name of the platform] has a different profile from that of the big commercial platforms. The goal of [name of the platform], besides displaying content, is to promote the diversity of the content that is on the platform and that is conveyed to the public. So it's exactly in that aspect of building an audience and presenting content that they generally don't have access to on other platforms."

(AUDIOVISUAL PLATFORM)

Thus, its main vocation lies precisely in making available content with less media appeal and, generally, more in line with the diversity of Brazilian cultural production. These catalogs seek to contemplate different formats, regional and identity themes, and include works of independent production, produced by creators with less projection in hegemonic commercial spaces (such as women, black people, LGBTQIA+, indigenous people, among others).

"And they are works that deal with the LGBTQIA+ theme, the gender theme, the race theme, they are short movies by peripheral filmmakers and young people who are starting out. So that's what [...] exemplifies the specificity of [name of the platform] as compared to the other platforms."

(AUDIOVISUAL PLATFORM)

"The platform was born with this idea of being able to first bring movies that are free for exhibition, already licensed as Creative Commons, and then just because it is licensed with a permissive license, the creators potentially have, let's say, a diversity ideology."

(AUDIOVISUAL PLATFORM)

In this context, partnerships with independent film festivals for the exhibition of movies for a limited time are a constant. The offer focused on diverse content also occurs, sometimes, through open calls for the submission of titles and works. In this case, filmmakers, or the public themselves submit works with permissive licenses, and a set of moderators approve them or not for exhibition, based on a human curatorial process.

On the other hand, among the large commercial platforms, in terms of the availability of works, some encompass user-generated content and others have a catalog defined by the on-demand content platforms themselves. In the first case, because it is a more decentralized content production model, there is the potential for the expression of diverse voices and cultural manifestations.

"I think that since it's an open platform, you'll find videos with absolutely every accent; you have this very large plurality of voices and dialects and languages on the platform because it's easy and because it's open."

(AUDIOVISUAL PLATFORM)

In the realm of platforms that offer on-demand content, in turn, the human editorial factor is the means used for the dissemination of new content in some circumscribed situations. The inclusion of emerging artists in major playlists or other types of publishing support are examples of strategies to give visibility to lesser-known works.

"For people to really get to know a new artist, you have to push them in some way. So, we put them in an editorial support, be it a playlist, a collection, be it a module that we will make out of singles, albums, [...] a podcast in which we call this artist to participate... So it's a big gear that goes back and forth and relies on the help of Artificial Intelligence to improve itself."

(MUSIC PLATFORM)

As indicated, editorial actions in these cases are directly associated with the very dynamics of AI recommendation systems. The discussion therefore pervades not only the availability of works in the platforms' collections and catalogs, but also the visibility attributed by algorithms, which affects the possibilities of content discoverability.

Personalization of the experience from the indication of content to users based on their preferences stands out in the

literature on the adoption of AI in the distribution of cultural goods and services (Rehm, 2020; WEF, 2018). Such possibilities, however, carry with them a series of widely discussed risks, which have a particularly relevant impact on the protection and promotion of the diversity of cultural expressions.

When it comes to personalizing recommendations, therefore, AI is used to build universes of interest for users based on consumption patterns. Thus, the weight of recommendation systems based on popularity, preferences, and previous experiences can restrict access to certain tastes or styles, leading to circumscription to similar content and rejection of differences (CDCE, 2018; European Parliament, 2021; Rehm, 2020; UNESCO, 2009). Thus, the very design of the algorithms is outlined, in general, in such a way as to reinforce the indication of content like that experienced.

"Overall, algorithms force on you more of the same every time. It doesn't have a proposition: 'you like this, you'll like this too, because it's a step further'. The proposition is: 'you like this, so you'll hear something that's more of the same'."

(MUSIC PRODUCER)

By virtue of offering content that is gradually more attuned to the users' behavior and taste, recommendation systems are not proving to be an effective tool, in general, for giving visibility to content that is outside of the preference bubbles. By working in an increasingly niched way, the algorithmic recommendation restricts the user's contact with unknown references, limiting the very process of audience creation – something that human curation processes try to reverse in a certain way.

"So, what we try to bring [...] I think it is also very important not to offer more of the same, you know? But to offer content that stimulates people as well. Not just something from the recommended ones, which is important [...] But, what about offering what you don't like, and what maybe you think you don't like, even to have contact with that, right?"

(AUDIOVISUAL PLATFORM)

Moreover, prioritization by algorithms – based not only on the user's own choices but also on the popularity of content within the platform as a whole – tends to amplify visibility and reiterate users' access to successful content that is "*booming on the platform*" (Audiovisual platform). This tends to reinforce patterns and contributes to the underrepresentation

of local, regional, ethnic, or identity-based content. Thus, the reach of such content depends to a large extent on an input or a specific indication given by the users themselves.

"The traditional [countryside] music of Piauí, I wouldn't access that music before the digital era and I won't access that music if nobody recommends it to me, because the platform won't recommend it to me. Now, what happens today is that if a friend of mine comes back from Piauí and tells me: 'I've seen such a cool traditional music band from Piauí, that's the name,' I can access it immediately. [...] So, the ease of access that the digital world has brought is undeniable. Now, if I'm a lazy person, I'll just stick to what the algorithm offers me."

(MUSIC PRODUCER)

Thus, access to diverse content depends on the user's profile and interaction with the platform, and it is up to the user to "burst the bubble" through targeted searches. From this point of view, characteristic of some platforms, the limitations in this access are attributed to the users themselves. In cases where a user is searching for specific artists or albums, the flow towards diverse content becomes difficult, either editorially or via AI.

"The algorithm doesn't like anything, the user does. So, the algorithm understands the users' habits; if the user listens to that, that's what's going to be delivered to them."

(MUSIC PLATFORM)

Additionally, this perspective indicates that it is possible to expand this universe by suggesting diversified works in the interaction with certain tools that offer content associated with genres and user preferences. Although contained within certain niches, the recommendations would make repertoire expansion possible.

"[Name of the platform] has a tool that is for you to listen to new things. [...] So, we always try to put in our playlists [...] artists that are outside this axis [Rio and São Paulo, that are playing a lot on the radio and are very mainstream], so that users have the opportunity to make these tracks their favorites, to get in touch, to listen, [so that they are] recommended as well."

(MUSIC PLATFORM)

Although some platforms report occasional initiatives in this direction, there is no strategic concern in using recommendation systems to give evidence and reach to content related to cultural diversity. Some measures only scratch this

possibility in order to *"maximize the consumer experience"* (Audiovisual platform) using AI, such as regionalizing the offer from models based on pre-positioning videos *"geared at a certain location or another"* (Audiovisual platform). Also based on the user profile, regionalization feeds back into these same dynamics.

"So, I also think it's interesting to see that we also have a consumption of local content and with relevant regional differences. I don't know if we have interesting public data to show you, I'd guess there is a very strong consumption of Carimbó in the Northern Region [of Brazil]."

(INFORMATION PLATFORM)

In any case, such criteria are part of the personalization of the experience, so there is no prioritization or preferential treatment for diverse cultural expressions (such as popular culture and ethnic minorities expressions). Large commercial platforms claimed to be *"agnostic to this content dispersion"* (Informational platform), demonstrating resistance to any kind of targeting that is not the result of personalization based on personal experience or advertising content. In this vision, it would not be up to the AI, as a tool, to interfere in a specific type of access and consumption, which should be in an organic and spontaneous way.

"But, the scenario is simple in the sense that we don't proactively curate content. […] We wouldn't like to be forced to do it, because we also don't know good criteria of how to do it in the experience of content regulation."

(INFORMATION PLATFORM)

Therefore, diversity in access to content of digital platforms in Brazil is less associated with the use of AI and relies more on human editorial and curatorial choices in offering, recommending, and consuming more diverse content from a sectoral, identity, ethnic, and regional perspective.

Finally, the lack of transparency and explainability of algorithms – commonly referred to as opacity – represents an important layer in the list of challenges of using these AI-based systems for content dissemination and ordering (European Parliament, 2021; Kotis, 2021; WEF, 2018), together with the absence of greater user control over choices and parameters: "For the user, the operation of this algorithm is opaque and

he has no ability to dialogue to determine the extent of what he would like to discover" (CDCE, 2018, p. 5). The issue of transparency also makes it difficult to monitor this agenda, since private data regarding access to content is not available to identify audiences and trends in terms of the diversity of cultural expressions offered and accessed.

In the context of Brazil, the lack of information about algorithms emerges as a point of attention that suggests an asymmetric relationship between the technology and those who use it. Little is known about how algorithms operate, to what data they have access, and what rules guide them with respect to accessing and distributing cultural content. Especially within commercial platforms, because it is a central element to their business models, the details of this operation are not disclosed:[21]

"I think there are a lot of variables included in that account, many, many variables, and they are variables that are kind of kept under lock and key."

(MUSIC PLATFORM)

In this sense, in response to demands for greater transparency, there are still incipient and sporadic efforts to provide information about how user data is being used by AI applications for content recommendation and how this is presented to them.

"There is a general movement in the industry, and we are working on this as well, on the [responsible AI] front, which is … a more responsible use of Artificial Intelligence. One pillar of this is to make the users more aware of how the offers are being structured for them, right? Which is the pillar of explainability, that we are still in the very beginning."

(AUDIOVISUAL PLATFORM)

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21   The difficulty faced in the interview scheduling processes of this qualitative survey, including the number of refusals, especially among the large transnational platforms, reflects the centrality of the topic to the business model and the institutional concern about disclosing strategic commercial secrets.

Homogenizing trends

The indirect effects of the operation of recommendation systems on content creation and production is another question posed in the context of digital platforms. In this debate, it is important to consider the reconfiguration of the cultural value chain in the digital environment to a network model (see p. 106), in which the stages of the chain interact with and influence each other (UNESCO, 2017b).

In this context, the platforms, which play an increasingly important role in the distribution of cultural content, influence the stages of creation and production. By reiterating user preferences and consumption parameters and directing access to what is most popular, content recommendations dictate homogenizing trends that are absorbed by artists and producers in their creative processes (CDCE, 2018; UNESCO, 2020; WEF, 2018).

The interviews with Brazilian cultural agents, especially in the music industry, revealed that certain technical (music volume, presence of certain frequencies, certain more comfortable equalization) and aesthetic (songs with shorter duration, short introductions, choruses followed by voice and little instrumentation, etc.) patterns "thrive" more on platforms whose business models rely primarily on algorithms. Thus, the perception of phonograms that follow certain parameters that are more suitable to be offered, made visible, and recommended promotes the adaptation of artists', music producers', and labels' productions accordingly.

"[...] in this way, it impacts. Like, for instance, knowing that a song that already starts with a chorus and does not have as much intro time, has lower skip rates. [...] So if you're making a song to be competitive, there are certain things that you obviously put into question in the arrangement, because you know that, let's say, songs longer than 3 minutes have less chance of being played. It's obvious that this is a filter. [...] This isn't negligible; this is something we have to look at."

<div align="right">(MUSIC PRODUCER)</div>

In this way, the professionals in the cultural field – in this case, the music professionals – surrender to the logic of AI and try to operate in tune with it in order to obtain success in their productions, which necessarily involves the mediation of algorithms on the platforms. The sentence *"My job is to make the business reach as many people as possible"* (Music producer) summarizes this picture well, in which the creation process is also guided by the technical and aesthetic patterns that are most popular on the platforms. Information about whether certain songs or records have had success and outreach, what arrangements seem to have worked or not worked, what themes produce the most engagement, what characteristics songs have that made them onto lists automatically recommended by AI, *"probably does guide artistic creations"* (Music producer).

Therefore, the algorithmic performance of the artists is used as a tool for analysis, diagnosis, and planning of their careers, based on information about the number of views, skip rate, index of favored and unwanted content, among several other data. All of these have become factors to be considered when creating or choosing their repertoires and the strategies for making their work available.

"It's not so easy to define, but I think some things we know are formats that work and that people, especially those who are starting out, try to somehow replicate those formats that work."

<div align="right">(AUDIOVISUAL PLATFORM)</div>

Another line of argumentation of the potential homogenization in artistic creation is to take this problem as not motivated, but only evidenced by AI. From this point of view, the segregation of diverse content, produced outside the major economic hubs and outside the prevailing market logic, occurred before the arrival of AI applications, following the dynamics dictated by the market.

"The algorithm doesn't understand what is more saleable or not. Let's get a little bit out of streaming and back to the market, unless you want to go back to the market and say something like this: 'look, that person, they make a very specific hit'. Let's suppose, a very specific Brazilian music, very niched, etc. Then, for the market, you do something more commercial, that's a little more fashionable at that moment. That's a market thing, but I don't think it's the algorithm."

(MUSIC PLATFORM)

According to this argument, the social distribution of the song is the factor that interferes with creative production. Currently, the audience has grown on digital platforms which, in a kind of AI-based feedback loop, apprehend the cultural interests of society at a given moment, while shaping the consumption pattern and shaping these interests. For some, therefore, the adaptation of creation to the logic of distribution would be, finally, a response to the aesthetic preferences of the public, in order to maintain their engagement.

"So I think the issue isn't what the algorithm is imposing, I think it's a need for the artist to have an increasingly engaged audience and to understand what's working or not working and often decide for what's working, for that path that's already open."

(MUSIC PRODUCER)

This dynamic, therefore, feeds back into the production centers based on the correlation between content attributes and audiences – a trend that gets worse with the entry of distribution platforms in content production, which start to generate works based on user behavior, in order to maximize consumption. In other words, what is seen is a cycle in the cultural chain: the absorption, by the creation and production stages, of an aesthetic consumer trend, located in the distribution, access, and participation stages, with risks to the creativity and originality of the works.

THEMATIC BOX – COPYRIGHTS AND CREATORS' REMUNERATION

Associated with the distribution of content by digital platforms and the copyright issue, the fair remuneration of artists and creators is another challenge (CDCE, 2018; European Parliament 2021; UNESCO, 2017b, 2018), especially in relation to the streaming market that mainly involves the music and audiovisual sectors.

In this area, there is a lack of global regulation, since the presence of these companies in the market is mostly transnational, and they currently have complete autonomy to remunerate content creators according to their own metrics and contracts (Instituto de Direito, Economia Criativa e Artes [IDEA], 2021). In this regard, the issue of transparency and sharing of data on content provision and access on the platforms has been raised, so that creators and producers can gauge the performance of their works and monitor consumption. In addition, there are debates involving the very issue of the percentage of copyright that must be collected – something that goes beyond digital consumption, but which is accentuated in the scenario of artists' almost total income from the digital economy.

Given that AI applications allow for an adequate calculation, in the Brazilian scenario the criticism is directed towards the lack of transparency and a more equitable and balanced remuneration of creators. The current remuneration model, known as "pro-rata", works in such a way that the entire amount collected is divided among all the songs played, establishing a monthly value for each song played (Ghezzi, 2021). In the platform segment itself, however, there are already proposals to migrate to the user-centric format, in which the percentage of distribution is removed from the platform and the remainder is fully allocated to the artist and other holders of related rights of the songs played by each user, in order to establish a compatibility between what the public actually listens to and what is proportionally directed to the artists.

CONCLUDING REMARKS

In order to understand the use of AI in the Brazilian cultural sector and its implications for the protection and promotion of cultural diversity, the research results enabled a preliminary look at the topic, based on the data that were collected from various actors at the intersection between culture and technology, including cultural agents, cultural institutions and digital platforms. In addition to encompassing different perspectives and institutional contexts of the application of AI systems, the study sought to understand the phenomenon in a comprehensive way

from a thematic and sectoral point of view, covering different cultural languages and domains. From this broad perspective, the results demonstrated some of the striking aspects of the use of AI at various stages of the cultural value chain in Brazil.

While the use of AI by cultural agents for cultural creation and production is still limited as a general phenomenon, it is used operationally (or instrumentally) and aesthetically (or finalistically), especially in music and the visual arts. In its finalistic use, new models are usually developed in a particular way, while apps that are available in the market are used more in the instrumental sphere.

In the distribution, access, and cultural participation, AI has enabled interactivity and for experiences to be personalized in the processes of transmission and reception of cultural goods and content. As for cultural institutions, the experiences are concentrated in the larger ones, and are made available by way of specific projects, whether in cultural mediation through virtual assistants, in strategies for mapping out and relating with the public, or in managing and disseminating digital collections. These initiatives are generally developed in partnership with large platforms and technology companies.

In the context of digital platforms, however, the use of AI is intense on those commercial platforms that dominate the market, which are generally transnational and have a huge volume of users. As a core element of their business models, the use of recommendation systems based on algorithms is a determining factor of the offer of content on the Internet, and this is one of the main vectors for inserting AI into the Brazilian cultural field. But public or independent platforms have been emerging as alternatives for promoting more diverse cultural productions that lie outside the preferential circumscription that algorithms outline for it. This is not only a programmatic choice (institutional and political), but also due to structural circumstances (such as a lack of financial and technological resources).

These characteristics, and others that have been described in this analysis, shape the Brazilian scenario of a cultural sector in which the use of AI is still incipient, except for the

distribution of and access to online content by way of large digital platforms. While the commercial performance model of these platforms is based on AI systems, the use of these technologies in Brazil is – with some exceptions – limited to just a few artists and producers (in the case of cultural agents), specific projects (in the case of institutions), and is technically restricted (in the case of alternative platforms). Institutional, financial, structural, computational, and functional (in the case of specialized professionals) barriers have proved to be significant, and determine a situation in which initiatives in the field of culture that are supported by the use of AI still depend mostly on international apps, companies, or platforms.

This scenario shows the dependence on external technological solutions, the high concentration in the AI development market, and the outdatedness in Brazil in relation to other countries (especially those in the Global North). It also demonstrates that the strategic technology agenda has still not been fully assimilated by the Brazilian cultural sector.

The reasons for this lack of technological appropriation in the cultural sector may be related to other priority demands – and even urgent demands – that precede the investment in technology due to the very survival of the institutions, that need to allocate resources to their cultural programs and structural needs; to the national agenda of cultural policies, which is far from a robust program of digital culture and economy; and, in a macro-political context, to Brazilian socioeconomic inequality itself, whose digital exclusion indicator is also reflected in the segregation of a large portion of the population (including the cultural sector) from the AI implementation process. The digital divide that exists in Brazil and internationally is a core issue, to the extent that it deepens creative divides, especially between the Global North and South (Kulesz, 2018; Santaella, 2021). Furthermore, the market concentration of AI applications may lead to an unprecedented concentration of the creation, production, and distribution of cultural goods and services (UNESCO, 2017b; WEF, 2018).

Given this scenario and the challenges surrounding the presence of AI in the Brazilian cultural sector, elements

emerge from the research that may point to possible future paths, including for further investigations in the field of AI and culture. To begin with, investments are needed in infrastructure, research, and innovation to foster local projects for the development and application of AI in culture (European Parliament, 2021; UNESCO, 2020). Democratizing access to technologies and promoting training for developing digital skills and AI competencies is essential for the full participation of cultural sector professionals and the public in the creation, production, distribution, and access to cultural expressions in the digital environment (CDCE, 2018; European Parliament, 2021; UNESCO, 2017a, 2020, 2022; WEF, 2018). Another relevant aspect is the creation of a data ecosystem for training AI applications and systems that would encompass large volumes of structured, interoperable data, with common taxonomies and semantic vocabularies, and requirements for dealing with biases (Kotis, 2021; Rehm, 2020; UNESCO, 2017b; WEF, 2018).

In that regard, public policies that strengthen the interface between culture and technology are strategic for promoting the appropriation of technologies by cultural professionals (Kulesz, 2018; UNESCO, 2017b), the digitization and availability of public collections (Europeana, 2020; UNESCO, 2017b, 2022), the regulation of streaming platforms (CDCE, 2018; Kulesz, 2018; European Parliament, 2021; Rehm, 2020; UNESCO, 2017b, 2018, 2020, 2022), among other initiatives. A specific agenda for promoting diversity can also be adopted in cultural policies, considering the updating of the 2005 UNESCO Convention for the digital environment (UNESCO, 2017b). The promotion of local cultural production, the creation of alternative platforms to offer diverse content, and the expansion of access to and the visibility of this content on large commercial platforms are widely discussed proposals, which also involve the taxation of these platforms and the establishment of quotas for the exhibition of national content (CDCE, 2018; Rehm, 2020).

The development of algorithms that encourage users to make discoveries outside their environment, the possibility of users shaping the algorithms with which they interact, or even the transparency of algorithms with regard to the vari-

ables used are also aspects to be considered (CDCE, 2018; European Parliament, 2021; UNESCO, 2017a). The development of regulatory frameworks for the digital economy can also help to increase the transparency of the sector and to define parameters for the copyright percentages platforms collect, measure, and distribute as remuneration to artists. Discussions involving the transparency of these applications and their effects on society are important for further consideration of the subject, alongside future studies that explore these gaps, and address the daily relationship of AI-based technologies with audiences, with other sectors, and with more marginalized segments of culture (such as popular and traditional cultures).

The results of this qualitative study are fundamentally important for understanding and making decisions with regard to a rapidly growing phenomenon. Based on the main aim of producing knowledge about the uses of AI and its possible implications, the research data were collected by interviewing respondents who have had experience of AI-based systems. The experiences of non-users, which could enrich the analysis of barriers to the adoption of AI in the Brazilian scenario, were not addressed.

Cultural agents and institutions, which were two of the classes of respondents contacted in this research, use AI in Brazil in a very circumscribed way. Identifying their specific experiences was a challenge, but it was compensated for by the willingness of these actors to talk about the topic. Among commercial digital platforms, on the other hand, the context in which AI is most widely used, it was very difficult to obtain any collaboration with the research. Despite the impact that the extensive use of AI in the distribution of cultural content represents in society, the large international platforms – most notably – resisted participating in the study, which demonstrates the institutional concern there is in revealing strategic secrets, given the importance of AI to their business models.

Despite the growing use of AI systems in the cultural sector, the interface between them is still little addressed in the spheres of government, academia, and civil society. By approaching this subject in a precursory and comprehen-

sive way, therefore, this research helps construct knowledge about an emerging phenomenon that is of global relevance, and whose complexities and peculiarities can be understood from a local perspective. In addition to the conceptual and methodological contribution towards future studies, the results presented in this analysis provide inputs for reflection and action by different stakeholders, including the formulation of public policies and regulatory frameworks that deal with the adoption of AI in culture, and the potential implications for the protection and promotion of cultural diversity.

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CONCLUSIONS

Artificial Intelligence and culture:
A long-term look

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t is not easy to think about long-term issues in the area of Artificial Intelligence (AI), especially when the topic involves complexities of various kinds, such as those discussed in this publication, or when the topic develops in a field that is well known by digital platforms, but incipient for most agents and institutions in the cultural sector, as was presented in the qualitative research that was conducted by the Regional Center for Studies on the Development of the Information Society (Cetic.br). Thinking about the long-term relationship between AI and culture in this complex, new context is, to say the least, challenging. But, when the future seems uncertain, there is a resource that can be used to make it more palpable: looking at the present from a critical perspective, in order to unveil its structures and glimpse the presumable course that the transformations will take.

It is important in this context to note the role played by the popularization of the use of the Internet, which has been decisive for the development of AI and brought with it all kinds of transformations. Of these, perhaps the one that most relates to the AI agenda and its consequences for the world of culture is the radical change that has occurred in the world of advertising, implemented on digital platforms through the use of recommendation algorithms and the micro-targeting of consumers. This subject is now detailed in order to envision four points of attention, without which it will prove difficult to construct cultural policies from now on.

CONTEXT: ONLINE ADVERTISING, MICRO-TARGETING, AND BIG TECHS

Throughout this publication, the relationship between the distribution of cultural content and the business models of streaming platforms is pointed out, with the latter relying heavily on the use of AI, machine learning (ML), and algorithmic recommendation systems (RS). Big Tech companies popularized these technologies from the 1990s on, and now they are slowly being used for different purposes by artists, cultural institutions, and other online content distribution platforms.

The use of these technologies by search platforms, like Google, was a response to the enormous growth in information that is available on the Internet. While these technologies

reduced the effort required to search for information, the ease with which information can now be searched for led to an increase in the number of users and greater retention of people's attention. One of the computing mechanisms behind this operation was the programming of algorithms that were capable of systematizing individual preferences and finding patterns in them, in order to deliver the subsequent recommendations with which they were compatible.

Thus, people's digital footprints that are recorded in large databases (Big Data) are used as input for creating and transmitting advertising messages that reflect, at an individual level, their preferences and personalities. All this takes place in an increasingly controlled and vigilant digital environment to map and predict the interests of these users.

This mechanism, which today is more or less well-known, but still not very transparent, enabled consumer audiences on the Internet to be better segmented by traffic intermediaries, such as Google, in a process that is called micro-targeting. The most common techniques for organizing collective opinions use elements of psychometrics to assess personalities (Costa & McCrae, 1992), uncover and segment interests, and influence the purchasing behavior of consumers (Bruno et al., 2019).

Big Techs today compete with each other to capture users and sophisticate the computing resources necessary for micro-targeting and are the most valuable companies in the world.[2] Their business model is that of accessing people, while their business is selling audiences for online advertising, so agencies and advertisers increasingly resort to online campaigns that are segmented by niche interests to sell their products and services. This means that they reach consumers more accurately and also evaluate their campaigns using more refined metrics when compared to advertising in the traditional physical media. Nothing is better for the advertising area than this new *modus operandi,* but this model has led to a shift in investments away from mass media to RS-based platforms,

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2   According to the consultancy firm Kantar Brandz, the most valuable brands in the world in size order are: Apple: USD 947.062 billion; Google: USD 819.573 billion; Amazon: USD 705.646 billion; Microsoft: USD 611.460 billion; Tencent: USD 214.023 billion; McDonald's: USD 196.526 billion; Visa: USD 191.032 billion; and Facebook: USD 186.421 billion (G1, 2022).

thereby reshaping the whole of the culture industry.[3] The high cost of innovating and developing these recommendation technologies is funded by online advertising.

POINTS OF ATTENTION FOR THE AI AND CULTURAL POLICIES AGENDA

ALGORITHMIC RECOMMENDATION SYSTEMS AND CULTURAL HABITS

The ability of Big Techs to retain people's attention is a central bargaining chip for the digital ecosystem's business model in which cultural goods are currently found, which forms a zone of tension between capital and social rights, such as having access to different content that is representative of different identity matrices, for example. Attention feeds online advertising, whose investments feed back into the entire system, and various strategies are put into practice in its name and in the name of the engagement that feeds micro-targeting.

Controlling traffic has become crucial for Big Techs, because this enables the RS that systematize the transitory nature of the preferences and interests of individuals to be constantly updated (Santini, 2020); these individuals are seen as consumers and not as citizens who have cultural rights (Canclini, 1997). Although conflicts over privacy exist, the power play between Big Techs and Internet users is still very uneven. The tendency is to consider data marketing – which often violates the privacy of Internet users – as something quite natural.

This discussion is particularly important when thinking about movies and music, which are cultural goods that seem

3   According to data from the Cenp-Meios study, produced by Cenp (Executive Council of Standard Norms, an entity that brings together the main advertisers, communication vehicles, and advertising agencies in Brazil), in 2021 digital media represented 33.5% of the investment in advertising by the 298 largest advertising agencies in the country, an increase of 7 percentage points compared to the previous 2020 report. On the other hand, investments in open TV, the leader in the ranking by sector, fell from 51.9% of the total to 45.4 % (Pezzotti, 2022). According to the Digital AdSpend 2021 (a study carried out by the IAB in partnership with Kantar Ibope Media), a total of R$ 30.2 billion was invested in digital advertising, an increase of 27% compared to 2020. The data also indicate an increase in the number of advertising companies, with a 30% increase in the number of digital advertisers when compared to 2020. Social networks received 54% of the investments (Meio & Mensagem, 2022).

to be the new frontier of data capitalism.[4] These goods are mainly consumed on international platforms whose business model is not based on guaranteeing access to specific works (as is the case with alternative platforms with human curators), but on selling the recommendation itself, which is adherent to the system of preferences and tastes of the users. Netflix and Spotify, for example, originally sold recommendations, rather than just movies and music. As a result, they cannot dispense with the continuous micro-targeting process (which is based on capturing attention) when it comes to maintaining their business models. In this sense, while the Internet offered the possibility of people distributing music, movies, and other cultural goods themselves,[5] it again takes issues that are traditionally dear to the cultural milieu to new heights, such as distribution that is concentrated in the catalogs of the major producers and record companies to the detriment of content that affirms the identity and is representative of the diversity of cultural expressions.

Concurrently with the issue of offering cultural goods, culture audiences have always been a central issue for cultural policies (Itaú Cultural, 2011). Since the studies of Bourdieu (Bourdieu & Darbel, 2007) and Certeau (1994) within the scope of the French Ministry of Culture to research into cultural habits in Brazil,[6] getting to know the practices of the population was always crucial for developing policies for disseminating culture, not only to meet the mapped out demands, but mainly to encourage new demands, since the taste for culture is not a natural occurrence (Donnat, 2011).

In this sense, and without ignoring the value in the ease of access provided to cultural goods by platforms and RS, how is it possible to create instruments to stimulate new demands in the consumption of culture if RS aim to offer content that already

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4   Data or surveillance capitalism is a term popularized by the American sociologist Shoshana Zuboff. According to the researcher, the term denotes a new genre of capitalism that monetizes data acquired through surveillance, especially in digital media (Zuboff, 2021).
5   Self-distribution enables artists to self-manage digital distribution, monetization, marketing, promotions, and accounting, for instance, by tracking the analytical data provided by platforms. Examples of companies that offer self-distribution services are One RPM and CD Baby.
6   Examples of surveys of cultural habits in Brazil are the Social Service of Commerce of São Paulo (SESC) and Fundação Perseu Abramo (2013) and Leiva (2017).

adheres to systems of user preferences and tastes? How can the convenience of recommendations that reinforce previous taste patterns be equated with stimulus to make discoveries that escape the patterns already sedimented by *habitus*?[7]

REGULATORY ISSUES: COPYRIGHT AND ARTIST REMUNERATION

The functioning of this model and its consequences for the world of culture bring with them the need for an assessment and adjustment of regulatory issues. The Brazilian Civil Rights Framework of the Internet (Law No. 12.965, 2014), for example, because of the numerous changes it underwent in its legislative process, removed copyright from its scope, which in practice exempted content providers from liability or fines related to any copyright infringement committed by users (Valente, 2019). Furthermore, there are issues in the particular case of music that have as yet no specific regulations and violate rights that have been guaranteed for a long time. Such is the case with rights related to performing musicians. Despite constant complaints about low payments, composers and singers receive royalties when tracks are played, but performing musicians do not because there are no commercial agreements with platforms and record companies. The lack of transparency in these international commercial agreements between platforms and rights licensors means that performing musicians, who have their rights guaranteed by various international agreements and national legislation, do not receive royalties from the tracks on which they played in the recordings. Over and above the lack of transparency in these commercial agreements, the economic power of the Big Tech companies promotes the entry of entities that represent musicians into the game already at a disadvantage when it comes to negotiating traditionally guaranteed rights.

Returning to the AI issue, if the popularity of music tracks is one of the main algorithmic recommendation criteria in

7   According to Pierre Bourdieu, the concept of *habitus* refers to a set of more or less durable dispositions, internalized throughout life, that inform the person's perceptions, feelings, and actions. It is built from interactions between the individual, the culture of the group and that of social institutions, such as family and school (Setton, 2002).

taste clusters that are identified by micro-targeting, it is not difficult to see that the catalogs of large corporations that are able to invest heavily in advertising tend to be more recommended, causing a short circuit in the system. These popular catalogs are recommended more and generate proportionally more royalties than the others, so they acquire greater reinvestment in data marketing, increasing their popularity even more.

Although there is room for all musical proposals on streaming platforms – and this is an extremely positive point considering the previous period – not all of them will have the same visibility and remuneration conditions. This leads to maintenance of economic concentration in the sector and poses a risk to the diversity of cultural expressions, although the prevailing narrative is that platforms have democratized access. It is one thing to expand access to the means of production and distribution, which has actually happened with streaming platforms, and quite another to democratize access, which would mean making access conditions equal for all. In other words, this debate simultaneously harbors discourses that are enthusiastic about technology and the increasingly sophisticated tools of micro-targeting, and criticism that emphasizes the human and cultural cost of this process.

THE ETHICS OF AI: PRIVACY AND BIAS

To the extent that AI systems have been implemented, risks of rights' violations have been discovered and the importance of having a discussion on the ethical issues of AI has intensified. A highly strategic point to be discussed in this context is the right streaming platforms have to collect private and subjective information from their subscribers (such as listening practices, choices, habits, types of device, locomotion, etc.), and use this information as a bargaining chip in other businesses (Ghezzi, in press). The data that feed the RS are the result of organized collective opinions and constitute the true inputs of the new economy. Algorithms can read this data and turn it into recommendations, which are the main economic assets of Big Techs. Recommendations, therefore, become econom-

ic assets at the expense of the privacy and subjectivity of users (Bruno et al., 2019).

The use of data, however, does not only concern the problem of privacy violations, as in the case of Cambridge Analytica and Facebook (Alves, 2018), but involves other relevant discussions, such as the right not to be judged or categorized for certain purposes, or based on opaque criteria (Frazão, 2018). Here we are referring to algorithmic racism[8], for example, and other biases caused by micro-targeting, which damage cultural diversity.

GOVERNANCE: A MULTILATERAL ARRANGEMENT OF THE DIGITAL WORLD

The history of these transformations reveals that the advertising world has shaped itself to fit the current configuration of the Internet. Whereas in the beginning the digital world was the promise of horizontal communication possibilities, today it is also a space controlled by gatekeepers in search of the attention of consumers, in which the private law of Big Techs tries to impose itself on the collective rights of society and on personality rights.[9] Using a well-known metaphor, the Internet has gone from being a public square to a narrow corridor, which certainly has implications for the world of civil rights and cultural consumption.

These transformations are related to the capitalist cycles and will probably last a long time, since they define platform capitalism, data capitalism, or even surveillance capitalism (Zuboff, 2021). The point is not to go back to a world prior to online advertising and its recommendation algorithms because, as seen from interviews with cultural agents and institutions, AI is full of creative, technical, and operational possibilities. It is about perceiving what the game of forces is and what rights are at stake in a relatively new space that

8   Algorithmic racism has become an important concept for understanding how the speedy implementation of emerging digital technologies, which prioritize ideas of profit and scale, has a negative impact on racial minorities around the world (Silva, 2022).

9   Personality rights are related to the individual and to aspects which are related to his/her identity and are non-transferable and inalienable. Among the personality rights provided for in the Brazilian Civil Code (Law No. 10.406, 2002), are the right to a name, to honor, to an image, to privacy, and to intimacy, and to the right over one's own body.

is full of tensions and still lacking in equilibrium between the parties involved.

Micro-targeting, which is essential for current business models, cannot transform the virtual space into a field with one-sided rules that only protect these models based on the attention economy. The capital-labor conflict that has shaped the consolidation of rights in modern societies is not sufficiently clear in platform capitalism, and much less balanced, while the economic power of Big Techs cannot be the only social force acting on the collective arrangement of the virtual space. This arrangement must be multilateral, in order to enable the economic activities of Big Techs while guaranteeing certain individual and collective rights that, outside the digital environment, are already more or less established. Cultural policy is responsible for this search for balance, and it is going to need to be updated and dialogue with science, technology, and innovation (ST&I) and communication policies in order to properly participate in addressing this problem.

EPILOGUE

These grounds are unstable, and even though it seems that technology is all-powerful and there is no room for re-arrangements, it is always possible to renegotiate practices that involve the digital environment. New possibilities depend on new governance agreements, which need to be envisioned before being agreed upon.

As impossible as they may seem in the current Internet configuration – that of the Web2,[10] which relates to apps and to the great gatekeepers of traffic – some issues may be the guides of a new governance on the Internet – the Web3.[11] On one hand, these are concerned with transparency and the role of individuals in the ownership and use of their own data. What if we had access to our profiles in micro-targeting and could use and sell them to advertisers interested in

10   Web2 designates the current structure of the Internet, characterized by the dominance of Big Techs that provide services in exchange for users' data.
11   Web3 refers to a decentralized structure of user-centric applications, without the counterpart of the monetization of their data.

us as an audience, and could earn part of the revenue from online advertising?

But they are also associated to decentralization and the prospect of a digital environment that focuses less on capturing user attention. What if we could be in a digital environment that is less hierarchical in terms of traffic control, in which vying for our attention was not worth anything?

Although these are not easy issues on the immediate horizon, when we look at the present, the critical perspective provides us with an opportunity to reflect on other possible scenarios for society, culture, and the role of AI.

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