Supporting Culture
in the Digital Age

Public Report

March 2020
Written by Octavio Kulesz

Edited by Meredith Okell,
Director of Communications and Engagement, IFACCA

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About the author

Octavio Kulesz (Argentina) is a digital publisher, entrepreneur and director of Teseo, one of the first academic e-publishing houses in Latin America. Octavio's work focusses on issues related to cultural industries in the digital age; he authored the chapter 'Cultural policies in the age of platforms' for the UNESCO report *Re|shaping cultural policies: advancing creativity for development* (2018); and has written several other reports that have contributed to deeper understanding of digital trends in emerging regions, such as *Digital Publishing in Developing Countries* (2011). Since 2012, he has been a coordinator for the Digital Laboratory of the International Alliance of Independent Publishers; and in 2019 he was selected as a member of the 2019-2022 EU/UNESCO Expert Facility, aimed at supporting initiatives for the implementation of the 2005 Convention on the Protection and Promotion of the Diversity of Cultural Expressions. In 2020, Octavio was appointed to UNESCO's Ad Hoc Expert Group (AHEG) for the Recommendation on the Ethics of Artificial Intelligence, which will produce a draft of the first global standard-setting instrument on the ethics of artificial intelligence.

Prologue

April 2020

We began work on *Supporting Culture in the Digital Age* in October 2019. In the months that followed, we read extensive literature on the subject; gained direct insights from National Member institutions across the Federation; and sought the perspectives of artists, creative entrepreneurs, policy makers and researchers worldwide. By early March 2020, the report was written and ready for translation. In the time since, the international arts and culture sector – as well as the world in which we live and work – has been radically transformed by the COVID-19 pandemic.

The cultural value chain that underpins our sector, and the structure of this report, has been thrown into disarray: artists and creative practitioners face increasingly precarious circumstances that threaten their employment and the sustainability of their practice; production chains have been significantly interrupted; and the vast majority of opportunities for distribution, access and participation have evaporated with the implementation of social distancing and lockdown measures to limit the spread of the virus. Suffice to say elements of the narrative within this report have progressed significantly since the end of February. At the same time, recent events have confirmed that it is vitally important to understand the effects of the digital age on the sector; and for public agencies that support arts and culture through policy, investment and promotion to consider associated challenges and opportunities, as well as how they might adapt their work across the value chain to support culture in the digital age.

In the last six weeks a multitude of digital responses from the sector and public agencies have emerged with accelerated speed, particularly in terms of digital distribution and participation. We have been deeply impressed by the resilience and adaptability of the sector, and the swift response measures implemented by governments and public agencies to support the sector worldwide. We are also keenly aware of the need to develop well-calibrated policies and strategies that consider the whole cultural ecosystem to ensure that it continues to be sustainable, diverse, equitable, and accessible, as this report demonstrates. As such, we have decided to release *Supporting Culture in the Digital Age* as prepared in March 2020. While the report may not include examples of the most recent measures taken, we believe the contents will prove invaluable to National Members as they develop medium- to long-term plans, policies and programmes to support culture in the digital age, particularly in the context of the COVID-19 crisis and its aftermath.

Magdalena Moreno Mujica, Executive Director, IFACCA

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Introduction

In March 2019, senior representatives from National Member institutions of the Federation gathered in Malaysia for the Executive Leaders' Seminar, alongside the 8th World Summit on Arts and Culture. During the meeting, members confirmed shared priorities for the Federation, including the need to more fully explore the effects of technology and digitalisation on the arts and culture sector, as well as the public agencies that support the sector through policy, programmes and funding. In response, the IFACCA Secretariat has developed this report with external expert author Octavio Kulesz (Argentina) – a digital publisher and entrepreneur whose work focusses on cultural industries in the digital age – to explore key issues, highlight case studies and identify recommended actions for supporting culture in the digital age.

This report draws on existing literature and insights provided by National Members from each of the regions in which we work, as well as a range of actors from across the cultural value chain. It also considers trends, challenges and responses from the perspectives of the three main groups of cultural actors: artists and creative practitioners; the cultural and creative industries; and audiences. This diversity of perspective highlights a spectrum of experience: while technology and digitalisation may spark global effects, how we experience – and are able to respond to – these effects varies greatly, and often unevenly. However, such diversity also reveals traits that are common to successful approaches to supporting culture in the digital age. These inform our recommendations and we hope they will be useful to arts councils, ministries of culture and other national cultural agencies as they respond, no matter where they are in the cycle of adapting to support culture in the digital age, be it exploration, implementation, evaluation or renovation. These recommendations are included in the final chapter of this extended version of the report for National Members of the Federation; however, we are pleased to make available this public version of the report.

The digital age has changed the cultural value chain; so too the environments in which we communicate. However, the need to protect cultural content and safeguard arts and culture remains paramount. As a Federation of public agencies that support arts and culture – and who share the vision of a world in which arts and culture thrive and recognised by governments and peoples for their contribution to society – we must work together to create new models that can respond to the challenges and opportunities these changes bring. Our efforts must be collaborative: we must learn from our peers; articulate the issues that our sector faces; champion the importance of cultural and creative industries; understand the limits of existing knowledge within our sector; and find ways to learn from and partner with those outside our sector. Importantly, throughout this process we must be aware of the disparities that determine who has access to arts and culture in the digital age and ensure that we develop plans that are non-hierarchical and inclusive.

On behalf of the Federation, I would like to thank Octavio Kulesz for his knowledge, expertise and ongoing thought leadership in this space; as well as our members and colleagues in the sector who contributed their insights through interviews and online surveys. The role of technology and issues related to the digital age cut across many areas of our work – including how we can maintain international connections when mobility is restricted – and we see this report as a first step for the Federation. We look forward to working with members and sector colleagues to take collective actions that address these issues internationally.

Magdalena Moreno Mujica, Executive Director, IFACCA

Executive Summary

The digital age has profoundly changed the world in which we live. The expansion of phenomena such as the Web, mobile phones, social media, e-commerce and artificial intelligence has reshaped how many of us experience the world and how we relate to each other. Digital technologies and tools have transformed not only artistic and cultural practices, but the entire cultural value chain: from creation to production, distribution, access and participation.

For artists and creative practitioners, new technologies have radically altered how they can work: they have optimised processes; pushed the limits of experimentation; generated new possibilities for how artists collaborate in the act of creation; reduced barriers to creation by making accessible tools widely available; inspired new forums in which experimental works can be showcased; and established new networks and methods that allow artists and creative practitioners to find audiences and collaborators (or even audience-collaborators). However, these opportunities are unevenly distributed across a digital divide, as the ability to leverage them relies on access. Access to infrastructure is a major issue, as almost half of the global population (46.4%) does not have access to the Internet; so too is access to skills, knowledge and experience, with new environments often replicating existing barriers based on language, disability, race and gender. Where access is possible, artists and creative practitioners face the challenges of visibility in now-crowded markets; being recognised in traditional arts and culture environments; exercising freedom of expression in censored digital environments; securing fair payment; and protecting intellectual property, particularly in digital spaces too vast to monitor. Some of these challenges are compounded by fundamental questions surrounding creation itself: in an age when machine learning and artificial intelligence produce works of arts, who holds the rights to what? And how can we protect traditional cultural expressions from appropriation and exploitation?

For the cultural and creative industries and sectors that distribute cultural goods and services, new technologies have generated new products; created unprecedented opportunities for preserving intangible cultural heritage and archiving information; opened significant new markets; spawned innovative business models; and empowered various actors to extend their roles within the cultural value chain. However, these opportunities also bring challenges. An abundance of cultural goods and services creates a concentration of supply that affects diversity of cultural expressions and content discoverability, particularly when distributors have the dual role – and vested interests – of content producers. Many organisations struggle to adapt to new environments because they lack the infrastructure, funds, time, staff and/or technical resources. While disconnect between the culture sector and other sectors that drive the digital agenda creates an imbalance in the skills, knowledge and funding required to operate – and compete with viable business models – in changed markets, with new players and scales of operation. There are also risks associated with insufficient data, with a lack of awareness and access to plentiful data (and the systems needed to analyse and leverage data) that hinders the cultural and creative industries' ability to carry out evaluation and forward plan.

New technologies also affect how we access – and participate in – arts and culture. More than half the world's population now has access to the Internet, and in developed countries more than 87 percent of people are connected. There are vast volumes of data circulating on the Internet, including increasing amounts of digital content consumed by audiences worldwide; and social networks foster active audiences who can easily publish and share content. These factors combine to create a new kind of audience that has expectations of great access for minimal (or no) cost; shifting notions of ownership and collection; and greater interaction, intervention and collaboration between audiences and creators. These changes too, bring with them issues. Disparities in access to infrastructure – and related skills –

exclude certain countries and social groups from digital life and, therefore, culture; and the contained nature of much digital exchange can obfuscate trends and make it difficult for actors across the cultural value chain to understand and meet audience needs. Moreover, audiences in these spaces may be censored, censured or have their personal data misused; virtual communities may create echo chambers that distort perceptions; and algorithms that tailor cultural content could ultimately pose a risk to the very idea of a common culture.

All of this clearly has implications for the public agencies that support arts and culture through policy, investment and promotion at a national level. While most countries have not yet developed comprehensive national digital culture plans, public agencies worldwide are tackling these issues and adapting how they work across the value chain to support culture in the digital age. An example of this being done at a sector-wide scale can be found in Canada, where in 2017 the Canada Council for the Arts set up a Digital Strategy Fund to encourage an overall approach to support artists, groups and organisations to understand, engage and respond to the digital world and the cultural and social changes it induces. There are also examples of dedicated programmes and activities designed to support the sector to work in new environments and access new markets, including in Switzerland where in 2016 ProHelvetia launched its Culture and Business initiative to support artistically and technologically innovative design and interactive media projects with market potential, through dedicated tools, expertise and funding programmes.

Many public agencies have also done significant work to give artists and cultural organisations access to training and resources that will help them adapt to and embrace new technologies, often by leveraging partnerships beyond the cultural sector. An example of such work can be found in England, where Arts Council England has set up its Digital Culture Network comprising nine expert Tech Champions – with expertise in digital content production, web design and user experience, Search Engine Optimisation/ Marketing, e-commerce, CRM, digital strategy and data and analytics – who offer support and training to those working in the sector, across the country. Public agencies are also working to harness the power of data and supporting the sector to do the same. An example of this can be found in Tunisia, where the Ministry of Cultural Affairs has developed and launched Open Culture, an open source online portal that allows users to freely access and request cultural data from across areas including music, dance, literature, audio-visual arts, cultural heritage, visual arts and cultural institutions.

The visibility of cultural expressions and discoverability of content have also been areas of focus for public agencies, including in Mexico, where the Secretary of Culture set up and maintains a site to profile cultural events taking place at the national level – including cinema, dance, literature, theatre and digital culture – which allows users to register and organise their calendar from a mobile application. Public agencies have also made progress to better understand audiences in the digital age: many use – and provide for the sector – free data and development tools, including in Spain, where the Ministry of Culture and Sports has set up the Permanent Museum Public Laboratory, which provides museum professionals and state administrators with meaningful visitor data.

Of course, public agencies are not immune to the effects of the digital age. This means that their adaptation is two-fold: they must understand and respond to the needs of the sectors they serve in the context of changing technologies and environments; they must also respond to how changing technologies affect the operations of their work. An example of how agencies are working to better understand their constituents can be found in the USA, where the National Endowment for the Arts is conducting a national research study – in partnership with the Ford Foundation and the Knight Foundation – to better understand the needs of artists who work with technology as a creative medium; and how arts funders and organisations that provide resources can support their practices. Other agencies have been able to introduce new technologies and adopt new ways of working that improve

how they support arts and culture from an operational perspective. An example of this can be found in Singapore, where the National Arts Council partnered with other national government agencies to adopt an agile development model – allowing for prototyping, iteration and improvement – and launch the MCCY Grants Portal, which provides a central point through which users can apply for government grants for arts, community, heritage, sports and youth. Others have adopted new internal technologies and systems that free staff from administration and allow them to focus energies on strategy and policy work. Public agencies face challenges too. New technologies bring with them challenges related to skills, staff, equipment and financial resources; delivering integrated innovations nationally across territories, sectors and social groups can be very complex; and the nature of communications in the digital age is changing how agencies connect with the public they serve.

This report explores trends, challenges and responses that affect the cultural value chain and its main actors; it also acknowledges the need to develop well-calibrated strategies that place people at the centre of our thinking and consider the whole cultural ecosystem. It identifies a recurring set of themes that could inform how public agencies – in different contexts worldwide, with varied opportunities, challenges and barriers – might approach supporting culture in the digital age. The extended version of the report for National Members of the Federation also includes further insights into the experiences of public agencies, as well a series of recommendations to consider when designing national digital culture plans, based on insights from successful case studies and international best practice.

Research Methods

This report draws on primary and secondary resources, as well as a review of existing literature. The author conducted interviews with government agencies responsible for arts and culture from each of the regions in which IFACCA works, as well as a diverse range of actors from across the cultural value chain including artists, creative practitioners, policy makers, researchers, civil society organisations, producers and distributors (see Appendix 5). The report also includes information gathered during meetings with National Members of the Federation; as well as structured online surveys completed by representatives from government agencies that support arts and culture, and the global sector (see Appendix 4).

Context

Digital technologies have profoundly transformed artistic and cultural practices. Indeed, the breathtaking expansion of phenomena such the Web, mobile phones, social media, e-commerce and artificial intelligence, have reshaped the way we create, exchange and relate to each other.

These changes have all brought with them new opportunities, but also enormous challenges. The rise of new technologies has made it possible to create, support, produce, distribute and access cultural goods and services in quantities unprecedented in human history. However, it has also caused many people who do not have access to these tools to be partially excluded from cultural life and threatened the economic sustainability of many players within the creative market. In recent years, public agencies that support arts and culture have introduced an extensive range of policies and programmes specifically designed to take advantage of the opportunities that this new environment presents and mitigate associated disadvantages. Some agencies have also developed plans to address these issues in a comprehensive manner. In Canada, we have found examples of this at the Federal and provincial levels. In 2017, the Canada Council for the Arts set up the Digital Strategy Fund which will invest a total of CA$ 88.5 million (€60 million) by 2021 with three main areas of action: Digital Literacy and Intelligence; Transformation of Organisational Models; and Public Access to the Arts and Citizen Engagement. At a provincial level, in 2014 the Quebec Ministry of Culture and Communication adopted its *Digital Cultural Plan* which includes a vast range of measures designed to help creative actors appropriate new technologies, and to enhance the visibility of cultural content in the digital environment. In Mexico, in late 2017 the Secretary of Culture drew up the country's *Digital Culture Agenda*, which focusses on several strategic pillars, including: the cultural and creative industries; skills; preservation; and social participation. Further south in the Americas, for over a decade the Ministry of Culture of Colombia has promoted its *Digital Culture Policy*, which seeks to foster the creation of digital cultural content throughout the country, among other objectives. Meanwhile, in the United Kingdom in 2018 the Department for Digital, Culture, Media & Sport (DCMS) launched its *Culture is Digital* policy paper, which encourages the use of digital tools to drive audience engagement; boost the digital capability of cultural organisations; and unleash the creative potential of technology.[1]

Multilateral organisations have also started developing a strategic vision on these topics. Since 2014, the Ibero-American General Secretariat (SEGIB) and the Organization of Ibero-American States (OEI), have coordinated to implement a *Digital Cultural Agenda for Ibero-America*, which will promote digitisation; society's participation in digital culture; creative industries; the generation of local and shared content; and the preservation of cultural heritage. In addition, within the framework of the UNESCO 2005 Convention on the Protection and Promotion of the Diversity of Cultural Expressions, in 2017 participating States adopted the *Operational guidelines on the implementation of the Convention in the digital environment*; and in 2018 they agreed a roadmap to foster diversity and strengthen the cultural value chain.

However, we must recognise that countries that have developed comprehensive digital culture plans are in the minority. For cultural public agencies – particularly smaller ones – it can be difficult to muster the financial or human resources needed to take on this task. As a result, instead of implementing holistic programmes, institutions often opt for partial or sector-specific measures that are short-term in scope; or

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[1] There have been several forerunners to this initiative, especially the Digital R&D Fund for the Arts, run by Arts Council England, the Arts & Humanities Research Council (AHRC) and Nesta from 2012 to 2015, with the aim of helping arts and cultural organisations across England to work with digital technologies. The lessons learned during the implementation of this pioneering programme – and in particular the data provided by the Digital Culture survey in its multiple iterations since 2013 – served as essential input in designing the Culture is Digital policy paper.

they force the adoption of specific technologies in an attempt to ensure strategies cut across the cultural ecosystem. Respectively, such actions fail to consider that each part of the cultural ecosystem is subject to wider technological environments and effects; or they are unsustainable and ill-suited to diverse contexts.

As such, this report aims to:

- analyse how new technologies affect the arts and culture sector
- explore the extent to which digital tools present opportunities or challenges for the work of public agencies
- identify success stories and best practices
- recognise global trends, as well as regional and national tendencies
- propose a framework for public agencies interested in developing and furthering digital culture plans.

In recent times, the impact of digital technology on artistic and cultural practices has sparked intense debate in the media and academia. In preparation for this report, we have analysed extensive literature on the subject[2] and established direct dialogue with 19 National Members of the Federation from each region. We have also considered the views of more than 40 artists, creative entrepreneurs, policy makers and researchers worldwide, who shared their views on these topics through a structured online survey.[3]

A comprehensive digital culture framework requires us to change how we address digital issues; and relies on a bottom-up approach. This includes making people our starting point, rather than specific technologies, an observation highlighted by many of the people with whom we spoke in preparing this report. Indeed, technologies evolve continuously, and many tools will be rendered obsolete within a few years; as such, people are the constant that will guarantee the long-term success of any policy. Moreover, given that we work in the field of human culture and creativity, it is natural to place people at the centre.

With this in mind – and in the context of policy making and implementation – we have structured the report around three different groups of actors within the cultural ecosystem:

- artists and creative practitioners
- cultural and creative industries in a broad sense, including companies and cultural organisations that work in the music, film and audio-visual, publishing, performing arts, visual arts, cultural heritage, video games and interactive sectors
- audiences.

These actors represent the entire value chain – creation, production, distribution, access and participation – and exist in any cultural context: artists and creative practitioners create; the cultural and creative industries produce and distribute; and audiences access and participate. This structure provides a comprehensive overview of the trends, opportunities and challenges that exist within the sphere of action for public agencies that operate in the field of arts and culture.

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[2] See Appendix 2 for selected texts.

[3] See Appendix 3 for the list of survey questions.

There are overlaps between the practices of the three groups of actors, particularly due to the influence of new technologies. Thanks to self-publishing platforms, many creators can now be their own producer or distributor; while music companies can use artificial intelligence (AI) technologies to generate songs automatically, in effect making them artists. At the same time, with the rise of social media, members of the public are increasingly active and play the role of co-creator more than just passive spectator. However, it is precisely in order to understand these new interactions that the initial categorisation is necessary. In many cases, it is also true that new players – such as the large Internet platforms – are responsible for the biggest changes in the cultural ecosystem. But here too, our frame of reference allows us to see how the tech players interact with each of the three main groups of cultural actors, who are ultimately the building blocks of the cultural and creative ecosystem.

Throughout the report we will analyse trends related to digital culture in the broadest sense, focussing on content in digital formats as well as other phenomena that, although based around physical events, also make extensive use of technologies (such as art installations involving robots). This report does not aim to provide an exhaustive overview of global digital culture – a task that would in fact be impossible, considering that there are currently over 1.7 billion websites (Internet Live Stats 2020) – or of cultural policies in the digital environment. Instead, it concentrates on a selection of trends and projects that are specifically relevant for arts councils, ministries of culture and other national cultural agencies. As such, we have not delved into issues such as public media and the press, which are not usually within these institutions' remits.

As we will demonstrate, based on the trends observed and existing policies aimed at the three major categories of cultural actors, there is a set of core themes and cross-cutting priorities that could guide how we construct comprehensive future programmes and policies designed to support arts and culture in the digital age.

In order to address these issues, the report is divided into two parts, in which we will:

1. examine the effects of digital technologies on the practices of 1) artists; 2) the cultural and creative industries; and 3) audiences (both in terms of opportunities and challenges), highlighting the proactive work of public agencies
2. analyse challenges faced by public agencies and propose a framework for drawing up digital culture plans, along with a series of recommendations, based on our findings.

Digital technologies and the cultural value chain: trends, challenges, responses

1. Creating in the digital age

Experimentation

Over the last two decades, digital technologies have radically altered the way artists work. For example, being a professional writer would now be unthinkable without word processors. In the same vein, for photographers and illustrators, image retouching and vector graphics editing programmes are now vital; while the work of musicians has been enhanced by digital tools for composing, notating and recording tracks. Similarly, creators of audio-visual works rely heavily on digital cameras and various video editing systems for their creations.

However, new technologies have not only helped to optimise processes; they have also expanded the boundaries of artistic experimentation. In 2018, the renowned British Indian sculptor Anish Kapoor unveiled his first virtual reality (VR) work, entitled *Into Yourself, Fall*, which takes viewers on a vertiginous journey through the human body. As Kapoor observes:

> One of the things about VR is that it does vertigo incredibly well. When you get that headset on, you are in a world of semi-reality. The idea of falling is the most obvious sensation, and I am trying to work with that […]. I have always been interested in the way technology changes, and opens, perception. And it is something which may lead to new ways of seeing, and feeling, and thinking (Aspden 2018).

Augmented reality (AR) also displays increasing aesthetic potential. For example, using an AR mobile app, the installation *Density* (2019), by South Korean artist Koo Jeong A, invites visitors from different parks around the world to find huge chunks of ice floating among the trees.

New artistic experiments based on 3D printing are also emerging. In 2016, the Italian sculptor Dario Santacroce decided to start employing this production method when he recognised that it was impossible to achieve perfect forms using traditional techniques. That realisation gave rise to the exploratory work that resulted in the series *Spherical Creations*, composed of 15 pieces designed with 3D modelling tools and 'printed' out of sand and mineral resin. The experience led Santacroce to ponder the essence of digital creation:

> Am I still an artist if my sculptures are executed by a machine? What is the art? Is it the object? Is it the relic that remains after the thought? Or is it just the initial thought? (2016)

While 3D printed works are usually inert, the question becomes even more complex when the creations are machines. Accelerated expansion of low-cost hardware – for example microcomputers like Raspberry Pi and microcontrollers like Arduino – have provided a significant boost for these types of compositions. One such project, African Robots – led by South African artist and curator Ralph Borland – combines street wire art and electronics to produce interactive and kinetic automata such as birds, animals and insects. In addition, in a technological context that is increasingly dominated by the Internet

of Things (IoT), there is a growing number of installations comprising all kinds of connected objects, speakers, lights, cameras, microphones and sensors that collect data and interact in real time with the public, as in the case of those by the Canada-based architect Philip Beesley.

In these examples – in which machines are used to create both virtual and physical objects or produce other interconnected machines – the human being remains in control of the creative process. However, the incursion of AI into the cultural sector could alter this equation. Indeed, in modalities such as machine learning, machines are fed large amounts of data and generate results without the need for strict predefined rules. Numerous artists are using machine learning systems – particularly deep learning ones, such as generative adversarial networks (GAN) – to create new aesthetic works. A case in point is the French collective Obvious Art, which in October 2018 hit the headlines for having sold a portrait designed with the help of AI for the sum of US$425,000 (€382,000).

These technologies can even be combined with human motion on stage. More and more there are examples of performing arts works in which physical movements are articulated with robots, sensors, VR applications and AI systems, among many other possibilities. For instance, in the work *Discrete figures* – a collaborative piece by Japanese companies Rhizomatiks Research and ELEVENPLAY, with American media artist Kyle McDonald – live dancers execute choreography with machine learning technology on a stage, in an interactive game between performers, drones and AI.

Collaboration

The digital age has also brought about new ways to conceive of the act of creation itself. In effect, the new tools are based on processes in which connectivity is indispensable and, in many cases, this has encouraged approaches that are more collaborative than the traditional image of the individual artist. The 2017 report *Making Art Work: An Economic Study of Professional Artists in Australia* – written by David Throsby and Katya Petetskaya, commissioned by the Australia Council for the Arts – highlights the fact that 27 percent of Australian artists use the Internet to create collaborative or interactive art with other colleagues, while in 2009 the figure was no more than 14 percent (p.27). To come back to the example of Obvious Art, it is interesting to note that this group consists of three young people with very different profiles – an entrepreneurial artist, an economist and a data scientist – whose complementarity has proved fundamental to the success of the project. At the same time, we are seeing the emergence of new tools adapted for online collaborative creation: for example, the portal Inédits (France) enables several authors who do not necessarily know each other to collectively create 'story trees'. When we spoke with Florence Euverte – co-founder of the project – she shared that for her, the digital age marks a break from the writing model of the past:

> With the advent of the Internet and collaborative tools, writing is beginning to take new paths. Writing a text among several people, reacting to the ideas of others, inserting one's creativity into a group dynamic: these are advantages both from the point of view of literary fertility and at the relational level. Indeed, collaborative writing helps establish new links between people and strengthen the group. Maybe it could even be the key to a new genre of masterpieces?

Reduced barriers

Furthermore, digital tools have helped to reduce entry barriers for artistic innovation. In recent years, more tools have been developed to aid non-professional creators to produce melodies, paintings and all kinds of works. For example, thanks to AI-based systems such as Google Magenta, AIVA or Amper it is possible to create songs in different styles without needing to have advanced knowledge of harmony or composition. If these trends continue, with new areas of experimentation and the emergence of new tools for creating works, the art world is clearly heading towards an unprecedented creative explosion.

The mobile phone revolution has accelerated the pace of all these changes. As we will see, these devices provide a key point of access to the Internet and digital content; they have also become a catalyst for creativity. The increase in camera resolution, the continuous improvement in lenses and the growing effectiveness of editing apps have empowered all users – both amateurs and professionals alike – interested in photography or filmmaking. The Smartfilms contest (Colombia and Mexico), which presents awards for the best audio-visual creations made using smartphones, offers clear evidence of this trend.

Digital arts festivals

In this context, the number of events that celebrate art and creativity in the digital sphere has grown worldwide. The Ars Electronica festival (Linz) is a pioneer in this field. Each year it brings together artists, scientists, technologists and the general public for its prestigious Prix Ars Electronica, which honours creativity and innovativeness in the use of digital media in several categories, including computer animation and AI. Other renowned gatherings include ArtFutura, Mutek and the International Symposium on Electronic Art, which organise activities in different cities throughout the world.

These types of events encourage the arts sector to experiment with digital tools and logics; at the same time they help bring the world of technology closer to that of culture. This is something that is recognised by the organisers of the Fak'ugesi African Digital Innovation Festival (Johannesburg):

> The festival takes as its starting point the idea that in order for innovation with technology to succeed, a strong connection needs to be made to African cultural practices and creative encounters […]. Being grounded in an African perspective is what allows for the understanding of the threads that need to be pulled together to create and develop from a point of inclusivity, criticality and contextualised future thinking for Africa (2019).

New audiences, new sources of revenue, new licences

Social networks have become an essential tool for artists to make a name for themselves and reach new audiences. At the same time, the digital age has multiplied the potential sources for collecting royalties. While in the first decade of the 2000s stores like iTunes revolutionised how music came to be sold – by song rather than by album, as it had been in the past – at present, the scene is dominated by streaming platforms. Also popular are membership systems like Patreon, in which artists can establish a direct link with their fans, also known as 'patrons'. In addition, models based on blockchain technology

such as MusicLife[4] or Ujo[5] serve to streamline royalty payments and facilitate contact between artists and the public.

Furthermore, over the last 15 years, it has become common practice to use new types of copyright licences, such as Creative Commons (CC). Instead of claiming 'all rights reserved', these opt for 'some rights reserved' and leave open the possibility of content being reproduced and, where appropriate, adapted and commercialised. These licences have played a vital role in the operation of platforms such as Flickr, which today hosts millions of photographs taken by both professional and amateur artists; Jamendo, which brings together songs by over 40,000 musicians from around the world that can be downloaded free of charge for personal use; and even Wikipedia.

Digital divides: infrastructure, accessibility, skills

This dynamic scenario is not without challenges. For a start, in order to take advantage of the creative potential of technologies, it is necessary to have the basic infrastructure of connectivity and devices. While widespread ownership of smartphones has helped to close the digital divide, there is still much work to be done, considering 46.4 percent of the global population has no Internet access (ITU 2019a). This problem has been explicitly highlighted by National Members of the Federation from the Pacific, such as the Ministry of Culture and Tourism, Solomon Islands which is one of the few countries worldwide without a telecoms cable. The disparity in infrastructure is evident within – as well as between – countries. This means that people that live in remote or excluded areas have fewer opportunities for digital creation than their fellow citizens.

There are also other imbalances that we must consider. For one thing, many creators who speak minority languages may encounter difficulties when working with tools that only offer interfaces and technical support in English, or other widely spoken languages. On top of this, many websites and digital tools lack accessibility, which may discourage or preclude creators and audiences with disabilities.

We should also note that there is a divide between those who have the skills – and access to skills – needed to create using new technologies, and those who do not. In the case of artists with traditional practices, it is not always easy for them to acquire the knowledge necessary to handle digital tools. Indeed, for creators who are more accustomed to working in a purely analogue environment it may not be feasible – or of interest – to set about mastering machine learning or virtual reality techniques. Furthermore, the advance of artificial intelligence and other automated techniques for creating works raises serious questions about the future of formal knowledge; models of arts and cultural training and education; as well as the institutions that nurture and develop them.

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[4] A blockchain-based music ecosystem operated by the Singapore-based non-profit organisation MusicLife Foundation and the Japanese company MusicLife Co. Ltd.

[5] Another blockchain-based platform, based in New York, where artists can upload original works, self-publish, control licensing options and manage distributions.

Gender and race imbalances

There are significant challenges in terms of gender and race. Indeed, the lack of diversity in the technology sector can sometimes reach alarming levels. Such imbalances run the risk of reproducing inequalities in areas that make intensive use of technologies, like the digital arts.

A study by the AI Now Institute of New York University cautions that in academia, women account for less than 20 percent of AI professors; while in private sector tech firms Facebook and Google, they account for 15 percent and 10 percent of AI researchers, respectively (Crawford, Myers and Whittaker 2019, p.10). In terms of race, in the USA the workforce for leading tech firms is even less balanced, with African Americans representing only 2.5 percent of the workforce for Google; and 4 percent for both Facebook and Microsoft (Paul 2019). In the case of AI, this lack of human diversity may reinforce the biases of those that make use of this technology and generate stereotyped or ethno-centred works.

Lack of visibility

While it is true that the Web offers undeniable advantages for any artist who wishes to promote themselves, the current overabundance of content means that standing out from the crowd is becoming an extremely difficult task. John Watson, Artist Manager and President of the Australian music company Eleven, sums up the situation perfectly:

> Most artists used to be trees falling in a forest with nobody to hear them. Now there are millions of 'trees' falling at once and so they need to create remarkable things that allow them to be heard above a forest of digital din (Hughes et al 2016, p. viii).

It is also worth noting that the problem of visibility for some of the today's most innovative digital artists may reflect the ongoing struggle for new forms to be recognised in traditional art circuits; while many innovative explorations are produced outside traditional arts and culture spaces, in fabrication laboratories (fablabs) and hackerspaces.

Registration challenges for unpublished works

The fact that systems for registering unpublished works are not fully prepared for digital creations presents additional difficulty. In many countries, the registration procedure must be carried out manually, by recording a copy of the work on a physical medium and taking it to the registration office. At a time when technologies are increasing the number of creations exponentially, the lack of adequate systems for registering such works constitutes an obstacle for artists and a threat to their copyright. When we spoke with the Colombian writer Alejandra Jaramillo, she pointed this out:

> When I showed up at the copyright offices, there were no categories for registering my interactive novel Mandala. No one could understand that it was a manuscript when all that existed was a digital version, in a low complexity operating system, but that it was not the final edited product that would be published in web format. So, it seemed to them that it was a publication and not a manuscript. I believe that copyright offices need to update very quickly with the various types of digital products that are being produced.

Copyright infringements, low remuneration and the value gap

The remuneration of artists and the copyright protection of their works are other fundamental issues. Copyright infringement continues to be a global problem that affects most markets. Indeed, there are still unlicensed streaming websites and peer-to-peer (P2P) file-sharing networks through which works are circulated unauthorised. To some extent, this challenge also applies to legal services such as YouTube, since any user can upload others' material to the platform. In 1998 the USA adopted the *Digital Millennium Copyright Act (DMCA)* which implemented two 1996 treaties of the World Intellectual Property Organization (WIPO); it states that such platforms are not responsible for unauthorised content, but they should remove it at the request of the rights holder. However, it is impossible for any artist to visit YouTube – plus hundreds of similar sites – daily in order to detect possible infringements of their works. Moreover, in cases where the rights holder uploads their content, they tend to receive lower advertising revenues than they would on other types of platforms.

In March 2016, in the USA dozens of artists launched a campaign – *A Creator's View of the Music Ecosystem and DMCA* – to reform the *DMCA* and make platforms liable for the content they disseminate. According to the petition:

> [the DMCA] has allowed major tech companies to grow and generate huge profits by creating ease of use for consumers to carry almost every recorded song in history in their pocket via a smartphone, while songwriters' and artists' earnings continue to diminish. Music consumption has skyrocketed, but the monies earned by individual writers and artists for that consumption has plummeted.

A few months later in June 2016, over 1,000 musicians sent a call to the European Commission warning that their future was being jeopardised by a 'value gap' caused by user upload services such as YouTube that were 'unfairly siphoning value away from the music community and its artists and songwriters.'

AI: who holds the rights?

In the case of AI, the issues of copyright and remuneration of creators are particularly complex. Who is the rights holder of works created with the aid of AI: the machine, the human who uses it, or nobody? A relevant case arose in 2017, when a European Parliament report on civil law rules on robotics (with recommendations for the European Commission) proposed to grant computers and robots the status of intellectual creators; however, this possibility was ruled out the following year. Another relevant case arose in January 2020 when a court in Shenzhen, China ruled that articles written by a robot – the 'DreamWriter' system owned by the company Tencent – were protected by copyright, as they displayed a 'certain originality' (Sawers 2020). Thus, the debate about who holds the rights for works created with AI has not yet been settled. The discussion becomes even more convoluted when we consider that the data used to feed AI machines may have originated from copyrighted materials, such as songs, videos or texts. In this case, is there an obligation to acknowledge the creator of these materials in the credits of the new work?

Intellectual property and traditional cultural expressions

In an interview with a representative from the Ministry of Culture and Tourism, Solomon Islands, they stressed that when talking about copyright – and intellectual property in general – it is essential to consider traditional cultural expressions. In their experience, tourists often use digital devices – particularly mobile phones – to make copies of designs or songs without the consent of the artists and then reuse them for their own benefit. The Ministry believes it is necessary to promote new regulations to protect the intellectual property of these creations, which sometimes belongs not to an individual artist, but to an entire community. Similar challenges are faced by artists around the world, especially Indigenous artists.

Indeed, with the use of AI techniques such as those described above, this problem will only get worse. In 2018, a researcher trained a GAN system to generate new designs with a dataset of African masks (Dibia 2018). As such techniques are perfected and combined with 3D printing to mass produce objects, there may be significant risk that the market will end up being flooded by fake traditional art. In terms of benefits, what will be left for the community that gave rise to those masks, or any other traditional cultural expression, used to feed the machines?

Censorship

Since we are talking about the concept of 'fake' we must mention an additional challenge that affects aesthetic creations in the digital environment. For several years, all manner of fake news and malicious disinformation have proliferated on the Web and attempts to control them have not always been effective. In fact, they have sometimes proved counterproductive, as they have ultimately censored digital works of art. In January 2020, some of the creations by digital artist Ramzy Masri were blocked by Instagram, which labelled them as 'false information'. Masri had simply published a collection of images coloured using Photoshop, but the algorithm detected that something about them was not real, so it suspended their dissemination. The episode sparked criticism from civil organisations. As Nora Pelizzari, Director of Communications of the National Coalition Against Censorship in the USA, pointed out:

> While the goals of this policy may be valuable, it is absolutely likely to do harm to artists. Artists manipulate images almost 100 percent of the time, in some way or another – it's core to what they do. This should not prevent them from posting freely and distributing their work as widely as possible (Pelizarri cited in Cascone 2020).

In addition to the automatic mechanisms platforms implement, various government measures designed to regulate digital media have affected creators. As highlighted in the report *The State of Artistic Freedom 2018* – published by Freemuse – digital security acts, cybercrime laws and other initiatives aimed at controlling online spaces have directly harmed poets, singers, photographers and other creators. In some countries, artists and bloggers with an online presence must register as online content providers with the communications regulator; this requirement can also act as a brake on free expression. In addition, many artists have been subjected to online harassment, which particularly affects women who express themselves on the Web (Cascone 2020).

Training, creation and experimentation

There are several initiatives that seek to overcome these difficulties, including a growing number of possibilities for creators who are interested in new opportunities to train, create and experiment. In England, The Space offers a vast range of essential training resources for artists in the digital sphere, supported with funding from Arts Council England. The Space also commissions projects across all art forms, from live streaming theatre to 360° exhibitions and digital storytelling. In Europe, the S+T+ARTS (Science + Technology + Arts) programme – promoted by the European Commission in 2015 in the framework of the Horizon 2020 plan – organises workshops, residencies and awards around the artistic exploration of technology and works in collaboration with other European centres, including Ars Electronica. In Canada, in May 2019 the Canada Council for the Arts announced the launch of its Creation Accelerator programme which – as part of the Digital Strategy Fund – seeks to support the creation of content such as podcasts, web series, short documentaries, sound art, animation, digital graphic novels and experimental videos, for subsequent dissemination via the digital platforms of the Canadian Broadcasting Corporation (CBC/Radio-Canada). Also in Canada, the organisation Art Impact AI, with support from the Council, offers workshops for artists that aim to generate shared resources; make recommendations for publishing policy; and create a community of practice that responds to the impacts of AI.

In parallel, the public sector is investing in experimental spaces and hubs specifically designed to explore and promote new expressive forms. In Mexico, the Digital Culture Centre founded by the Secretary of Culture in 2012 organises conferences, training and other activities aimed at harnessing digital technologies as tools for cultural transformation, with a particular focus on young users.

Meanwhile, across Argentina, Canada, Peru and the United Kingdom the AMPLIFY D.A.I programme – promoted by The British Council in partnership with the Canada Council for the Arts, MUTEK and Somerset House Studios – connects an active network of women working in the digital arts, seeking to thrive, support one another and challenge male dominated discourse and practice within these spaces.

Understanding trends and the digital needs of artists

In an interview with a representative from the National Endowment for the Arts (USA), we learned that it launched an Arts & Technology Field Scan in mid-2019. The Arts Endowment will conduct this national research study in partnership with the Ford Foundation and the Knight Foundation, in order to better understand the needs of artists based in the country who work with technology as a creative medium; and how arts funders and organisations that provide resources can support their practices.

Promoting digital inclusion

Public agencies are also working to promote digital inclusion to redress imbalances in representation. For example, in Mexico, when the Secretary of Culture founded the Digital Culture Centre (mentioned above), it embedded in its strategy the criteria to encourage the inclusion of groups that are left behind in the adoption of new technologies. The Centre actively demonstrated these principles in 2019, when it conducted numerous workshops for seniors, the homeless and young people in recovery homes that focussed on animation, Internet radio, and other digital creation tools.

Protecting copyright and ensuring fair remuneration

In September 2016, the European Commission presented a draft reform of EU copyright rules for the digital age. This ultimately took the form of the Directive on Copyright in the Digital Single Market, adopted in June 2019, which postulates the need for platforms to devote greater efforts to prevent personal copyright infringements (Article 17) and ensure that authors and performers receive appropriate and proportionate remuneration for the exploitation of their works (Articles 18 to 23).

In Australia, in 2018 the government allocated funds to create a digital label programme to mitigate against inauthentic Indigenous art, which will initially serve to support Aboriginal and Torres Strait Islander artists and designers. Under the programme, art dealers that are signatory to the Indigenous Art Code are authorised to apply a quick response (QR) code to works of art that they receive directly from Indigenous artists, which acts as a digital certificate and directs consumers to information about the product, designer and provenance; or to the art centre's website or social media page, when scanned.

2. Production and distribution

Music

As mentioned, profound changes have affected the music sector following the emergence of new formats (such as MP3), and new modes of distribution. The industry has gradually migrated towards a subscription-based model made possible by streaming, away from a model founded on the sale of copies which prevailed in the analogue environment, as well as in virtual stores such as Apple's iTunes. According to data from the International Federation of the Phonographic Industry (IFPI), in 2018 proceeds from streaming systems accounted for 47 percent of the recording industry's global revenues, representing a growth of 34 percent in 12 months. The remaining revenue corresponds to performance rights (14%), other digital modalities (12%), physical formats (25%) and synchronisation revenue (2%). It should be noted that the streaming-based music subscription market is becoming more competitive: in addition to the current leader – Spotify – it is necessary to take into account the services provided by Apple, Amazon and Tencent, along with other niche applications like Beatport and Primephonic.

Film and audio-visual

New technologies have also had an obvious impact on the film and audio-visual industries. Indeed, the possibility of filming with multiple cameras simultaneously, the improvement in motion-capture systems and the proliferation of all kinds of visual effects and animation software – many of which make use of AI techniques, such as those developed by Deepmotion or RADiCAL– have opened up new possibilities for the sector, and enabled a huge leap in productivity.

In terms of distribution, most cinemas around the world have already adopted digital formats, but it has been the boom in video on demand (VOD) services that has done most to transform the sector. Platforms that offer movies and series – such as Netflix, iQiyi, Amazon Prime Video, Hulu and Disney+ – dominate the subscription VOD market (SVOD), while sites like YouTube, Youku, Vimeo and DailyMotion lead the field in ad-supported VOD (AVOD). Moreover, in addition to the big players, there is a considerable number of smaller companies that distribute niche content, including Mubi and Fandor.

Book publishing

If there was a pivotal year for digitisation in the publishing industry, that year was 2007. Within the space of a few months, the International Digital Publishing Forum (IDPF) adopted the EPUB open format as the industry standard for ebooks; and Amazon launched the first model of the Kindle e-reader. These events marked the beginning of an accelerated race towards the digitisation and electronic distribution of texts, which only intensified when Apple unveiled the iPad in 2010. The world's leading book fairs – such as Frankfurt, London and Guadalajara – opened pavilions dedicated to new technologies. At the same time, publishers of all sizes devoted increasing efforts to digitising their catalogues and converting their business models, in the hope of monetising titles that were no longer available in paper version and cashing in on the long tail effect.[6]

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[6] This refers to a strategy whereby the sale of smaller volumes of lower demand items over time may make up a market share to rival the share generated by the sale of larger volumes of a few high demand items.

Ten years on, ebook sales in the USA have stabilised at around 25 percent of publishers' online retail (AAP 2019), although in other countries the proportion tends to be lower. Industry-produced ebooks are sold by copy through the large platforms – Amazon Kindle Store, Google Play Books, Apple Books – and to a lesser extent via subscription schemes for streaming reading such as Amazon Kindle Unlimited, or other smaller platforms like 24symbols based in Spain. Institutional sales – to libraries, universities and schools – through e-aggregators such as Overdrive and EBSCO or start-ups like Odilo is another market that is being consolidated.

The publishing industry is keenly aware of the importance of metadata for the circulation of digital content throughout the value chain; as such it is investing in the development of standard metadata formats – the ONIX format in particular – and platforms, like Metabooks in Brazil. Audiobooks are increasingly important in the publishing market, to the extent that many analysts believe they will soon outperform ebooks. At the same time, self-publishing platforms like Smashwords which bypass traditional publishers, are also increasing their foothold. Lastly, but no less importantly, online literature is becoming an extremely lucrative segment in Asia, as demonstrated by portals such as Qidian and Hongxiu (China) or Pratilipi (India).

Theatres and operas

In order to adapt to innovations and experimentation in the performing arts, theatres and opera houses are gradually updating their infrastructure. In addition, live-to-digital screenings have opened up new commercial possibilities, such as transmission via streaming platforms (for example Digital Theatre) or institutions' websites (as employed by the Vienna State Opera).

Museums and galleries

Digital transformation affects museums and galleries extensively. For a start, there are more and more VR experiences like Modigliani VR: The Ocher Atelier, which recreates the artist's final Parisian studio. Three-dimensional exhibitions are another way for museums to display their collections, as in the case of the Digital Art Museum of China or the National Historical and Architectural Museum 'Kyiv Fortress' of Ukraine. We also see a proliferation of all kinds of mobile applications, such as the one developed by the Bardo Museum of Tunisia using AR and the guide to the Bangkok National Museum in Thailand, which offers detailed information about the installations and works on display. Smartify, meanwhile, is an app developed in the UK that works in dozens of museums and enables users to instantly identify artworks and access information by scanning them with a smartphone. At the same time, we are witnessing the emergence of online art content aggregators like Artsy, whose database contains more than one million items from hundreds of collections around the world.

Digitisation also plays a fundamental role in the preservation of intangible heritage, with organisations around the world recording historical documents and materials in different formats so they can be made available to the public through open access on the Web. In addition, the major Internet players are investing in the museums and galleries sector to offer them free services including digitisation, online hosting of collections and the creation of mobile and virtual reality applications. The two main companies in this segment are Google (with its Arts and Culture service) and Chinese company Baidu (with its project Baike). Some museums have even set up their own labs, as the National Museum of Singapore has done with its DigiMuse programme, which engages with the wider technology industry to encourage creative experimentation in cultural spaces.

Many museums have also used digital tools to run successful crowdfunding campaigns for specific projects. In late 2016, the Smithsonian National Museum of American History launched a call through Kickstarter to pay for the restoration of Dorothy's ruby slippers from *The Wizard of Oz*. The initiative exceeded all expectations and managed to raise almost US$350,000 (€314,109) donated by over 6,000 supporters (Smithsonian National Museum of American History 2016).

Libraries and archives

Libraries and archives have worked with digital tools for a long time to catalogue, digitise and preserve their collections. In addition, libraries around the world enable users to access ebooks, audiobooks and other digital materials provided by publishers and e-aggregators. In Chile, the Digital Public Library has teamed up with Odilo to provide a free ebook loan service available via an app that offers access to all residents, visitors in the country and Chilean citizens residing abroad. There is a similar system in place in Spain, called eBiblio, which made more than one million ebook loans in 2018. Libraries are also expanding their portals for downloading and consulting public domain materials.

The Spanish platform Hispana makes it possible to consult electronic repositories throughout the country from a single point, which helps prevent the same work from being digitised repeatedly and encourages metadata to be standardised among participating institutions. Even bigger platforms – such as Europeana or the Digital Library of Ibero-American Heritage (BDPI) – allow users to consult the collections of various countries. Some libraries have also developed systems for archiving web content, such as the Web archives in the UK and Australia; and video games, as the National Library of France has done. Much like the museum sector, a number of libraries have created their own research and development units in order to inspire and support the use of their digital collections and data, as is being done by British Library Labs.

Video games

Video games and interactive media are quintessential examples of a digital creative industry. China, the USA and Japan are the main markets for a sector whose revenues exceed US$150 billion (€138 billion) (Wijman 2019). The considerable impact that video games have on popular culture has brought new opportunities for video game publishers, such as the sale of rights and licences for film adaptations. The growing interaction between the video game sector and other industries has resulted in a boom in transmedia storytelling, in which a plot or content can begin in one format and continue in another.

Unlike industries such as music or book publishing, where content can be produced at relatively low cost, the video game development process tends to be more costly and time-consuming, as it usually involves numerous people (such as programmers, designers, artists and screenwriters). In this context, it is not surprising that the biggest video game publishers are tech giants like Tencent, Sony and Microsoft. However, these titans coexist with other long-established big players from the sector – for example Ubisoft and Electronic Arts – as well as independent publishers like Devolver Digital and even individual developers who self-publish their games.

The subscription model is going from strength to strength in the video game market, while mobile phones are gaining importance as a consumption platform. In Africa, these devices are essential to the industry's growth, as underlined by Sidick Bakayoko, Director of Paradise Game (Ivory Coast), the largest video game centre on the continent:

There's enormous potential in Africa because the continent is primarily mobile. We've done a jump and instead of first going with PC, we've gone directly to mobile. So there's great potential for video games using electronic payments (AFP 2018).

This has facilitated the emergence of extremely dynamic companies such as Leti Arts (Kenya) and especially Kiro'o (Cameroon), which have financed several games through crowdfunding and even sold film rights to a Hollywood studio (Kit 2016).

Lack of technical infrastructure, resources, skills and data

Nevertheless, it is not all plain sailing for the cultural and creative industries in the digital age. Firstly, there are many organisations that are struggling to find their place in this new context. An obvious example is physical bookshops: in Italy alone, in the last five years 2,300 bookstores closed, which means they have disappeared at a rate of more than one per day ('Italy's bookshop crisis: 2,300 stores close in 5 years' 2020). For other actors such as libraries, museums or theatres, the problem often lies in a lack of equipment and technical infrastructure.

If many creative businesses and cultural institutions are failing to thrive, it is not for want of trying. However, they often lack certain key resources that they need to leverage digital advantages. According to the UK *Digital Culture* survey (Arts Council England & Nesta 2017), cultural organisations encounter two main obstacles to achieving their digital aspirations: shortage of funds and staff time. In addition, they often do not have the right technical skills. These barriers limit investment in research and development and delay the execution of innovative projects (p.5).

Moreover, in our age of platforms, data is the greatest asset. Unfortunately, there is a lack of awareness in the cultural sector about the importance of plentiful data. Without relevant data, organisations cannot understand the trends in their markets; and without adequate metadata, content will not be found by users. It is also essential to have the skills and systems necessary to interpret, analyse and use this information for forward planning and evaluation.

Dissociation between cultural actors and digital players

This lack of technical infrastructure, resources, skill and data is compounded by the notorious disconnect between the cultural sector as a whole and the different digital actors. Indeed, the *Culture is Digital* policy paper from the UK offers several reasons to explain the lack of communication between the two groups:

- a lack of shared language and understanding of each other's industries
- a lack of technical skills and knowledge which could undermine a cultural organisation's standing with the tech sector
- an imbalance of funding and skills between culture and tech organisations leading to an imbalance of control in the relationship
- a lack of understanding of IP and tech business models from the cultural organisation side (DCMS 2018, p 61).

Protection of intellectual property

The ability of cultural organisations and creative businesses to protect copyright – and intellectual property in general – is no simple matter, especially in a context characterised by mass file sharing and traditional distribution model crises (as touched upon earlier).

These organisations do not always have sufficient knowledge about intellectual property in these new environments, for example in relation to the sale of digital rights, or the use of orphan works and copyright exceptions. In the UK, the 2015-2020 strategy of the Intellectual Property Office (IPO) points out that intellectual property legislation is underutilised and intellectual property rights are under-exercised; while only one in 10 UK firms has provided intellectual property training to staff (2016, p.31). At the same time, only one in four of the organisations polled in the *Digital Culture* survey feel well-equipped with skills related to rights clearance or to legal advice around intellectual property rights (Arts Council England & Nesta 2017, p.21).

The sustainability of the cultural and creative industries in the age of platforms

Viable business models are another major challenge. As we have seen, new niches and commercial opportunities have emerged in various sectors; however cultural and creative industries often find it difficult to incorporate new business models and evaluate what each involves in terms of revenue, costs and taxes. Generally, it has been major firms and big Internet players that have made the most of the opportunities opened by new niches and digital distribution markets worldwide. Subscription systems are good example: they offer a very practical way to distribute content to millions of consumers; however, the actual earnings they make possible may turn out to be disappointing for small organisations.

In addition, the large Internet platforms are ubiquitous across the creative sectors and – discontent to be simply intermediaries or distributors – they have made inroads into production. For example, in the audio-visual sector Netflix includes an increasing number of its own movies within its catalogue; meanwhile in the publishing sector, Amazon operates 16 imprints and even offers writers the possibility of self-publishing. This can lead to a greater concentration of supply, as it disintermediates traditional actors and intermediates platforms. As Heritiana Ranaivoson, a researcher at the Institute for Studies in Media, Innovation and Technology (SMIT) at the Free University of Brussels explains:

> The problem with the 'platform' is that it is a business model of the few and not of the many […]. Digital platforms are getting more and more monopolistic – which has to do with network effects and economies of scale: the bigger the platform is, the more dominant they will get ('The creative and cultural sectors' 2018).

The impact of concentrated supply on the diversity of cultural expressions

The problem of concentrated supply is economic in nature, but it has a clear cultural effect, mainly in terms of content discoverability. Indeed, when the same actor is both a producer and distributor, it is reasonable to think that they will be driven to promote their own content at the expense of third-party content, which will end up relegated. This means that even if the total catalogue of works offered is huge, the number of products consumed will in fact be far fewer.

Moreover, concentrated supply can have a detrimental effect on cultural diversity, as in some sectors large platforms offer very little local content. In March 2018, more than 200 Australian screen writers,

producers, directors, cast and crew signed an open letter to Federal Parliamentarians warning of the threat to local content in an age dominated by financial hardship for the sector and the rise of powerful players such as Netflix, Amazon and mobile phone operators:

> Our ability to keep telling Australian stories on screen is at risk, our voices in danger of being drowned out by a deluge of overseas content. And if our nation's stories aren't told, they die. And when they die, future generations won't know who we are and what makes us us.

Research and development, experimentation and skills

In response to these challenges, numerous initiatives have been implemented globally to help creative businesses and cultural organisations to modernise, engage in research and development, and experiment with new formats. In Europe, the European Commission runs the programme Creative Europe which offers an array of financing for cultural projects in the digital environment. In Spain, the Ministry of Culture and Sports provides a vast financial aid scheme to support digital and technological projects that aim to modernise and innovate for the cultural and creative industries. In Colombia, the Ministry of Culture and the Ministry of Technology have collaborated on Crea Digital, a joint initiative that fosters experimentation, the adoption of new technologies in the cultural and creative industries, and the co-production of digital content. Similarly, in Canada the 'Transformation of Organisational Models' component of the Canada Council's Digital Strategy Fund helps arts organisations to transform how they work, to adapt to the digital environment.

Incubators and hubs also support experimentation and innovation in the cultural and creative industries. For example, in Tunisia the Ministry of Cultural Affairs of Tunisia oversees the International Centre for Digital Cultural Economy; while in Mexico, the Guadalajara Creative Digital City is a large scale project set up to create an interconnected urban environment in which creative industries can thrive, implemented in partnership by local government (the City of Guadalajara) and a private sector organisation (the Council for the Promotion of Innovation and Design).

Many support plans also focus on the need to develop and improve skills among those working in the cultural and creative industries. In the UK, the collaborative Digital R&D Fund for the Arts created a general toolkit for practitioners who wish to improve existing digital products and services, or develop new ones. It has also published four *Making Digital Work* reports that look specifically at: mobile, accessibility, business models and data. Arts Council England also helps organisations access practical advice on digital technology through its Digital Culture Network which comprises nine expert 'Tech Champions' who offer support and training to the sector; and through partnerships such as its two-year partnership with Google Arts and Culture to provide technical workshops to cultural organisations across the country (Arts Council England 2019). Arts Council England has also now launched a Digital Culture Compass that enables cultural organisations to understand and benchmark their digital capabilities and make plans for improvement, in partnership with the National Heritage Lottery Fund. Meanwhile, in Canada the Digital Strategy Fund includes a 'Digital Literacy and Intelligence' grant that supports the cultural sector to build digital knowledge, skills and capacity. On a regional scale, the European Commission also has several initiatives to support the design of innovative interdisciplinary modules for university courses that combine arts and ICT with entrepreneurial skills and business exposure (European Commission 2017).

Specific measures for the audio-visual sector and interactive media

There are numerous measures in place for sector-specific support, in addition to such cross-cutting programmes. Many countries have promoted and created public streaming platforms in order to provide greater visibility for domestic audio-visual productions, for example Onda Media (in Chile) and Retina Latina (in Bolivia, Colombia, Ecuador, Mexico, Peru and Uruguay). While in Europe, in October 2018 European Parliament voted in new rules on audio-visual media services, which urge VOD services to dedicate at least 30 percent of their catalogue to European content, and to contribute to developing European audio-visual productions.

Public agencies are also designing more plans to strengthen the development of immersive and interactive media in the arts and culture sector. For example, in England the Arts Council has worked with Digital Catapult to establish the Creative XR Fund; in Switzerland, for the last five years ProHelvetia has issued annual calls for Interactive Media Projects through its Culture and Business initiative; in Ukraine, the Ukrainian Cultural Foundation runs a Multimedia Technologies programme ; and at a provincial level in Canada, Ontario Creates has set up the Interactive Digital Media Fund.

Discovering cultural content online

Some public agencies have made efforts to increase the visibility of cultural expressions online. An example of this can be found in a collaboration between the Ministry of Culture of France, and the Ministries of Communications and French Language in Quebec, Canada. In April 2019, they launched a joint mission to increase the online discoverability of Francophone works and creations, with an aim to explore the obstacles that hinder the circulation and indexation of French-language content on digital platforms, and identify concrete plans to tackle those obstacles ('Lancement de la mission franco-québécoise' 2019).

Harnessing the power of data

Public agencies are also harnessing the power of data and supporting the sector to do the same. In Tunisia, in 2016 the Ministry of Cultural Affairs committed to promote openness in the cultural sector to increase access and stimulate innovation; this included a commitment to share public cultural data from across all fields including music, dance, literature, audio-visual arts, cultural heritage, visual arts and cultural institutions. As part of this commitment it developed and launched Open Culture, an open source online portal that allows users to freely access and request cultural data.

There are several examples to be found in Canada too, including the Canada Dance Map which was developed with support from the Canada Council in partnership with the Ontario Arts Council. There are also other initiatives that seek to consolidate cultural data. This has been done for specific sectors, for example by Linked Digital Future (funded by the Canada Council) which seeks to help the performing arts sector leverage the potential of new technologies by fostering collaboration along the performing arts value chain, with five areas of focus including: research, governance, prototyping and development, digital literacy, and public engagement. It has also been done across sectors, for example by SynapseC, which seeks to develop expertise and leverage data for the arts and culture in Quebec and Canada, and to establish an international benchmark for the use of data to benefit the cultural ecosystem.

3. Access and Participation

The unstoppable advance of mobile phones

More than 4 billion people – 53.6 percent of the global population – have Internet access (ITU 2019b). Connectivity in developed countries is already close to saturation, with more than 87 percent of people connected to the Internet. In recent years, mobile connection has grown much faster than fixed broadband subscriptions, and almost all of humanity now lives within the reach of a mobile network. Indeed, 3.5 billion people – 45.1 percent of the world's population – own a smartphone. China and India have the most mobile phone users, with 851 million and 346 million, respectively (NewZoo 2020). In these two countries – and generally in emerging and developing nations – smartphones are the preferred means to access digital content. In addition, the boom in mobile phone use in small towns and villages – areas in which inhabitants have been able connect to the Internet for the first time thanks to a phone – has accelerated the consumption of content in vernacular languages. This phenomenon can be seen clearly in India, a country that boasts 22 official languages with more than 6,000 dialects.

A public that is consuming more and more digital content

The volume of data now circulating on the Internet is gigantic; for the most part (60.6%) this is a result of video streaming consumption. Worldwide around 92 percent of Internet users watch videos online via video sharing platforms (Sandvine 2020). Each day YouTube's 2 billion users access 5 billion videos (Rutnik 2019) and spend an average of 40 minutes on the platform. Generally speaking, the channels with the most YouTube subscribers relate to music, series and movies, this includes: India's largest music label and movie studio, T-Series; the specialist 3D children's animation channel Cocomelon - Nursery Rhymes from the USA; Sony Entertainment Television India; Brazilian funk music channel KondZilla Channel; as well as numerous channels that belong to individual artists such as Justin Bieber and Ed Sheeran, among others. The most widely watched channels on other video sharing portals deal with similar themes.

Netflix is the market leader in the SVOD segment. It has around 167 million paid subscribers – mostly from outside the USA – who spend on average more than one hour per day watching movies and series using the application (Brantner 2018). The total audience for SVOD services globally reached 627 million people in 2019 (Statista 2020a). In the case of music, Spotify has 248 million users, almost half of whom are paid subscribers (De Silva 2019) that spend about 25 hours per month listening to songs via streaming (Statista 2019). About one billion people consume music via these types of applications (Statista 2020b).

When it comes to digital reading, audience figures are more elusive. This is partly because the leading platforms (such as Amazon) tend not to release many statistics; and also because the statistics compiled by the publishing industry do not always consider reading activities that take place outside of the traditional value chain. In any case, Tencent's China Literature – which manages online literature sites Qidian and Hongxiu – has around 217 million active users each month (China Literature 2019). This is a sure sign that in some regions e-reading constitutes a mass phenomenon.

In addition, 2.4 billion people play video games of some kind (Takahashi 2019). On average, these people devote no less than 6 hours per week to this activity (Limelight Networks 2019).

Social networks

The audience landscape in the digital environment would not be complete without users of social networking services. According to data for 2019, 3.48 billion people – almost half of the world's population – regularly make use of such of tools (We Are Social 2020, p.7). Excluding video sharing sites like YouTube, the most widely used social media are Facebook (2.271 billion users); Whatsapp (1.5 billion); Tencent's WeChat (1.08 billion); Instagram (1.00 billion); and Tencent's QQ (803 million) (idem p.81). On average, Facebook and Instagram users spend almost one hour a day on these platforms (Molla & Wagner 2018).

Age cohorts: Millennials and Centennials

The two most digitally active age groups are Millennials (or Generation Y, born between 1980 and 1995); and Centennials (or Generation Z, born between 1995 and 2010). These two cohorts make up around 60 percent of the world's population (Miller & Lu 2018).

Millennials represent the first digital generation; they tend to prefer social networks such as Facebook, which they use to publish and share content with contacts. Meanwhile, Centennials represent the first mobile generation; social media provide their main sources of news, communication and entertainment. In contrast to Millennials, Centennials prefer services like messaging app Snapchat and Instagram, and place greater value on the privacy of the content that they share (Premack 2018).

Online influencers – role models who are well known on social media – wield considerable clout among young users. 'Micro-influencers' – individuals who have a few thousand followers and are regarded as experts in their respective niche – also fulfil an important function.

A new type of audience

These phenomena come together to create an audience quite different from that of past decades. For a start, digital subscription models have significantly deflated the price of cultural goods and services. The current situation is one of unprecedented abundance: never before have audiences had access to such diverse catalogues for such low prices (or free of charge, as is the case for many video sharing platforms).

Furthermore, the rise of streaming and social media is rendering obsolete notions of ownership and collection, particularly for younger generations. For hyperconnected users, it is all about accessing content and sharing experiences. This has the potential to create global audiences structured around virtual communities, whose members may have never met face to face.

In addition, audience behaviour has been significantly changed by the ability to publish and share content in a straightforward manner. In the age of social media, the idea of a passive public satisfied by simple consumption is outdated. Users interact, comment, intervene and even collaborate in the process of creating content, to the point where traditional roles of artist and art lover are becoming blurred, as Australian analyst Megan Brownlow suggests:

> The interactive nature of the Internet is perfect for garnering input from arts lovers and fellow creators, who, through the act of providing feedback, become invested in their virtual colleague, someone they have likely never met in person. In this sense the observer/commenter becomes part of the creation. How does one determine where the artist ends and the arts lover begins? A

key trend to watch and perhaps a subject for future research, is this blurring of the two (Brownlow in Australia Council for the Arts 2017, p.87).

Digital gaps affecting audiences

From the audience point of view, this presents numerous challenges. To begin with, the aforementioned infrastructure disparities have an impact: countries and social groups without adequate connectivity and devices may end up excluded from digital life, and thus culture.

The shortage of information, communication and technology skills constitutes an additional barrier. Indeed, according to the International Telecommunications Union (ITU), large portions of the population in many countries still lack basic computer skills, such as copying a file or sending an email with an attachment. Without such elementary knowledge, it is almost impossible to take advantage of the possibilities offered by the Internet in terms of access, communication and participation.

In addition, many cultural content sites and applications are not designed for people with disabilities,[7] which creates another digital divide.

Overlooked trends

The boom in social media and digital exchange that takes place in private – or in relatively closed communities – means that many trends go unnoticed by more traditional actors. For this reason, public agencies and civil society organisations often have inadequate understanding of audiences, particularly younger generations. Indeed, some institutions are convinced that young people are less engaged with culture. However, according to Paul Roberts, Chair of the UK social enterprise Innovation Unit, this impression is false:

> There is a significant degree of engagement [among young people], but it's taking place by alternative means, alternative venues or alternative organisations. Young people are engaging in a whole range of artistic and cultural activity, which is as it were off the formal radar (Armstrong et al. 2018, p.15).

Misdiagnosis of audience behaviour can lead to misguided content and communication strategies; it can also lead to growing disconnect between users and the public sector and cultural organisations. There is particular risk that the public sector may not transmit cultural information through appropriate distribution channels, and that it may lose sight of cutting-edge movements. This would result in cultural information circulating in an informal and fragmented manner. In turn, this would not only weaken communication about culture; it would also limit the construction of joint projects with audiences, who may lose interest in maintaining interaction.

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[7] See Aquino (2016) for more information.

Filter bubbles

Although social media and digital tools may enable the creation of virtual communities, and thus strengthen social ties, they may simultaneously contribute to greater fragmentation, insofar as they reinforce group stereotypes. In the last decade, algorithmic personalisation has generated veritable echo chambers or – to use the expression coined by Internet activist Eli Parisier – 'filter bubbles' around users. According to Parisier, these mechanisms produce highly distorting effects:

> The danger of these filters is that you think you are getting a representative view of the world and you are really, really not, and you don't know it. Some of these problems that our fellow citizens are having kind of disappear from view without our really even realising (cited in Jackson 2017).

If artificial intelligence is increasingly used to create artistic works, the application of algorithmic personalisation would mean that the precise knowledge that platforms have about their consumers' tastes could in the future allow them to produce cultural content that is specifically tailored to certain users. If confirmed, this trend would threaten the very idea of a common culture.

Fake news, censorship and privacy

There are other trends that affect audiences. As mentioned earlier, the enormous viral potential of social media has contributed to the proliferation of fake news and hate speech, which has a negative impact on content quality and the pluralism of online discourse.

Audiences are also affected by explicit censorship measures implemented by governments with the aim of prohibiting free access to certain news, opinions and artistic expressions. In some cases, governments may block entire sites – as Turkey did between April 2017 and January 2020 with Wikipedia (Harrison 2020) – and even shut down the Internet for a period, as happened during elections in Benin in April 2019 (Latif Dahir 2019).

Privacy is another key issue. According to a survey published by Statista and We Are Social, 42 percent of Internet users believe that their data is being misused (2020, p.57). In countries like Spain and Mexico, that percentage reaches 63 percent and 59 percent, respectively. Data is not just essential for feeding AI systems or gaining a better understanding of the market; it is also a basic asset for online advertising. Most of the services that freely disseminate cultural content – or enable interaction between online communities – obtain their income from advertising to consumers and, in some cases, by selling personal databases to other companies. Obviously, this poses private data protection problems for users.

Fostering accessibility

In response to these challenges, public agencies have implemented numerous measures and there are many international laws that require websites – whether public or private – to be accessible to people with disabilities. In addition, there is legislation that refers more directly to accessibility in the field of culture. For example, section VII (Appendix I) of the European Accessibility Act (2019) thoroughly details requirements that ebooks must meet to ensure they can be read by people with functional limitations.

An engaging use of social media

Cultural institutions have used social media to attract users who would have otherwise been very difficult to engage. On 9 April 2018, the Museum of English Rural Life (MERL) shared on Twitter a picture of a sheep from 1962, with a short caption that read, 'look at this absolute unit'. The post had a humorous tone that invited users to respond with comments of their own. The result astounded everyone: the photo garnered over 100,000 likes and almost 30,000 retweets, while the number of followers of the MERL account increased from just 9,000 to 150,000. The museum – which is more than an hour's drive from London – received new visitors, not just from the UK, but also from the USA, New Zealand, Canada and Europe. For Adam Koszary – the social media strategist behind the tweet – the secret lay in the power of memes:[8]

> Apart from content and tone, we also had the angle. Imagine what would have happened if we had tweeted the image of the sheep and simply explained what it was: an Exmoor Horn aged ram. Some people may have found it cute, it could have done moderately well and there it would have ended. Memes, however, are the currency of the Internet (Koszary 2018).

Some organisations have developed their own online systems to engage users in cultural issues. Since 2015, the British Film Institute (BFI) has made available to the public an archive containing thousands of movies, documentaries and news footage, from Victorian times to as recently as 1980. In 2019, the BFI introduced a crowdsourcing website where users can identify locations and pin the information to the film, thereby turning the public into an active player. This is how the initiative is described by Colette McFadden, Head of Heritage Programmes at the BFI:

> We knew we had to find a meaningful way to harness all the wonderful stories and data being shared and enable people to tell us even more about the hidden histories and locations in our films [….]. The platform empowers people to interact with their screen heritage, be expert witnesses to their own local history and share it with the rest of the nation (McFadden cited in Barlow 2019).

Audiences labs and data development tools

Getting to know audiences better is now a fundamental requirement and cultural institutions spare no efforts in this regard. An initiative of the Ministry of Culture and Sports in Spain, the Permanent Museum Public Laboratory (LPPM) is a management improvement instrument that provides museum professionals and state administrators with meaningful data about visitors. In England, the National Gallery has collaborated with data insights company Dexibit, to harness AI techniques in its work to understand visitors: they are exploring how to move beyond simply analysing past visitor experiences, to employ predictive analytics to forecast future attendance and visitor engagement (Paredes 2017). Also in England, the Audience Agency project Audience Finder (supported by the Arts Council) provides a free national audience data and development tool that enables cultural organisations to understand, compare and apply audience insights. In Canada, the 'Public Access to the Arts and Citizen Engagement' component of the Digital Strategy Fund helps artists, groups and arts organisations to improve public access, engagement and participation in the arts through digital means.

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[8] A meme is an idea or behaviour that is transmitted in a viral manner from person to person by means of imitation

Public portals

Public agencies have also set up dedicated portals to promote national cultural offerings, which make it possible to consolidate communication. In Chile, Elige Cultura ('choose culture') is a collaborative platform run by the Ministry of Cultures, Arts and Heritage; it brings together a broad array of activities carried out in public and private spaces across the country such as museums, cultural centres, art galleries, libraries and theatres. It also links with various national and international portals to share digital cultural content including virtual tours, online art collections, photo galleries, 360° images, documentaries, podcasts, reports and mobile applications.

In Mexico, the Secretary of Culture maintains the website México es Cultura ('Mexico is culture') which profiles the main cultural events taking place at the national level in fields including cinema, dance, literature, theatre and digital culture. It also allows users to register and organise their calendar from a mobile app.

In a similar vein, in Singapore the National Arts Council (NAC) runs the online guide A list, which allows users to access cultural programming in the country and subscribe to a newsletter that can be customised based on multiple categories; it is also equipped with an agile feedback system designed to enable any individual or organisation to send information about other events.

Protecting data privacy

The *General Data Protection Regulation* (GDPR) is one of the most significant recent developments in protecting data privacy. Adopted in 2016 and enforced in 2018, GDPR is a European Union regulation that seeks to harmonise data privacy laws across EU countries, as well as give greater protection and rights to individuals. Among its objectives, it grants European citizens the right to receive transparent information from the data controller; to object to their information being processed for marketing purposes; and to demand that their personal data be rectified and/or deleted. The GDPR is one of the strongest data protection regulation systems in the world and has already served as a model for legislation outside of Europe. Significantly, although it's a regulation of the European Union, the GDPR applies to all entities that process the data of EU citizens, not just European institutions. As such, its entry into force has helped improve standards for how organisations worldwide protect personal data; and raise awareness on related issues.

Towards a digital culture framework

Core themes

As we have seen, our three major groups of cultural actors – artists, the cultural and creative industries, and audiences – actively use digital tools. While this trend takes place in countries with good infrastructure, it has an impact on all regions. Indeed, in the last decade the proliferation of mobile phone use coupled with other factors has shaken up how culture is created and consumed in developing countries. Moreover, no segment remains unscathed: the music industry, the audio-visual industry, book publishing, traditional arts disciplines and the preservation of cultural heritage would all be very different today, had it not been for digital technologies.

The opportunities that result from these changes are many and varied. For artists, digital tools enable significant leaps in productivity; open new areas for aesthetic exploration (VR, AR, 3D printing, connected objects, AI and collaborative writing, among other examples); and increase potential sources of income. For the cultural and creative industries, the digital age has led to greater efficiency; the consolidation of new business models; new services; and new markets on a global scale. For audiences, the boom in mobile phones, social media and streaming services has brought phenomenal growth in cultural offerings, as well as the opportunity to participate more actively in social life.

However, the current landscape is also fraught with difficulties. Deficiencies in infrastructure, digital literacy and accessibility hinder cultural activity in the new technological environment. For artists and those working in the cultural and creative industries, protecting copyright and securing fair remuneration can also be complex tasks. In addition, it is not always easy for artists and those working in the cultural and creative industries to access the tools, skills or finance necessary to explore new models. The lack of data particularly harms the cultural and creative industries. While interaction with tech players presents an additional challenge. Some traditional segments, such as physical bookstores, face serious obstacles to sustaining their business models. The rise of the large Internet platforms poses the risk of greater economic concentration in the cultural market and reduces the visibility of local goods and services. Censorship of web content is another serious problem that particularly affects creators and audiences.

As we have seen, public agencies have implemented a considerable number of policies and programmes to take advantage of opportunities and mitigate against challenges that arise from digital transformation. These range from introducing new legislation; supporting experimentation through dedicated strategies; offering training programmes; mapping trends; creating labs; launching web portals; implementing content protection measures; as well as other initiatives that have had a positive impact on the cultural ecosystem.

However, behind this broad range of trends, challenges and measures, there is a recurring set of themes:

- Economic sustainability of the value chain. This is linked to issues such as business models, remuneration of different actors, copyright protection, new forms of distribution, the impact of large Internet platforms and the equipment needs of cultural organisations.
- Skills and experimentation. This includes digital literacy, managing tools for different uses across creation, production, distribution, access and participation, exploring new formats and media, as well as research and development.

- Preservation and visibility of national cultural expressions. This includes both traditional and contemporary expressions.
- Social inclusion. This considers gender, race, minorities, accessibility and disparities in access to basic infrastructure that affect users.
- Fundamental rights. These include freedom of expression and the right to privacy particularly.
- Data. This includes collecting and mapping cultural information; and working with open data and metadata from different sectors.

These core themes cut across the issues that affect the main actors in the cultural chain – artists, the cultural and creative industries, and audiences – and may prove useful for designing a framework to support arts and culture in the digital age. However, for the framework to be truly comprehensive, we must factor in the perspective of those who are going to implement it: the public agencies.

Public agencies in the digital age

The trends and challenges that affect the cultural value chain and its main actors clearly have implications for the public agencies that support arts and culture through policy, investment and promotion at the national level. Public agencies are also not immune to the effects of technology and digitalisation. At an operational level, they face challenges similar to those encountered by other actors across the cultural value chain; and in some cases they are unable to adapt swiftly to new environments due to a lack of – or lack of access to – necessary resources such as skills, staff, equipment or financing. Such operational challenges are further compounded for public agencies in cases where the existing machinery of government complicates their ability to implement integrated solutions. While at a national policy level, although public agencies responsible for arts and culture are sometimes involved in planning programmes for infrastructure and digitalisation, wider government decisions around who needs to be involved in such decision-making often exclude arts and culture portfolios. As a result, many national policies for infrastructure, technology and digitalisation fail to address the needs of the cultural sector or acknowledge its potential to contribute to national responses. There is also an important difference that can make it more complicated for public agencies to adapt: where artists, those working in the cultural and creative industries and audiences can turn to public agencies for help, where do public agencies turn?

As we have seen, the principles of collaboration, connection and experimentation are increasingly important in digital contexts regardless of sector or location. These principles have the potential to inform how actors across the entire cultural ecosystem can work together to support culture in the digital age, including public agencies; artists and organisations in the cultural and creative industries; audiences; partners in the tech world; other government portfolios and public agencies (particularly those driving technology and innovation agendas); different levels of government; and other national institutions (including universities).

As a Federation of arts councils, ministries of culture and other national cultural agencies, there is also unique opportunity for National Members of IFACCA to work together – with these principles of collaboration, connection and experimentation – to share knowledge and expertise; and identify collective actions that we can take internationally.

Conclusions

The impact of new technologies on the cultural ecosystem is extremely complex. Indeed, digital trends involve all kinds of cultural actors – artists, the cultural and creative industries and audiences – that use myriad different tools, such as VR, AR, AI, 3D printing, digital distribution and social media, to name just a few. The effects occur throughout the cultural chain (creation, production, distribution, access, participation) and in every area imaginable (including music, audio-visual, publishing, performing arts, visual arts, cultural heritage, video games). The players that affect the cultural ecosystem include those that operate outside the cultural sector, particularly Internet platforms and start-ups, which together profoundly transform the landscape.

These changes do not only take place in developed countries; thanks to the boom in mobile phone use, they are now truly global. Alongside the main global trends, other local forces exist that are determined by the technological, legal and social conditions of each country. This creates a particularly rich scenario, in which both opportunities and challenges abound. Behind this multitude of trends, tools and uses, it is possible to identify a consistent pattern. The digital age entails a new logic, one that is linked to collaboration, connection and horizontality.

In this context, it is crucial that arts councils, ministries of culture and other national cultural agencies develop their own long-term digital culture plans. In addition to policies that support each link of the cultural value chain, it will be vital to work with a methodology that can enable all stakeholders to adopt new technologies with a co-created and shared vision. Although the arts and culture sector has traditionally faced constraints – including those related to budgets and technology – a well-calibrated strategy that can inform the design of a national digital culture plan could significantly enhance the work of public agencies. It may even position public agencies at the forefront, allowing them to lead other sectors in innovation and creativity. Success in this mission will lead to a cultural ecosystem that is far more sustainable, diverse and vibrant.

Appendix 1: Glossary

360° exhibition	an immersive technique that allows spectators to zoom in to an object or visit a room from multiple angles. This type of three-dimensional exhibition is increasingly used in museums and galleries.
3D printing	a process used to construct solid objects based on a digital model. It is also known as *additive manufacturing*, since it involves successively adding material layer by layer.
Algorithm	in the field of information technology, an algorithm is a sequence of instructions used to perform calculations, data processing and other tasks.
Algorithmic personalisation	automated system that enable platforms and applications to customise the content their users see, based on the data they hold about them
Artificial intelligence (AI)	simulation of human intelligence in machines that are programmed to learn and solve problems, among other things.
Augmented reality	the blending of interactive digital elements – such as sounds, images or text – into our real-world environments.
Blockchain	a time-stamped series of immutable records of data called a distributed ledger that is managed in a decentralised manner.
Crowdfunding	the use of small amounts of capital from a large number of individuals to finance a project or venture, typically via the Internet.
Deep learning	a subset of machine learning (see below) where machines mimic the human brain and use different layers of neural networks to learn from the data.
Fake news	deceptive information spread via social media and traditional media, the aim of which is to disinform.
Hackerspace	a collaborative workspace where people interested in various digital techniques and tools come together to make, learn, explore and share.
Internet of Things	a system made up of interconnected machines and devices that exchange data without the need for human mediation.
Live-to-digital	the capture of a live performance using digital video technology, either for internal use or for subsequent broadcast or streaming.

Long-tail effect	an expression coined by Chris Anderson in 2004, which refers to the possibility offered by the Internet to sell smaller volumes of vast numbers of lower demand items over time, which may make up a market share to rival the share generated by the sale of larger volumes of a few high demand items.
Machine learning	a variant of artificial intelligence (see above), in which machines use data to feed algorithms, the performance of which automatically improves with exposure to additional data over time.
Meme	an idea or behaviour that is transmitted in a viral manner from person to person by means of imitation.
Metadata	data that provides information about other data. In the case of cultural goods and services, metadata serves among other things to identify, describe and catalogue them; it plays a particularly important role in the digital environment.
QR code	a quick response (QR) code is a module that allows information to be stored in a two-dimensional bar code. The code can be read from a mobile device and automatically redirect the user to an Internet application.
Start-up	an innovative company that aspires to rapid growth by embracing the upscaling possibilities offered by digital tools.
Streaming	the process of delivering or obtaining data that unfolds in real time, as opposed to file download – in which the end-user obtains the entire content before watching or listening.
Technological Neutrality	a principle according to which an initiative or regulation should be able to be applied in any technological environment without being tied to any particular tool.
Value gap	a mismatch between the value that online platforms extract from the consumption of cultural content and the value that is returned to rightsholders.
Virtual reality (VR)	a simulated environment created by computer technology.
Video on demand (VOD):	a system for disseminating multimedia content that allows users to access specific content when they choose and to view it on any connected digital device. SVOD, is a subscription-based VOD service that allows users to access unlimited content for a flat fee. AVOD is a platform that offers free access to content, that is financed through advertising.

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Appendix 3: Survey

SUPPORTING CULTURE IN THE DIGITAL AGE

New technologies have profoundly altered arts and cultural practices across the globe. Indeed, the breath-taking expansion of the Web, mobile phones, social media and artificial intelligence, to name just a few examples, have shaped new ways of creating, producing, distributing and consuming cultural goods and services. All these elements have given rise to new opportunities and challenges.

The aim of this form is to collect information on initiatives, experiences and perceptions relating to the opportunities and challenges faced when applying digital technologies in arts and cultural work, including government funding and policy making. The responses will be extremely helpful and, along with other elements, will enable us to draw up a list of good practices, opportunities and recommendations intended for arts councils and culture agencies.

* indicates a required answer

ABOUT YOU

Given name: *
Family name: *
Email: *
Phone:
Position / role title*
Section / Department:
Organisation:
Country: *

YOUR WORK AND TECHNOLOGY

How informed are you about available technologies that could be used your work?*

☐   Extremely informed
☐   Very informed
☐   Somewhat informed
☐   Not very informed
☐   Not at all informed

Select the statement that best describes your engagement with digital tools, in the context of your work:*

☐   I / my organisation regularly identify and adopt new relevant digital technologies
☐   I / my organisation have identified and adopted some relevant digital technologies
☐   I / my organisation have identified relevant digital technologies which will be implemented
☐   I / my organisation have identified relevant digital technologies, but implementing them is not current priority
☐   I / my organisation have not yet identified digital technologies that would be relevant

ACTIVITIES

Please identify the three most significant initiatives that you have undertaken in your work in relation to digital technologies since 2015 and provide the requested details. If you have not delivered any significant initiatives related to digital technologies in this period, please simply enter 'Not applicable' in the Project title field.

1)   Project title:
         Launch date:
         Target Audience:
         Objectives:
         Results Achieved:
         Challenges faced:
         Any other relevant details:

2)   Project title:
         Launch date:
         Target Audience:
         Objectives:
         Results Achieved:
         Challenges faced:
         Any other relevant details:

3)   Project title:
         Launch date:
         Target Audience:
         Objectives:
         Results Achieved:
         Challenges faced:
         Any other relevant details:

POLICIES

Has your government introduced policies that relate specifically to digital technologies and their effects on the sector? *

☐   Yes
☐   No

If yes, please provide a short description of the policy, including the issue(s) to which it responds:

If yes, based on your experience of these policies, do you have any recommendations for policy makers?

OPPORTUNITIES

How do digital technologies represent an opportunity for arts and culture?*

☐   They enhance the work of governments and agencies that support arts and culture
☐   They enhance the work of libraries
☐   They enhance the work of museums
☐   They enhance the work of artists and cultural entrepreneurs
☐   They enable new forms of expression and artistic experimentation
☐   They make it possible to broaden access to culture
☐   They help to increase accessibility
☐   They encourage more efficient distribution of cultural goods and services
☐   They represent a new source of income for the cultural sector
☐   They help to preserve cultural heritage
☐   They make it possible to get to know audiences better
☐   They encourage participation
☐   They make it possible to involve young people in cultural activities
☐   They are a means of evading traditional censure mechanisms
☐   They extend the reach of cultural policies
☐   They encourage intercultural dialogue
☐   They help to decentralise culture
☐   They strengthen social bonds
☐   They help to revive certain languages
☐   They stimulate employment and economic growth
☐   Other (please specify):

If you have specific examples, please expand on your answer:

Which technologies do you think are most promising for public support of the arts and culture sector through policy, initiatives and / or funding? *

☐   Augmented reality
☐   Virtual reality
☐   Crowdfunding
☐   E-commerce / Mobile commerce
☐   Artificial intelligence
☐   Robotics
☐   Blockchain
☐   Internet of Things
☐   Social Networks
☐   Mobile applications
☐   Web applications
☐   Online galleries

☐   QR Codes

☐   3D printing

☐   Video games

☐   Drones

☐   Massive online open courses

☐   Open educational resources

☐   Video mapping

☐   Other (please specify):

Which technologies do you think are most promising for those working in the arts and culture sector? *

☐   Augmented reality

☐   Virtual reality

☐   Crowdfunding

☐   E-commerce / Mobile commerce

☐   Artificial intelligence

☐   Robotics

☐   Blockchain

☐   Internet of Things

☐   Social Networks

☐   Mobile applications

☐   Web applications

☐   Online galleries

☐   QR Codes

☐   3D printing

☐   Video games

☐   Drones

☐   Massive online open courses

☐   Open educational resources

☐   Video mapping

☐   Other (please specify):

OBSTACLES

What are the main obstacles you have encountered in your work with digital technologies?*

☐   Lack of funding

☐   Lack of training

☐   Lack of expert advice

☐   Lack of staff

☐   Lack of digital literacy and skills

☐   Lack of devices on the ground

☐   Lack of data

☐   Technical problems such as the lack of interoperability between operating systems

☐   Lack of a comprehensive digital culture policy at the national level

☐   Failings in local technological infrastructure

☐   Lack of interest on the part of users

☐   Lack of interest on the part of authorities

☐   Existence of a digital divide affecting part of the population

☐   Digital transition is very complex for cultural institutions

☐   The legal framework is not adapted to the new era

☐   Significant problems when it comes to protecting copyright

☐   Other (please specify):

If you have specific examples, please expand on your answer:

THREATS

To what extent might digital technologies pose a threat?*

☐   They may pose a risk to the security of government information

☐   They may introduce unknown risks to processes for which public agencies are responsible

☐   They increase inequalities between social sectors

☐   They can be used to limit freedom of expression

☐   They exclude digital non-natives

☐   Traditional cultural expressions run the risk of being forgotten

☐   Libraries, museums and other institutions may lose users

☐   They may pose a risk to personal privacy

☐   They exacerbate economic concentration

☐   They eliminate jobs

☐   They threaten cultural diversity

☐   They promote fake news, hate speech and discrimination

☐   They harm minority languages

☐   Other (please specify):

If you have specific examples, please expand on your answer:

POLICIES AND INITIATIVES FOR THE FUTURE

What new policies and initiatives could be implemented that would take advantage of digital opportunities, while mitigating against obstacles and threats?

USE OF DIGITAL TOOLS

What social media and digital tools do you and/or your organisation use to develop your work?? *

☐   Facebook
☐   Twitter
☐   YouTube
☐   Instagram
☐   LinkedIn
☐   Vimeo
☐   SoundCloud
☐   Pinterest
☐   Snapchat
☐   WordPress
☐   Flickr
☐   Kickstarter
☐   WeChat
☐   Weibo
☐   QQ
☐   Douban
☐   Blogs
☐   Podcasts
☐   Mobile applications
☐   Digital archives
☐   Newsletters
☐   Other (please specify):

What are the main benefits?

What are the main challenges?

Appendix 4: Survey participants (public agencies)

Australia	Australia Council for the Arts
Canada	Canada Council for the Arts
Chile	Ministry of Cultures, Arts and Heritage, Chile
China	China Federation of Literary and Art Circles
England	Arts Council England
Fiji	Fiji Arts Council
Mexico	Secretary of Culture, Mexico
Namibia	National Art Council of Namibia
Norway	Arts Council Norway
Paraguay	National Secretary of Culture, Presidency of the Republic, Paraguay
Singapore	National Arts Council of Singapore
Spain	Ministry of Culture and Sport, Spain
Solomon Islands	Ministry of Culture and Tourism, Solomon Islands
South Africa	National Arts Council of South Africa
Tunisia	Ministry of Cultural Affairs, Tunisia
Ukraine	Ukrainian Cultural Foundation
USA	National Endowment for the Arts
Viet Nam	Ministry of Culture, Sports and Tourism of Viet Nam
Zambia	National Arts Council of Zambia

Appendix 5: Survey participants (civil society)

Agillo, J (Canada), President of ArtsPond.

Beldad, I (Spain), Community manager.

Bittard, R (France), Communication manager at Labo de l'Édition.

Brugman, F (Spain), Culture Programme Specialist at UNESCO.

Castellanos Ribot, A (Mexico), Member of the UNESCO 2005 Convention expert facility.

Chávez Aguayo, M.A (Mexico), Professor at University of Guadalajara.

Connell, A (Canada), Consultant in digital strategy.

Conolly, L (Australia), Artist.

Cordero Morales, O.R (Colombia), Publishing advisor at Ciudad Codificada.

Cornell, K (Canada), Executive Director of Canadian Dance Assembly.

Delfin, M (Peru), Director of Asociación Civil Solar.

Deloumeaux, L (Canada), Associate Programme Specialist at UNESCO Institute for Statistics.

Díaz, A (Paraguay), Director of Asociación Cultural Crear en Libertad ACCEL.

Euverte, F (France), CEO of Inédits.

Fariña Noguera, F.A (Paraguay), Director of Centro Cultural Melodía.

García Alonso, M (Spain), Project Coordinator at Organization of Ibero-American States (OEI).

González Martín, L (Spain), Director of Fundación Germán Sánchez Ruipérez.

Grevtsova, I (Russia/Spain), Professor at Escuela de Diseño de Barcelona.

Hanania, L (Brazil/France), Associate Professor at Université Paris Descartes.

Jaramillo Morales, A (Colombia), Writer and professor at National University of Colombia.

Julien, F (Canada), Director of Research and Development at Canadian Arts Presenting Association (CAPACOA).

MacLeod, M (Scotland), Project manager.

Noejovich, S (Argentina), Coordinator of Dailan Kifki reading centre, National Library of Argentina.

Pandean, S (Indonesia), IT expert.

Perramon Llavina, M (Spain), Director of Gestió de Publics Integral.

Saravia, E (Colombia/Germany), Chief Economist at Sound Diplomacy.

Schargorodsky, H (Argentina), Director of Observatorio Cultural, Facultad de Ciencias Económicas, University of Buenos Aires.

Scheinig, M (Argentina), Photographer, researcher and professor at University of Buenos Aires.

Serafini, D (Paraguay), Music producer at Supernova.

Sierra Montaño, E (Colombia), Expert in interactive media.

Silupya, N (Zambia), Cultural specialist at Zambia National Visual Arts Council.

Sternberg Rubiano, P (Colombia), Advisor at Instituto Municipal de Cultura y Turismo.

Tsuboi-Friedman, H (Japan), Board Member at Kanagawa Prefecture Culture and Arts Promotion Council.

Vangeti, P (France), Consultant at World Heritage Education Programme, UNESCO.

Veneman, M (Netherlands), Manager at Rythmos Advisory.

Varbanova, L (Bulgaria), Programme Director of the Master Program in Management of Performing Arts and Industries, National Academy of Theatre and Film Arts.

Vlassis, A (Greece/Belgium), Researcher at University of Liege.

Wangusa, A (Tanzania), Executive Director of Culture and Development East Africa.

Whyatt, S (UK), Artistic freedom expert.

Zinchenko, K (Ukraine), Curator at Congress of Cultural Activists.