Jobs in the Orange Economy: Impact of Disruptive Technologies

November 2023

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This Discussion Note is part of the Solutions for Youth Employment (S4YE) series focusing on the design and implementation of youth employment programs. The Note focuses on the creative and cultural industries and delves into how the advent of disruptive technology is likely to transform businesses, create new jobs and change the nature of existing ones that are part of creative and cultural industries.

The Note discusses three main types of technologies that are increasingly being adapted across creative economy sectors: Artificial intelligence (AI), Cloud and Blockchain, Augmented and Virtual Reality (AR/VR). Given the varying and distinctive features of these technologies and their evolving nature, the Note does not quantify the impacts and conclude the degree to which these technologies will change the creative economy, however the Note discusses relevant opportunities and concerns, and highlights areas where attention should be concentrated if benefits with respect to job creation and growth are to be realized.

This Note also identifies and highlights key areas of technical and digital technology skills that align with the evolving digital needs and facets of creative economy sectors, and therefore should be developed by creative professionals or those that are part of the creative value-chains.

1. Introduction

The emergence of disruptive technology has revolutionized various sectors and is increasingly becoming part of all development discourse. Undergoing a period of what is referred to as the Fourth Industrial Revolution (or 4IR), disruptive trends including the rise of data and connectivity, analytics, human-machine interaction, and improvement in robotics[1] have transformed businesses and have also created new avenues of growth and job creation – reshaping the way firms operate and individuals work. The adoption of disruptive technology is likely to become a mainstream phenomenon and will continue to be a key driver of business transformation and jobs over the coming years. 85% of the organizations, globally, are likely to be exposed to new and frontier technologies, and greater digitalization.[2]

Naturally, creative economy sectors, such as Audio-Visual Media, Art, Music, Fashion journalism, and more are not impervious to the effects of emerging technologies – impacting both the type and nature of jobs. Artificial intelligence (AI), cloud and blockchain technologies, augmented reality (AR) and virtual reality (VR) are not only acting as drivers of job creation but are also altering the nature of existing jobs in the creative economy. Some foundational types of technologies that can be applied all along the value chain cover aspects such as:
- Connectivity, data, and computational power: cloud technology, the Internet, blockchain, sensors, etc.
- Analytics and intelligence: advanced analytics, machine learning, artificial learning, etc.

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[1] McKinsey & Company. 2022. "What are Industry 4.0, the Fourth Industrial Revolution, and 4IR?" Link
[2] World Economic Forum. (2023). "Future of Job Report." Link

- Human-machine interaction: virtual reality (VR) and augmented reality (AR), robotics and automation, autonomous guided vehicles
- Advanced engineering: Additive manufacturing (such as 3D printing), nanoparticles, etc.

This Discussion Note delves into the opportunities and concerns for the most prominent emerging technologies, highlighting areas where attention should be concentrated if benefits with respect to job creation and growth are to be realized. Furthermore, the emergence of technology, captures only half the narrative. The optimization of digital tools and technologies is contingent upon digital skills development which will determine job engagement and accessibility. This Discussion Note, therefore, also highlights the need to reskill and upskill workers to align with the evolving – digital – needs of the creative economy.

2. The Creative Economy Landscape

2.1 Economic Growth and Income Generation

The creative economy is likely to be a key driver of long-term economic growth and job creation for countries around the world, especially as governments look to recover and rebuild from the adverse impacts of Covid-19. The creative economy is projected to reach a global valuation of $985 billion by 2023, and could well represent 10% of global GDP by 2030.[3] [4] It is further expected to grow by up to 40% by 2030.[5] Currently, the creative economy, interchangeably referred to as 'orange economy' or 'creative and cultural industries or sectors', accounts for 6.2% of global employment *(Figure 1)*, or more than 48.4 million jobs worldwide,[6] and contributes to over 3% or $2250 billion, annually, to global gross domestic product (GDP).[7] To put this into perspective, the revenue generated by the creative industries exceeds that of the telecom sector, and it tends to employ more people than the automotive industry of Europe, Japan, and the United States, combined.

Individuals, working in the creative economy across different regions, form a decent proportion of the overall labor force. Active labor force participants in the creative economy represent 5.9% of all participants in the job market across Western Europe and North America, and 8.2% of those across Africa. In terms of revenue, cultural and creative industries were estimated to have generated around €509 billion in 2020, representing 5.3% of the European Union's (EU) total GDP.[8]

In Africa and the Middle East, the sectors employ around 2.4 million people and create around 1.9 million jobs in Latin America and the Caribbean region.[9] 'Nollywood' (the nickname given to the Nigerian film production industry), for instance, is the second-largest employer in the nation after the agricultural sector, creating 300,000 direct jobs.[10]

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[3] G20. (2021). "Creative economy 2030: Inclusive and resilient creative economy for sustainable development and recovery." Link

[4] Ibid.

[5] Deloitte. (2021). "The Future of Creative Economy." Link

[6] UNESCO. (2021). "Cultural and creative industries in the face of COVID-19: an economic impact outlook." Link
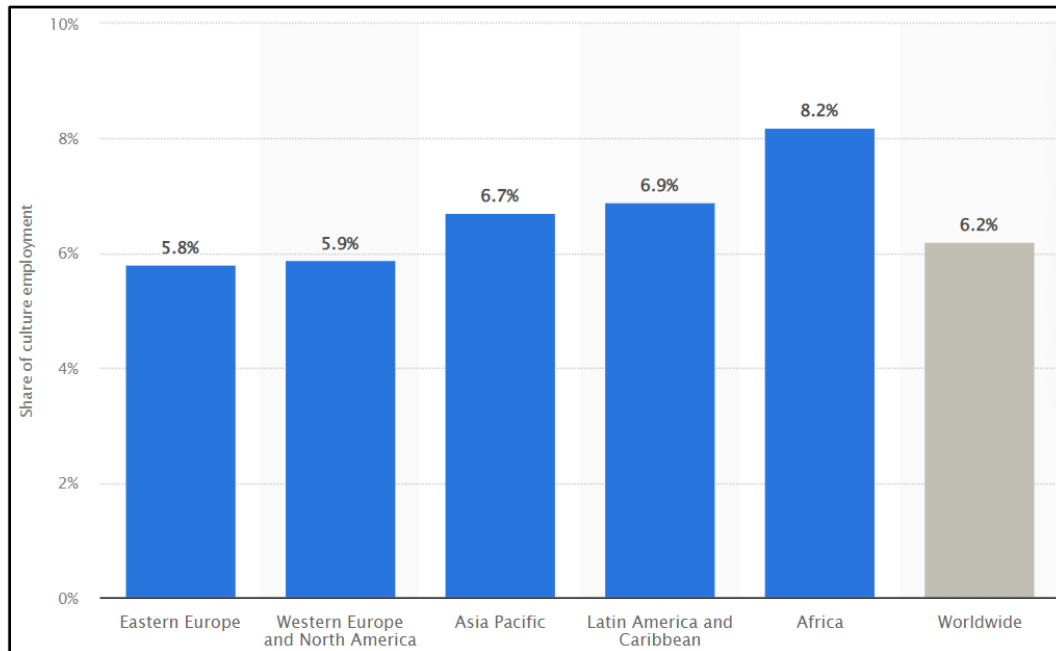
[7] UNESCO. (2022). "Reshaping Policies for Creativity".

[8] European Commission. (2018).

[9] World Bank. "Orange Economy: As a Driver of Jobs for Youth." Link

[10] World Bank. "Orange Economy: As a Driver of Jobs for Youth." Link

Figure 1: Creative Economy's Share of Employment (% of total employment worldwide in 2020, by region)

Source: UNESCO, 2022

The value of creative goods and products has increased exponentially since 2002 and is further expected to grow. The creative economy is estimated to grow 40% by 2030, adding over 10 million jobs, globally.[11] Not surprisingly, this upward trajectory also correlates with the digitalization of artistic and creative works including music, video, and publishing. Among the different sectors of creative economy, television, visual arts, and newspaper and magazine are the three largest sources of global revenue, while visual arts, books, and the music sector tend to be the three largest employers.[12]

The contribution of creative economy is not only limited to income generation but has a deep impact on the way societies and people interact. Creative economy sectors contribute to the generation of ideas, metaphors, and messages, and have been instrumental in driving social and economic development.[13] Furthermore, the design, and use and access to technology-oriented products has benefited greatly from contribution of artists, design engineers, etc. which has led to greater adoption, acceptance, and uptake of technological products with enhanced attractiveness of software interface, user-friendly experiences, and design. Therefore, creative industries have facilitated the transformation of not only institutions, communities, and cities, but also that of modern-day technology.

2.2 Jobs in the Orange Economy

A large majority of people working in the creative economy tend to be freelancers, micro-enterprises, and informal workers. Almost 33% of the creative workers, that are part of the creative economy sectors,
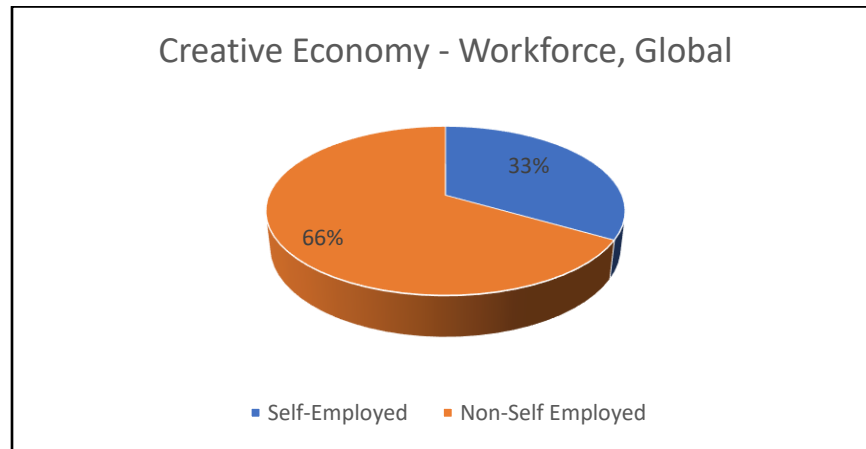
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[11] Deloitte. (2021). "The Future of Creative Economy." Link
[12] UNESCO. (2015). "Cultural Times: The first global map of cultural and creative industries." Link
[13] European Union Open Method of Coordination Expert Group on Cultural and Creative Industries.

are self-employed *(Figure 2)* – a figure which is twice as much than the observed average for the entire economy, globally.[14] Self-employment in creative economy across the 27 European Union (EU) countries is higher than for other types of employment – estimated to be 32% versus 14% in non-creative economy sectors.[15] The proportion of self-employed further exceeds 50% in developing countries such as Costa Rica, Colombia, Mali, Pakistan, and Sri Lanka.[16]

Figure 2: Percentage of Self-Employed, globally (Creative Economy)

The creative economy tends to be largely informal, employing over 30 million people across emerging markets.[17] Furthermore, the informal economy is estimated to account for up to 40% of cultural and creative production,[18] a number which is higher in developing countries such as Cabo Verde where 66% of the income generated by creative industries is attributed to the informal economy.[19]

Many of those working in the creative sectors do so part-time, combine two or more jobs, and often do not have a permanent job, despite being better educated than workers employed in other sectors. Among those who are self-employed, globally, 8% have more than one job.[20] Such 'atypical work' patterns are more frequent in the cultural and creative industries, particularly among core professions for the sector: artists, writers, journalists, creators, musicians, translators, and interpreters; and consist of on-call, short term or fixed term contracts, project or task-based work, agency work (more and more often via digital platforms), etc.[21]

The cultural and creative sectors are particularly important for youth. For instance, the share of people employed in cultural occupations between 15 and 24 years of age is 33% in Pakistan, 27.1% in Ghana, and

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[14] Data from Eurostat. Accessed: Link
[15] World Bank (2021). "Cities, Culture, Creativity: Leveraging Culture and Creativity for Sustainable Urban Development and Inclusive Growth." Link
[16] Data from UNESCO's UIS Stat database: Link
[17] ADB. (2022). "Creative Economy 2030: Imagining and Delivering a Robust, Creative, Inclusive, and Sustainable Recovery." Link
[18] SACO (South African Cultural Observatory). (2019). "The Employment of Youth and Women in Cultural Occupations in South Africa." Link
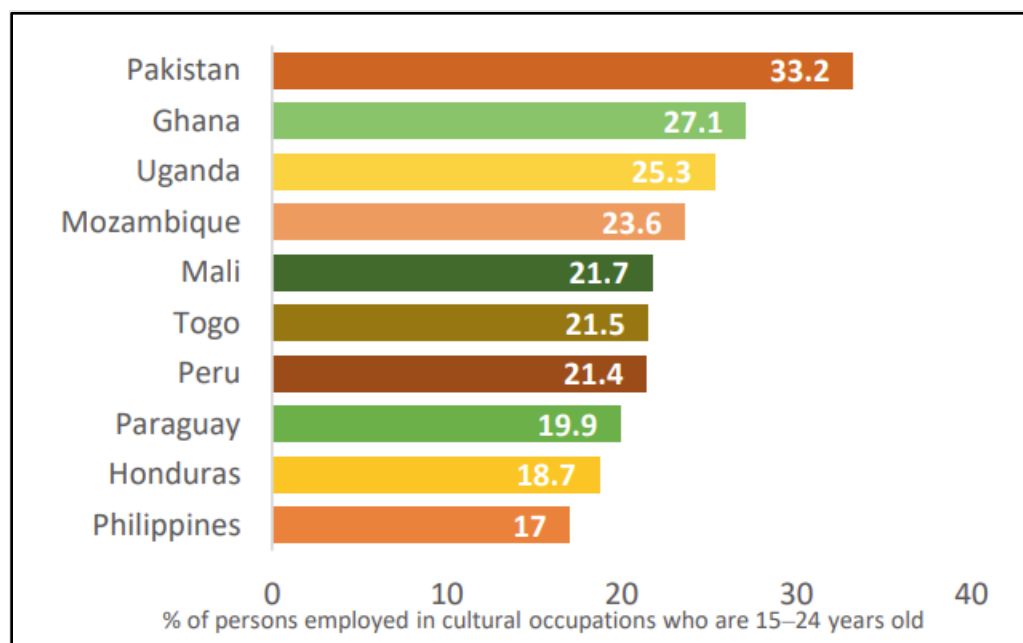[19] UNCTAD. (2020). "CREATIVE ECONOMY OUTLOOK Trends in international trade in creative industries." Link
[20] Data from UNESCO's UIS.Stat database at Link
[20] ADB. (2022). "Creative Economy 2030: Imagining and Delivering a Robust, Creative, Inclusive, and Sustainable Recovery." Link
[21] EU. (2019). "Employment in the cultural and creative sectors." Link

25.3% in Uganda.[22] In Latin America and the Caribbean, young workers account for nearly 20% of cultural occupations in Peru, Paraguay, and Honduras *(Figure 3).* This is an important fact to highlight given the ability of youth to adapt and shift more easily to the use of emerging technologies.

Figure 3: Top 10 countries with a large percentage of persons employed in cultural occupations who are 15–24 years old, 2015 or latest year available.

Source: Solutions for Youth Employment (S4YE), 2020.

Furthermore, the share of youth is larger in low-income countries than advanced countries *(Figure 4).*[23] Although developing countries have a larger proportion of youth in the world, this figure highlights the important contribution of the orange economy as a source of employment opportunities, particularly for youth in the less developed world.

Employment across creative economy sectors has a much smaller gender gap in comparison to other revenue generating sectors of global economy. Rather, as supported by data from a study of 35 low- and middle-income countries surveyed by UNESCO, more women than men are employed in cultural work in over half of countries surveyed. Notably, in Sri Lanka, 12% of the female workforce is engaged in a cultural occupation compared to 3% of male workers.[24]

It is, however, important to recognize the nuances along the different value-chains in terms of the type of roles women and men take up. Despite women's over-representation in creative industries', data shows that women represent 38% of the CCI workforce – well under the labor market average of 46%, for roles which require higher degree of education.[25] Some creative sub sectors however have deep occupational segregation, for instance, in the film sector women are overrepresented in make-

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[22] S4YE, World Bank. (2022). "Orange Economy: As a Driver of Jobs for Youth." Link
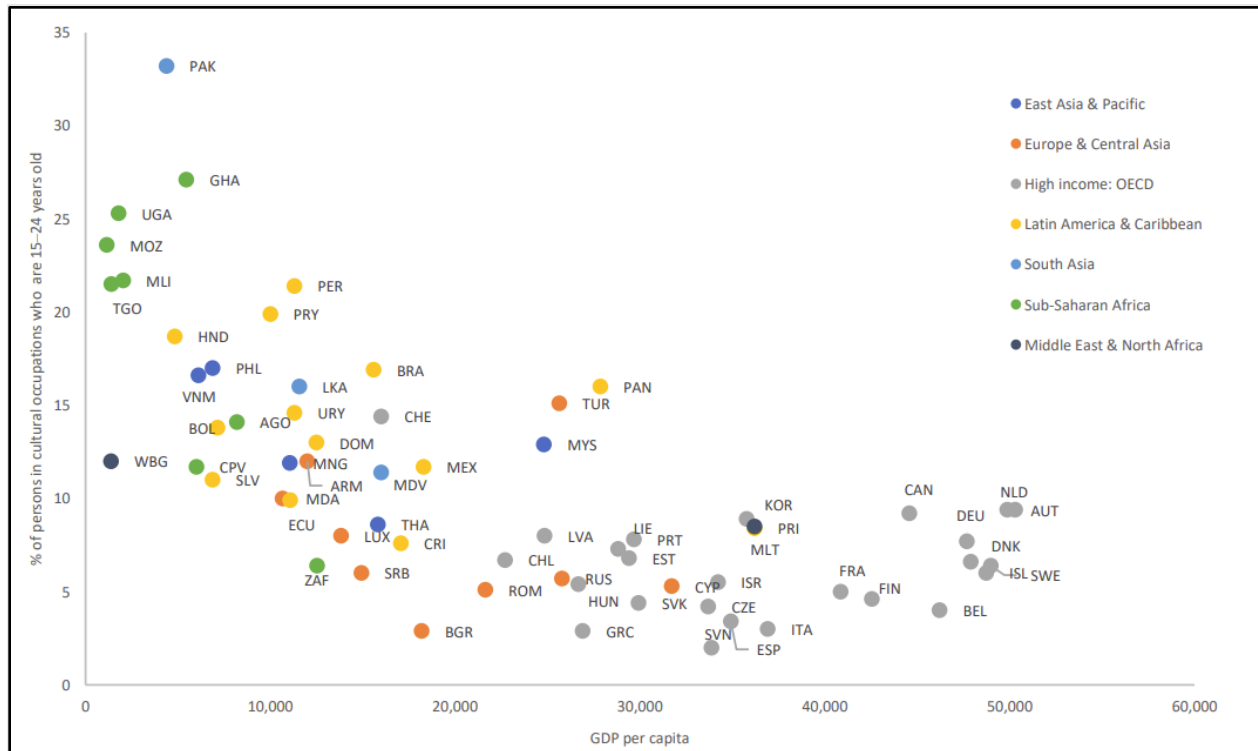[23] Ibid.
[24] World Bank. (2022). "Three lessons on fostering inclusion, empowerment, and employment through creativity." Link
[25] European Commission. (2021). "Towards gender equality in the cultural and creative sectors." Link

up/costume, while men hold greater employment in lighting/camera work. Similarly, women constitute 87% of the those working in hair and make-up positions in the UK, whilst only 21% of the electronic artists booked in music festivals globally.[26]

Figure 4: Percentage of persons employed in cultural occupations who are 15–24 years old by GDP per capita, PPP, 2015 or latest year available.

Source: UIS, 2020; World Bank, 2020; World Development Indicators Database.

The gender divide becomes more pronounced in digital occupations such as animation *(detailed in the section on Challenges and Risks)*. The transition from school to work within animation is a tough step for women, reflecting a common trend in many of the creative industries. According to research in the US and Europe, women make up 60% of animation students, which drops down dramatically to an employment rate of 20-40% in professional roles.[27] Additionally, there is a vertical gender divide: women are underrepresented in decision-making roles, as well as in management and leadership positions. Despite an incredible 70% of the fashion workforce being women, only 25% of the higher management in top labels are female, and only 14% of the major fashion brands are led by a female executive.[28]

2.3 Foundational Technologies and Digitalization

Technology and digitalization have increasingly transformed, and further continue to transform the creative economy. In 2022, 5.3 billion people (or 66% of the world's population) had access to and use
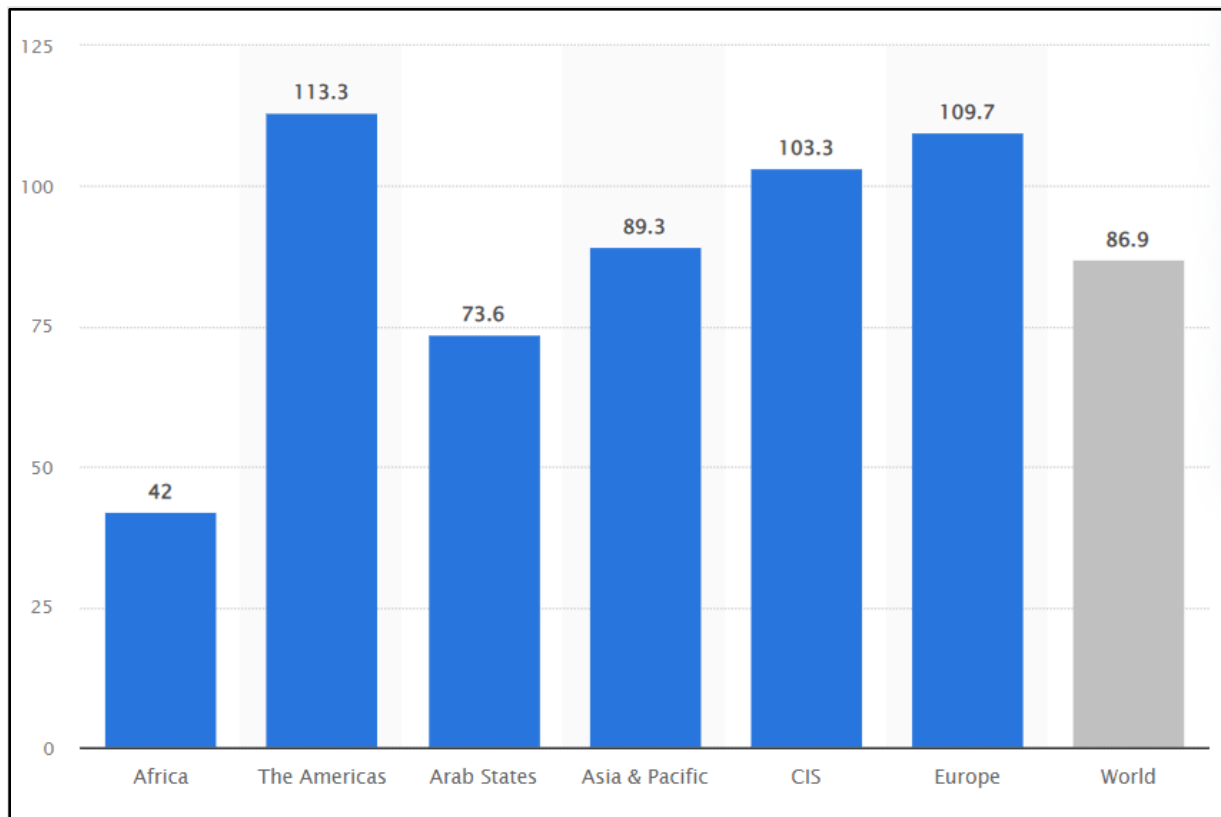
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[26] The Wire. (2021). "Women Underrepresented in Cultural, Creative Industries Globally: UNESCO." Link
[27] Brewer, Jenny. (2018). "Why is there a lack of women in animation, and what can we do about it?" It's Nice That. Link
[28] Fashion Revolution. (2021). "The fashion industry needs to break with its gender and women's rights problems." Link

the Internet,[29] while mobile broadband subscriptions have reportedly reached a staggering figure of 86.9 per 100 inhabitants, globally *(Figure 5)*, reflecting the magnitude of global connectivity and digital dynamics. which have provided unprecedented access, collaboration, monetization, and engagement opportunities to creative professionals.

Figure 5: Mobile Broadband Internet Subscription Rate* (2002, by region) [30]

*Rate per 100 inhabitants

Broadband internet and mobile connectivity have enabled artists, musicians, writers, and other creative professionals to share their work online, reaching audiences that were previously inaccessible – opening new markets and opportunities. High-speed internet has also facilitated content creation and distribution through streaming platforms, social media, and other digital channels. This has democratized creative processes, allowing individuals to circumvent traditional gatekeepers. The advent of online platforms and tools have helped amplify collaborative and networking ventures, making virtual collaboration seamless, fostering a vibrant and connected creative community. Furthermore, the internet, virtue of being a vast repository of information and learning resources, has made it easier for creative professionals to access resources to enhance creative skills, develop craft, and stay abreast of latest trends.
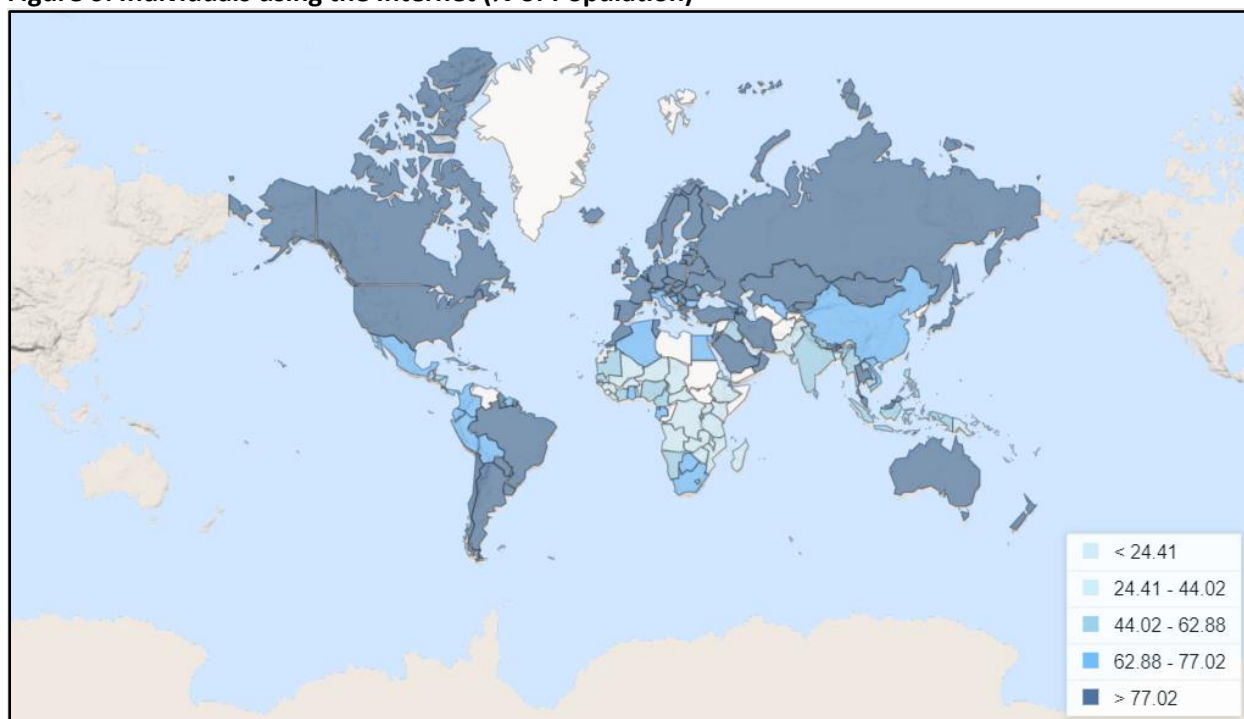
However, the digital divide still remains a challenge. In general, young people are the driving force of connectivity, with 75 per cent of the 15-24 year old now online, compared with 65 per cent among the

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[29] ITU. (2022). "Measuring Digital Development: Facts and Figures 2022." Link
[30] Statista. (2022). "Mobile broadband internet subscription rate in 2022, by region." Link

rest of the population.[31] And while the gender parity score in Internet use, defined as the percentage of women divided by the percentage of men using the Internet is slowly improving, the population of non-Internet users has also become more skewed as women are more often left behind. Currently, 63% of women are using the internet in comparison to 69% of men, globally.[32]

Figure 6: Individuals using the Internet (% of Population)

Source: World Bank Data, 2023. Generated.

Case Study 1: Sandbox - An Integration Space for Technology and the Performing Arts in Panama

A project by the Inter-American Development Bank, Sandbox, seeks to leverage the potential of the creative and cultural industries to generate employment and entrepreneurship, and means for developing young people's soft skills and 21st-century skills. The intervention seeks to increase opportunities for labor-market inclusion for at-risk youth. The proposed solution includes: (i) training and practical experience for young people at social risk with the STEAM platform; (ii) interdisciplinary collaboration using technology for the co-creation of innovative artistic works (more sophisticated offerings); and (iii) democratization, decentralization, and new distribution channels for performing arts works and interdisciplinary experimentation with technology by creating a "sandbox".

Key Results
Within the last three years, since the project's implementation, 385 young people completed a 21st-century skills program, 43 young people completed at least one internship in STEAM training plan, with 35% female participation in the internships.

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[31] ITU. (2022). "Measuring Digital Development: Facts and Figures 2022." Link
[32] ITU. (2022). "The Digital Gender Divide." Link

2.4 Digital Platforms, Gig Work, and Creative Economy

The growth of the gig economy, too, is a result of internet penetration and mobile connectivity. Freelancing websites, gig marketplaces, e-commerce platforms, and social media outlets have revolutionized various industries part of the creative economy such as music, gaming, content creation, and more. While creative industries have offered creative professionals – and more profoundly the youth – tools and inspirations in terms of visual expression and storytelling that have had important spillovers to other sectors in the new digital world.

Digital platforms are fueling creative economy's growth by enabling performers, artists, musicians, and others to reach new audiences. Throughout Africa, revenue from digital music streaming is expected to reach $500 million by 2025, up from only $100 million in 2017.[33] Music streaming now accounts for more than half the revenue of the global music industry – 62.1% to be precise.[34] Similarly, revenue for the entire video streaming app industry amassed $82.3 billion in 2022

> **Box 1: Leading Digital Platform for Creative Economy Sectors**
>
> *Music:* Spotify, Apple Music, YouTube
> *E-Commerce:* Amazon, Shopify
> *Film and Video:* Netflix, Disney, Hulu, Vimeo
> *Gaming:* Twitch, YouTube Gaming
> *Content Creation:* Instagram, Facebook, TikTok

and is further projected to reach $115 billion by 2026.[35] Also, in addition to revenue generation, online video subscriptions have been witnessed to peak at 1.1 billion in 2021, globally, reflecting a 26% increase from 2020.[36]

Online gig work is a rapidly growing segment of the labor market, already accounting for up to 12% of the global labor market, or over 400 million people, half of which are youth.[37] Gig work has opened up a wider range of job opportunities for artisans and artists, allowing them to connect with clients globally, increasing their chances of selling their products (such as artifacts in the case of artisans) or finding projects that align with their skills and interests. The global gig economy is estimated to reach $455 billion by 2023, growing at a compound annual growth rate (CAGR) of 17.4%.[38] In 2020, Upwork reported that the creative and content category was the fastest-growing segment on their platform.[39]

Reciprocatively, creative industries have been a locomotive for the digital economy, estimated to have been contributing up to $200 billion per annum, in global digital sales.[40] Creative content has been a powerful generator for the sales of digital devices, which amounted to $530 billion in 2013. Additionally, digital cultural goods were the biggest revenue source for the digital economy, generating $66 billion of business to consumer (B2C) sales in 2013 and $21.7 billion of advertising revenues for online media and free streaming websites.[41] Major internet giants, globally, have emerged through the production of creative content *(See Case Study 2 on Instagram)*.

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[33] World Bank. (2022). "Unlocking Opportunities for Youth in the Orange Economy: Music in Africa." Link
[34] UNESCO. (2022). "Reshaping Policies for Creativity." Link
[35] Business of Apps. (2023). "Video Streaming App Revenue and Usage Statistics 2023." Link
[36] Ibid.
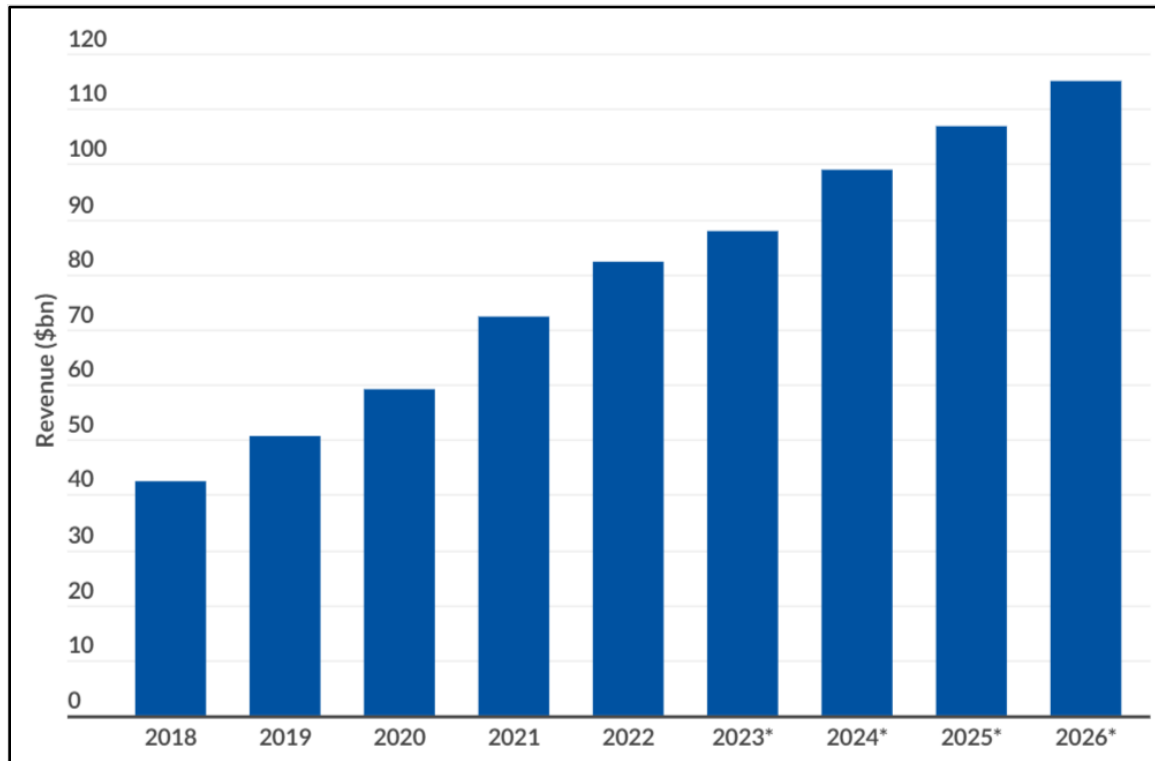[37] World Bank. (2023). "Working Without Borders: The Promise and Peril of Online Gig Work." Link
[38] Brodmin. (2022). "Gig Economy – The Economic Backbone of the Future?" Link
[39] Upwork. (2021). "2020 Annual Impact Report" Link
[40] UNESCO. (2015). "Cultural Times: The first global map of cultural and creative industries." Link
[41] Bilous, Kostiantyn. (2019). "Why Piracy Increases Exports in Films." Link

Figure 7: Global Streaming Projected Market Size (2018 to 2026)[42]

Source: PWC, Statista

Case Study 2: Instagram Facilitating the Rise of Creative Products and Content Creation

As of January 2023, Instagram has 2.35 billion monthly active users, a figure that has undergone unprecedented increase since December 2016, when the application had 600 million registered monthly active users. From being a photo-sharing platform, when it was launched in 2010, the application has evolved into a digital platform being leveraged by businesses for not only marketing, but also as a digital platform that facilitates purchases. It continues to be the third most used social media platform, fifth most visited website in the world, and according to Insider Intelligence generated $43.2 billion in ad revenue during 2022, alone.

Creative professionals ranging from artists to designers, and models to writers use Instagram to expand their business and maximize global reach. According to Instagram Business, 90% of users follow at least one business account on the app. The impact of Instagram on the arts industry, for instance, has been greater than that of any traditional gallery. Findings from a survey of collectors by Artsy, revealed that almost 52% purchased art from artists that were originally discovered on Instagram.

Similar trends have been witnessed for the fashion industry as well. This is evident from the increase of posted engagements by 44 million (unique accounts) as a result of fashion industry's spring 2016

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[42] Business of Apps. (2023). "Video Streaming App Revenue and Usage Statistics 2023." Link

collection debut, in September 2015. Furthermore, the birth of the "insta-model", as a separate new entity within the fashion industry shows how Instagram is shaping trends in the creative industry and creating newer forms of self-employment and associated work opportunities such as media and PR management.

The influence of Instagram goes well beyond the arts and fashion industry. It has changed the manner in which creative content is created and consumed, providing creative professionals a novel avenue for income generation.

Overall, the adoption and integration of digital technologies has disrupted traditional labor markets and business models particularly in the areas of media and entertainment. This rise of streaming services, social media platforms, and user-generated content has disrupted traditional and conventional forms of media. Cloud-based collaboration tools and project management software have made it easier for creatives to work together, remotely, facilitating greater collaboration and creativity. Additionally, digital financial services (DFS) and digital payment systems such as PayPal, Square, Mastercard whose growth and expansion is directly linked with greater internet penetration have served to streamline payment process, reducing administrative overhead costs, and enabling quick and reliable transaction between creative professionals that are participants of the gig economy.

2.5 Covid-19 Crisis: Accelerating the Shift to Digitalization

The COVID-19 pandemic dramatically increased society's dependence on information and communication technology (ICT) to address the disruption of business activities and daily life. Health professionals shifted to telemedicine, educational institutions pivoted to online learning, and retailers and wholesalers shifted to online ordering and delivery as their primary business. Financial institutions such as banks and microfinance institutions (MFIs) expanded digital access to financial services. And many companies began to deploy remote work, digitalizing at least some part of their business. Prior to COVID-19, some 60% of the world's GDP was expected to be digitalized by 2022,[43] but the crisis accelerated this transition, and significantly increased companies' need to adopt digital technology.

Covid had a deep impact on the creative economy. It is estimated that the global gross value added to the cultural and creative industries contracted by $750 billion in 2020, and at least 10 million jobs were lost due to Covid-19 induced restriction. Lockdowns in many countries led to the closure of cultural facilities and cancellation of events; halted work across creative occupations; and limited domestic and international travel.[44] The revenue of creative economy decreased by between 20% and 40% in 2020, across various countries, and cultural and creative industries generally performed worse than their national economies.[45]

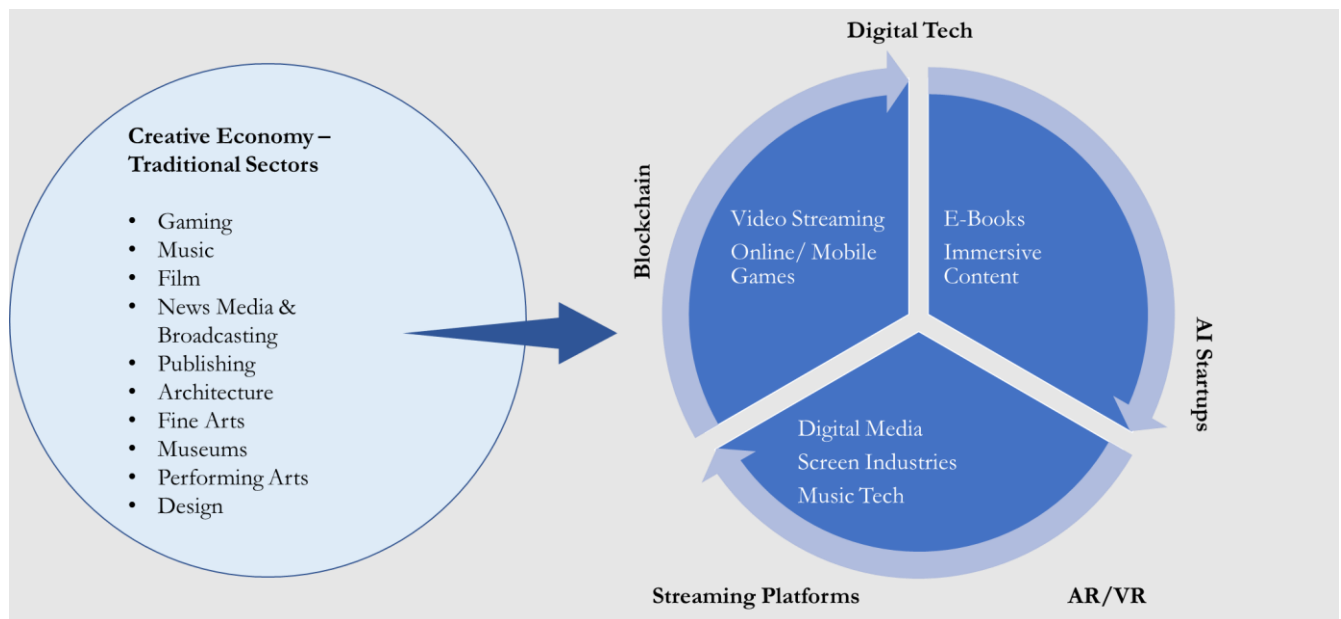[43] OECD. (2021) "Bridging the Digital Gender Divide." Link
[44] ILO, 2020a; IDEA Consult et al., 2021
[45] BOP Consulting. (2021).

While some creative industries struggled during the pandemics, revenues for many gaming companies, and streaming services underwent an increase during the pandemic.[46] Location-based sectors and activities, such as museums, festivals, in-person art exhibitions, live music, performing arts were deeply impacted due to lockdowns and social distancing protocols, while sectors such as gaming and e-sports experienced an exponential increase in user engagement. Many artists and creative professionals seized the opportunity of the rise in niche streaming services to develop innovative projects using digital tools for creation, production, distribution, and access to cultural and creative expressions.

Technology further shifted the channels through which music, art, and other cultural content is being disseminated and shared *(Figure 8).* Virtual reality, as an example of disruptive technology, enhanced tours, and enabled users to visit museums virtually from any location. By using a VR headset, the visitor would be 'teleported' into a museum space and would be able to investigate any exhibition object in 3D. The Almeida Theatre in the UK, working with the Natural History Museum, the Science Museum Group, the University of Exeter, and a creative company called Factory 42 created an immersive experience, what they described as a "mixed reality experience".[47]

Figure 8: Digital Transformation of Creative Economy Sectors

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[46] WEF. (2020). "How COVID-19 is taking gaming and esports to the next level." Link
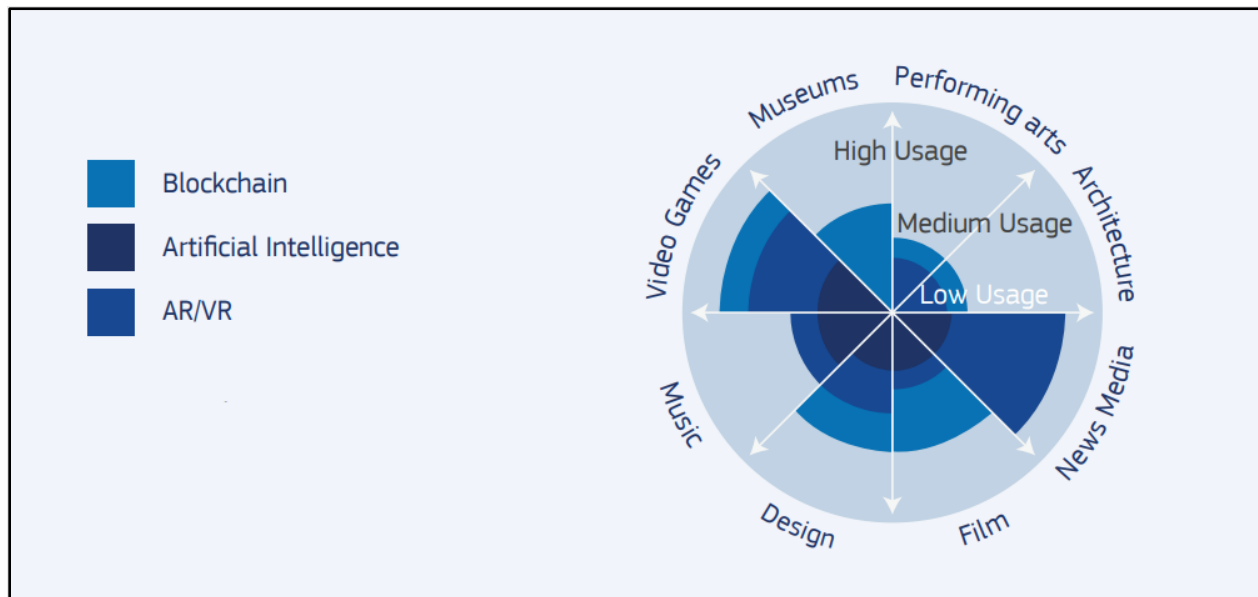[47] WhatsOnStage. (2019). "RSC, Almeida and Punchdrunk participate in government-funded immersive entertainment project." Link

Beyond foundational technologies, the emergence of advanced technologies such as artificial intelligence, machine learning, blockchain, big data is likely to further drive the digitalization of the creative economy. As a result of this inevitable shift the creative economy landscape and employment patterns will likely change. Novel products, industries, and even sectors will emerge; and the structures of various existing industries and sectors will change – positively impacting some, and endangering others.

3. The Emergence of Disruptive Technologies

Creative economy sectors are increasingly being transformed by the emergence of advanced technologies like Artificial Intelligence (AI), Cloud and Blockchain technologies, and Augmented and Virtual Reality (AR/VR). *Figure 9* displays an assessment of the level of technological adoption across different sectors of the creative economy. The diffusion of these disruptive technologies has begun to shape the sector and will affect the types of new jobs that will emerge and the skills that will be needed.

Figure 9: Use Cases of Advanced Technologies Across Creative Industries

Source: Technopolis Group, 2022 (based on assessment of use cases)

3.1 Artificial Intelligence

Artificial intelligence (AI) is a computerized system that can think and act like humans. It designates "the science and engineering of making machines intelligent, especially intelligent computer programs,"[48] [49] with intelligence defined by the AI100 Panel at Stanford University as "that quality that enables an entity to function appropriately and with foresight in its environment."[50] [51] Simply put, AI is a series of

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[48] Definition attributed to Professor John McCarthy in 1956. Quoted in Moor, James. 2006
[49] Moor, James. (2006). "The Dartmouth College Artificial Intelligence Conference: The Next Fifty Years." AI Magazine, Volume 27 Number 4, pp 87–91. Link
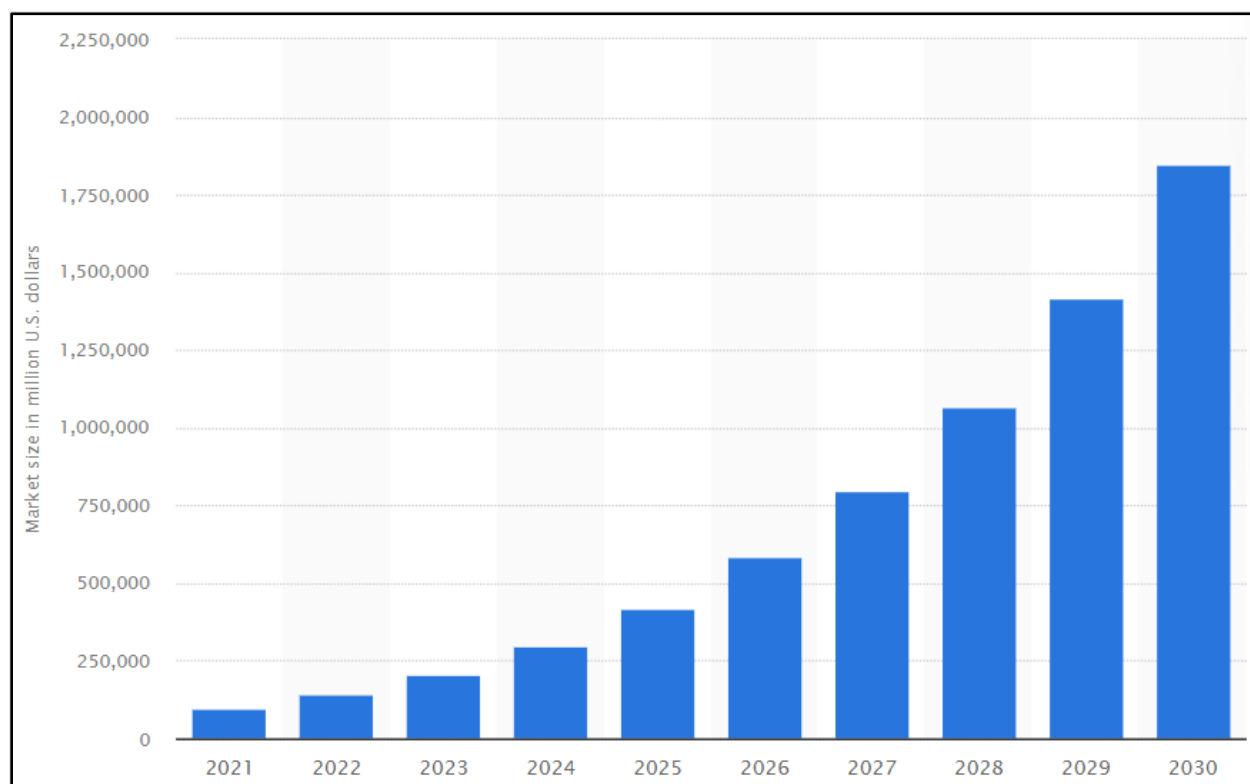[50] Definition attributed to Professor John McCarthy in 1956. Quoted in Moor, James. 2006
[51] Ibid.

approaches, methods, and technologies that display intelligent behavior by scanning and analyzing their environments, learning from it, and taking actions in response to what they sense, as well as to human defined objectives – with some degree of autonomy – to achieve specific targets that can improve the provision of services.[52]

The list of new AI applications grows every day, and with them new opportunities in the creative sectors.[53] 75% of the companies, globally, are looking to adopt and integrate some version of this technology.[54] The music industry, for instance, is using AI not only for the distribution of music but also as a tool for automated production (of music). AI powered, optimization engines, such as Spotify and Apple Music, use implicit information such as user interaction, song similarity, and natural language processing to recommend, and at times create and recreate songs. In 2020, AI-powered music streams on Spotify surpassed 1.9 billion hours, indicating the consumption of musical content created by AI.

Figure 10: Market Size of AI, globally (2021 – 2030)[55]

Source: Statista, 2023

Similarly, the processes that make up part of the film and video production, are increasingly being driven by AI and generative networks. For example, producing visuals, script writing, composing background scores, editing, and undertaking promotions.[56] A prominent example is that of *Cinelytic*, an AI

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[52] Collier, Matt, Richard Fu and Lucy Yin. (2017). "Artificial Intelligence: Healthcare's New Nervous System."

[53] The global market for AI is currently valued to be almost $136.5 billion, and is further expected to grow twentyfold by 2030, up to nearly two trillion dollars. (Grand View Research, 2023). Link.

[54] WEF. (2023). "Future of Jobs Report." Link

[55] Statista. (2023). "Artificial intelligence (AI) market size worldwide in 2021 with a forecast until 2030." Link

[56] Allerin. (2020). "Can AI Automate Film Industry" Link

driven software which can predict the value of the box office collections based on the cast for the title role.[57] Another AI-driven tool, *Scriptbook*, provides an analysis of the script, content validation and automated story generation.[58]

Beyond film and music, AI is also being employed to amplify reach of existing art collections by drawing out new interpretations and connections between collections and objects, digitizing the preservation of cultural assets and creating new dynamic and personalized user experiences. One prominent example is that of *Rijksmuseum* in Amsterdam which is using its digital collection and AI algorithm, enabling curators to link works of art and simultaneously seek connections and motifs more effectively.[59]

More generally, AI is being used to automate many routine tasks, freeing up time for creative professionals to focus on more complex and high-value work. For example, AI can be used to generate data visualizations and automated graphic designs, reducing the need for human designers to perform these tasks manually. As a result, designers are able to focus on more creative and strategic work, such as developing brand identities and creating innovative marketing campaigns. Video games, news media, visual arts and film where large amounts of data are already being collected in a digital form, are better positioned to take advantage of AI, and are increasingly doing so.

3.2 Blockchain

Blockchain is a decentralized, distributed, and public digital ledger technology that allows for secure and transparent record-keeping of transactions and data across a network of computers. Enterprise blockchains can develop across industry supply chains with a multitude of stakeholders breaking down silos and easing administrative procedures, showcasing great value for businesses. Blockchain technology is forecasted to generate an annual business value of more than $3 trillion by 2030.[60] Across creative industries and sectors, blockchain technology is being used to address challenges with copyright management, royalty tracking, digital rights, provenance verification, fundraising and micropayment. *(Figure 11)*.

Blockchain can be leveraged to address some of the major challenges that creative professionals face, such as piracy and establishing intellectual property. Blockchain technology offers the means to evidence ownership at reduced cost. By storing digital fingerprints or unique identifiers of creative content on a blockchain, creators can demonstrate the existence of their work at a specific point in time. This immutable record can serve as evidence in copyright disputes, helping protect intellectual property rights. A prominent use-case example is that of NFTs, or non-fungible tokens, which are unique files that live on a blockchain and are able to verify ownership of a work of digital art. In 2021, digital artist, Mike Winkelmann, sold an NFT artwork for $69 million, showcasing the potential of blockchain-based digital asset ownership and trading.[61]

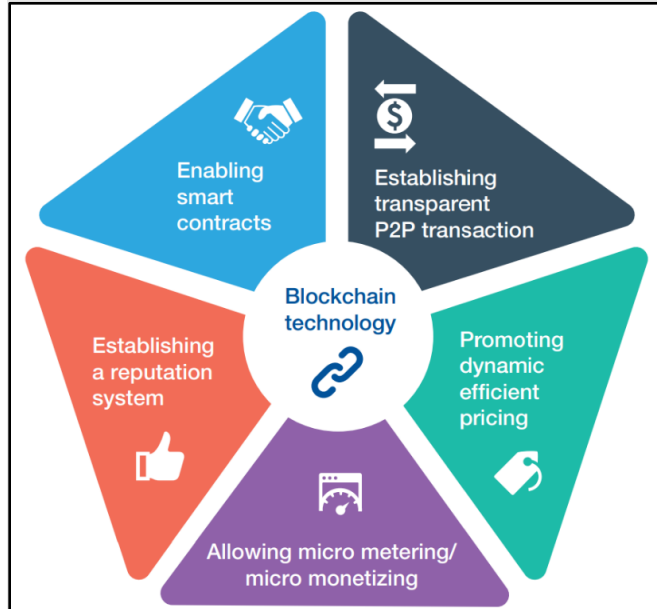[57] The Verge. (2019). "Hollywood is quietly using AI to help decide which movies to make." Link
[58] Scriptbook. Link

[59] Technological trends in the creatives industries – European Commission
[60] PwC. (2018). "Blockchain is Here. What is Your Next Move? PwC's Global Blockchain Survey 2018."
[61] The Verge. (2021). "Beeple sold an NFT for $69 million." Link

Figure 11: Blockchain and the Creative Economy

Source: World Economic Forum, 2018.

Mediachain, is one example of a blockchain technology, that provides a decentralized solution for copyright attribution and metadata management for digital content, enabling creators to assert their ownership and receive fair compensation. Similarly, *Verisart* is another platform that uses blockchain to verify and certify the authenticity of artwork, by assigning a unique digital certificate (recorded on blockchain) and providing a secure and immutable record of its origin and ownership history.

Another problem closely associated with copyright infringement is that of counterfeiting. It has been hugely detrimental to the growth of the fashion industry. With access to blockchain technology, fashion startups have begun experimenting with decentralized databases that securely store, and exchange data related to new products and designs.[62] This ensures a secure way to buy, collect, sell, and recycle original products, that could help more growth and investment in the sector.

The film industry is exploring block chain solutions to support protection and royalty payments for artists and creatives across the film lifecycle. Smart contracts, which are self-executing agreements built on blockchain, can be programmed to automatically distribute royalties to creators when their work is used or sold. This eliminates intermediaries and ensures fair compensation for creative professionals, reducing the complexity and costs associated with traditional royalty collection and distribution systems. *Ujo Music* leverages blockchain to enable direct music distribution and transparent royalty payments. It facilitates smart contract-based licensing and royalty tracking, ensuring fair compensation for musicians and rights holders.

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[62] Satoshi Studio. Link

Furthermore, blockchain technology could help address financing issues that participants in the creative economy tend to grapple with *(detailed in Box 2).* Blockchain technology can enable frictionless micropayments and peer-to-peer transactions. With blockchain-based cryptocurrencies or tokens, creators can directly monetize their work by selling it to consumers without relying on traditional payment systems or intermediaries. This opens new avenues of financial engagement, especially for unbanked, informal participants, supporting the generation of new revenue streams and eliminating unnecessary transaction fees, fostering direct interactions between creators and consumers.

Box 2: AI and Blockchain Technologies could help address access to finance

A major challenge for businesses in the creative economy is the lack of access to finance. Micro and small businesses or sole traders often do not have the data or financial records required to prove their creditworthiness, and face difficulties in securing loans or other financing options. Additionally, high levels of informality and seasonality of cashflow or lack of collateral exacerbates barriers to accessing finance.

The artisan (or handicrafts) sector, operates mostly the informal economy, employing more than 300 million people[1] out of the 2 billion who work in the global informal economy. It is one of the primary means of employment for women globally, and people in, rural areas. However, most artisans rely on informal financing channels which impedes their growth and incomes. Similarly, people in performing arts, or those associated with tourism, have variable income streams that fluctuate seasonally. Others, tend to produce and have intangible assets such as intellectual property which are not easily valued or monetized. Given such characteristics, creative industries are often viewed by traditional lenders as "high-risk."

While creative industries have received support from DFIs and central banks through specialized financing facilities, there still appears to be a large financing gap. On the supply side, traditionally available sources of funding for the CI have been limited to government funding programs, Corporate Social Investments (CSI) from the private sector, venture debt/capital, which have not been commensurate with, nor adapted to the financing needs of the industry. Financial service providers are wary of lending to the creative sector because of (i) perceived higher risk of the sector, informality and unstable cashflows; (ii) inadequate knowledge of the creative industries given the novelty of the sector; (iii) inadequate credit and risk framework/tools to evaluate/manage creative industries risk; and (iv) underdeveloped financial products to reach participants in the creative economy[1].

Furthermore, the financing needs of participants can also vary, for example, actors in the creation stage, including artists and designers, tend to require venture debt type of financing and smaller loans while actors in production stage, such as artisans, tailors, and music publishers, need working capital financing, invoice/purchase order financing, and asset financing/leasing to develop and expand their businesses.

Artificial Intelligence

Traditional financing often relies on credit scores and collateral, which is not readily available for many creative economy participants. AI algorithms can analyze non-traditional data sources, such as mobile-money transaction data, text messages, social media activity, online presence, and digital footprints,

to assess creditworthiness and risk profiles. This reduces information asymmetry and enables lenders to make informed lending decisions. An example of this approach is Lending Club, a peer-to-peer lending platform that utilized AI algorithms to assess borrower's creditworthiness by leveraging alternative data sources and extending loans to creative economy participants based on their potential rather than traditional credit scores.

Furthermore, AI-powered predictive analytics models can assess the market viability or potential ROI of creative projects by analyzing historical data, market trends, and audience preferences. Various other uses of AI include automating financing processes, enabling tokenization and crowdfunding platforms, offering data-driven investment insights, and providing financial education and guidance. Such applications of AI help bridge the gap and create more opportunities for financial inclusion within the creative economy.

Blockchain

Blockchain technology has facilitated the emergence of crowdfunding platforms and Initial Coin Offerings (ICOs) as an alternative source to raise funds in place of traditional finance. These applications (based on blockchain) enable creators to raise funds for their projects directly from supporters. Blockchain-based crowdfunding provides transparent and auditable records of contributions, ensuring accountability and enabling supporters to become stakeholders through tokenization.

For instance, Singular DTV – a blockchain-based solution for entertainment rights, royalties' management, and payment processing – combines blockchain and smart contracts to enable the tokenization of creative projects, such as films and TV shows. It allows creators to raise funds through Initial Coin Offerings (ICOs) and distributes revenue directly to token holders.

Similarly, to address the challenges that small and medium sized enterprises (SMEs) face in accessing finance, IBM has created micro-loans for SMEs in Kenya, using blockchain technology to manage the entire lending process from application to accepting the terms and repayment. The entire lending process occurs through mobile phone and is automatically directed towards working capital. As of April 2018, IBM managed to process more than 220 micro-loans of $30 on average. This system increases the transparency and efficiency of the lending process and of the money usage. This pilot case was successful as even beneficiaries with limited IT literacy managed to properly conduct every required transaction.[1]

Furthermore, blockchain-based decentralized finance (DeFi) platforms can provide alternative financing options for artists and creators. These platforms facilitate peer-to-peer lending, crowdfunding, and investment opportunities without the need for intermediaries. AI algorithms can assist in risk assessment, credit scoring, and matching investors with suitable projects or creators.
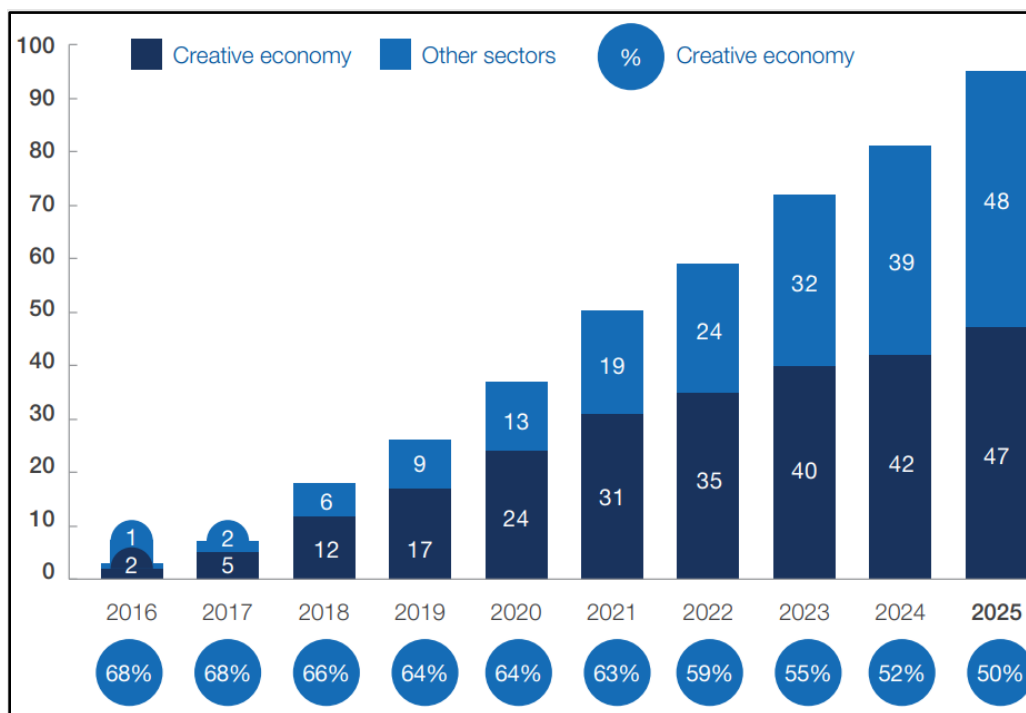
3.3 Augmented and Virtual Reality

Augmented reality (AR) and virtual reality (VR) are two of the most recent disruptive technologies in the creative sectors. They tend to create immersive and interactive experiences by blending or replacing

the real world with virtual elements. While they both involve computer-generated content, they differ in their level of immersion and the way users interact with them. Augmented reality overlays digital information or virtual objects onto the real-world environment, while Virtual Reality creates a completely computer-generated virtual environment that users can interact with and explore.

Both AR and VR have evolved rapidly in recent years, finding their use and application across various industries and sectors. In 2020, the number of AR users worldwide reached $598.5 million and is further projected to grow to $1.73 billion by 2024.[63] The number of VR users worldwide grew to over 171 million in 2022 and has been the source of 23 million jobs.[64] Furthermore, the global market size for AR and VR is projected to reach $95 billion by 2025, growing at a CGAR of 25.3%, with almost 50% attributed to the creative economy (*Figure 12*).[65] This rapid growth can be attributed to the fact that AR and VR offer unique opportunities for humans to interact with digital content and the physical world through storytelling, interactive experiences, training simulations, design visualization, virtual tours, and much more.

Figure 12: Projected VR/AR Growth, 2016 – 2025 (Revenue, $ billion)[66]

Source: Data from Goldman Sachs

Creative sectors are being impacted by the emergence of AR and VR. For example, the global VR gaming market revenue is projected to reach $27.09 billion by 2025, driven by the increasing adoption of VR headsets and immersive gaming experiences. In 2015, the United States accounted for the largest revenue share in AR/VR in gaming, however, China has now emerged as the leader in market capitalization,

[63] Statista. (2022). "Number of mobile augmented reality (AR) active user devices worldwide from 2019 to 2024." Link
[64] Academy of Animated Art. (2023). Virtual Reality Statistics: The Ultimate List in 2023." Link
[65] Goldman Sachs. (2016). "Augmented reality starts to liven up the VR/AR market." Link;
Markets and Markets. (2022). "Augmented Reality and Virtual Reality Market." Link
[66] WEF. (2018). "Creative Disruption: The impact of emerging technologies on the creative economy." Link
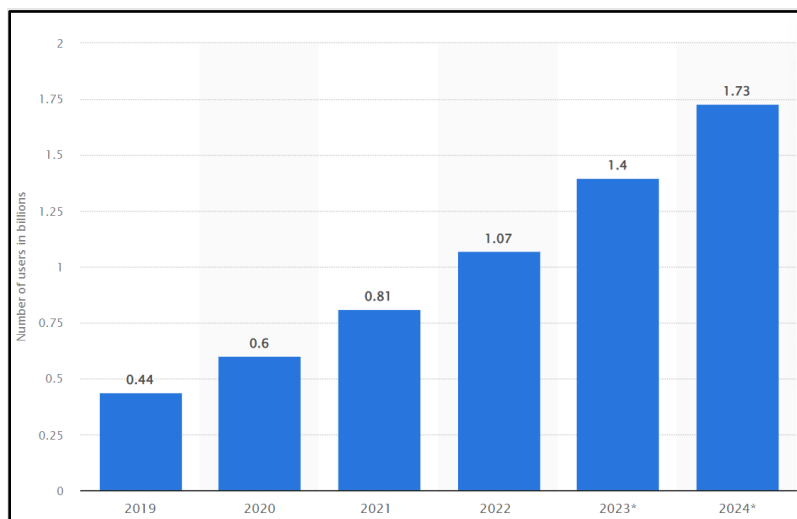
globally, and as one the key regional markets, in Asia,[67] reflective of the sectors acceptance and adoption across regions.

Museums, art exhibitions, and live games and performances (such as theatre or music), as well as film, media, and design industries are also impacted by AR/VR – offering the possibility of new immersive experiences. These technologies are blurring the line between reality and virtuality, captivating audiences, and offering new revenue streams for the creative economy.

AR and VR offer new avenues for creative expression, enabling designers, artists, and architects to immerse audiences in interactive and immersive experiences. AR and VR have contributed to the creation of virtual artworks such as NFT Art,[68] 3D sculptures, interactive installations, and immersive storytelling that transcend traditional mediums. These technologies have both allowed and nudged creators to push the boundaries of their imagination and engage audiences in novel ways. Architects are using AR to overlay virtual prototypes onto physical spaces, and VR to create virtual walkthroughs and flythroughs of architectural designs, which has revolutionized client engagement. Clients are now able to experience the physical outlook of a place yet to be constructed, virtually, and provide feedback on proposed spaces and structures.

The visual arts and design industry is experiencing a similar form of transformation. Artists are leveraging VR tools to create virtual galleries, showcasing their work to a global audience without physical limitations. Similarly, AR and VR are being utilized to enhance tourism experiences and preserve cultural heritage. AR applications can overlay historical information, virtual tour guides, and interactive elements onto physical landmarks, enriching visitors' understanding and engagement – and implicitly promote cultural exchange, heritage preservation, and tourism revenue in the creative economy.

Figure 13: Number of Mobile (AR) active user devices worldwide from 2019 to 2024[69]

Source: Statista, 2022.

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[67] ARVR Tech. Link

[68] NFTs represents a unique piece of art or digital content that can be bought, sold, and owned by individuals on a blockchain platform. NFT art has gained significant attention in the art world due to its ability to establish provenance, ownership, and scarcity in the digital realm.

[69] Statista. (2022). "Number of mobile augmented reality (AR) active user devices worldwide from 2019 to 2024" Link

As AR and VR evolve and are adopted by the industry newer jobs and roles will emerge. These roles are likely to be related to both the technical aspects of AR and VR development such as those related to user-experience (UX) design, research and development (R&D), content creation, and training and education, as well as to those that fit within the newly adapted value-chain of creative economy industries that leverage AR and WR technologies, such as gaming, entertainment, architecture, etc.

4. Digital Skills - Becoming Foundational

The rapidly evolving nature of technology, and its adoption, calls for the need to upskill and reskill creative professionals. Like many other industries, creative economy is at the precipice of technological transformation with new methods of creation, production, distribution, and access along the horizontal and vertical components of their value-chains. There is demand for not only professionals with existing digital skills (such as data analysts, computer scientists, robotic engineers, etc.) but also an increasing need for creatives to equip themselves with the working knowledge of various technologies. IADB's Creative Tech Lab is one example that helps create an ecosystem conducive to digital skills development and growth *(see Case Study).*

However, it is important to be aware of the gaps in basic digital skills, first. According to the International Telecommunication Union (ITU), less than half the population have basic computer skills, such as copying file a file or sending an email with an attachment, across 40% of the countries analyzed.[70] The relatively low level of skills at the country level, is in stark contrast to their respective share of overall Internet use, i.e., 86%. This gap between individuals using the internet and those with digital skills demonstrates that many may be using the internet without being able to fully benefit from it, indicating that lower levels of digital skills remain a barrier to meaningful participation in the digital society – a gap that governments will need to address if they are to successfully support and promote the creative economy, as well as effectively protect the diversity of cultural expressions in the digital environment.
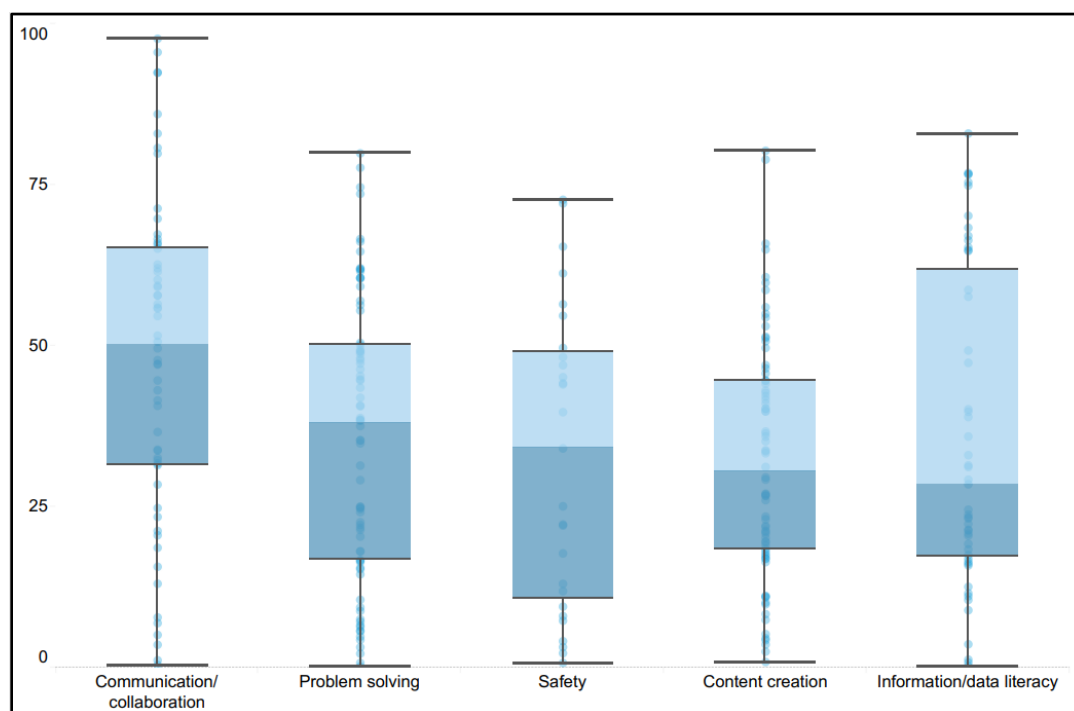
Beyond acquiring basic digital literacy and skills, the growth of the creative economy is also contingent upon employing professionals who possess advanced knowledge of disruptive technologies. A snapshot of professionals with technology-oriented roles working in the creative economy space across the 27 European Union countries reveals that AR/VR, cloud computing, and AI are three of the most in-demand and sought after technological advanced skills.[71] The findings are derived by analyzing *LinkedIn* data, taking into account registered professionals on *LinkedIn*, their designations, and industry, to illustrate the supply of professionals with advanced technological that are most active in various sectors that are part of the creative economy.[72] *Figure 15*, below presents the share of professionals employed in the creative economy as a percentage of all advanced technology skilled professionals in the industry.

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[70] This is based on 78 countries that submit data across five categories analyzed by ITU. These five categories are: Communication, Problem Solving, Safety, Content Creation, and Information/Data Literacy.

[71] European Commission. (2021). "Advanced Technologies for Industry – Sectoral Watch: Technological trends in the creative industries." Link

[72] The full methodology of the LinkedIn analysis is available: https://ati.ec.europa.eu/reports/eu- reports/advanced-technologies-industry-methodologicalreport
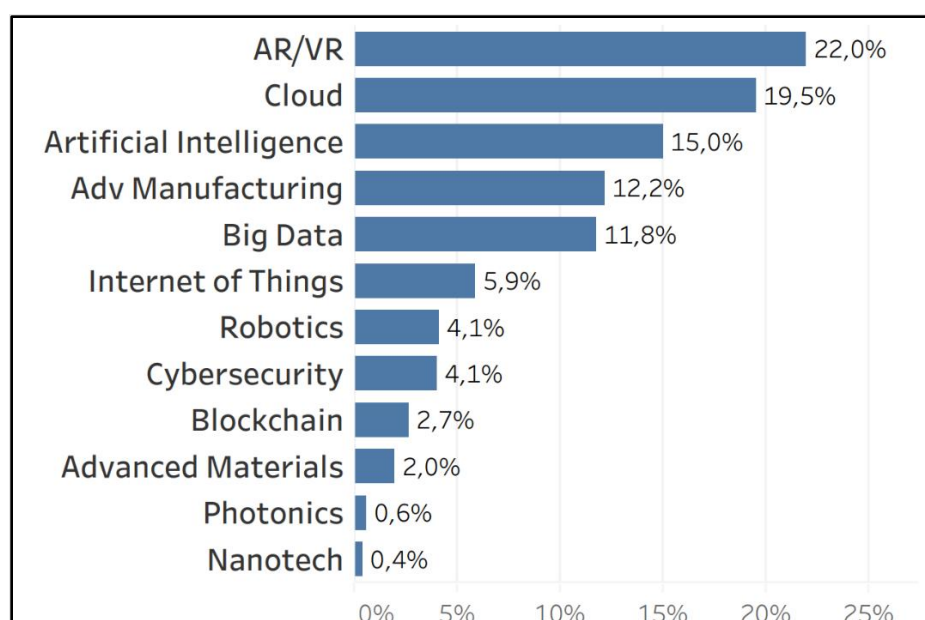
Figure 14: Percentage of Individuals with ICT Skills, by Type of Skill (2019 – 2021)[73]

Source: ITU, 2022.
Note: Bars indicate the 25th, median and 75th%ile of all country values. Bottom and top lines indicate minimum and maximum values. Data availability: 58 countries for communication/collaboration, 78 countries for problem solving, 27 countries for safety, 76 countries for content creation, and 51 countries for information/data literacy. In-scope ages may vary between countries.

Figure 15: Share in Total Advanced Technology Skilled

[73] ITU. (2022). "Low levels of ICT skills hamper progress to universal and meaningful connectivity." Link

Digital Literacy

Digital literacy forms the foundation for all other digital skills. It includes the ability to understand and navigate digital technologies, including basic hardware, software, and online platforms. As the different sectors related to creative economy integrate with the digital economy, creative professionals – from music composers to writers to artisans – must develop a robust understanding and working knowledge of digital tools, interfaces, and workflows to effectively harness technology's potential. Otherwise, this is likely to exacerbate a gap between the high-skilled and low-skilled creators. Some key areas related to digital literacy for creative professionals include, but are not limited to:

- **Digital tools and software:** This includes graphic design software (e.g., Adobe Creative Suite), video editing software (e.g., Adobe Premiere Pro), 3D modeling software (e.g., Autodesk Maya), and audio editing software (e.g., Ableton Live). A strong command of these tools allows artists, designers, and creators to bring their ideas to life and produce high-quality, professional work.

- **Online presence and branding:** It involves creating and managing websites, portfolios, and social media profiles to showcase work, connect with potential clients or collaborators, and build a personal brand. Understanding strategies for effective online branding, search engine optimization (SEO), and social media marketing is vital for creative professionals to enhance their visibility and attract opportunities.

- **Digital content creation:** This includes developing skills in photography, videography, writing, and storytelling for digital platforms. Understanding the nuances of content creation for different digital channels, such as social media, websites, and blogs, allows creative professionals to engage their audience effectively and communicate their message or story in a captivating manner.

- **E-commerce and digital sales:** The ability to leverage e-commerce platforms and conduct digital sales is crucial for artists, designers, and creators to monetize their work. Understanding online marketplaces, e-commerce platforms, and payment gateways allows creative professionals to sell their products, artworks, or services directly to customers worldwide. This aspect of digital literacy enables artists to bypass traditional distribution channels and have direct control over their sales and revenue generation.

- **Other areas,** albeit a little advanced, involve knowledge of intellectual property rights and copyright laws, data analysis and audience insights, cybersecurity, online safety, and more.

Augmented and virtual reality relevant skills

The technologies and skills associated with the use of augmented and virtual reality (AR/VR) products are some of the most relevant to creative economy. Some of the key digital skills and areas of engagement include:

- **Programming language and skills**: A prerequisite for the functioning of any advanced technology is knowledge of the script and language upon which the technology's use-case is built and formulated. Skills in scripting and programming languages such as Java, C# or C++ are crucial for

Case Study 3: Fast tracking careers in the South African animation industry

"Grow your business from four to twenty employees in one year during the pandemic". This became an outstanding reality for the [Katanimate Animation Studio](#) that participated in the Covid-Relief program which was co-developed by the industry association Animation SA* and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)**. The program connected unemployed young professionals with animation companies in need of extra staff during COVID-19. It aimed to provide valuable on-the-job training while helping struggling businesses stabilise, increase production capacity, and develop intellectual property to provide more resilient revenue streams. And thereby initiated the success story of Katanimate animation studio.

Background

Due to the covid crisis, South African animation companies, particularly the smaller ones working mainly as service providers, had lost significant revenue as marketing budgets were cut in the face of a collapsing retail sector. Government systems, supporting work experience programs in South Africa, were unable to keep up with the demand. This led to newly graduated students and junior employees missing out on valuable work experience opportunities due to budget cuts and last-in-first-out workplace policies. This was a huge loss given that the most useful training happens on the job and a proven track record of practical work experience is often worth more than a formal degree. Small companies bear the costs of training and salaries of junior staff, regardless of their education, until such time as they become productive staff members.

A relief program for the new normal

Considering these challenges, Animation SA and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) co-developed a Covid-Relief program as part of the project Cultural and Creative Industries. The Covid-Relief program piloted the placement of unemployed young professionals with animation companies that needed additional support staff and who could offer valuable work experience in return.

Following a call for applications, the Animation SA board, and GIZ established a rigorous needs-based selection process. The professionals, freelancers and graduates were matched with micro, small and medium sized enterprises who required specific skilled support for their projects. The program ran for a period of five months from November 2021 to March 2022. During this time, Animation SA was successful in placing 40 unemployed, skilled workers with 14 animation studios in the provinces of Gauteng, Western Cape and KwaZulu-Natal. A win-win situation for companies and workers. In addition to professional HR counselling, Animation SA offered participating companies and employees a web portal to share knowledge and resources.

Mission Possible!

Within a very short implementation period, the Animation SA Covid Relief Program was able to create 17 jobs within the first six month of the program and helped 14 businesses survive during times of crisis. The program was particularly successful because it responded quickly to community needs and intervened where necessary. One year on, it was discovered that one of the animation studios

(Katanimate) has created a further 14 jobs as a direct result of the Covid-Relief-Program, with two of the juniors who participated in the program now in team lead positions.

The Animation SA support mechanism combined skills- and enterprise development with fostering a conducive business environment. It demonstrated that a multifaceted approach is not only possible but can be effective too. Due to the success of the first program, a second program for another 20 young professionals started in October 2022.

***Established in 2006, Animation SA is South Africa's animation industry association. Animation SA represents the interests of animation and gaming professionals and offers several value-add services to their members.

**GIZ is providing support to Animation SA to strengthen their internal capacity as an industry association, further develop services to members and broaden Animation SA's role and capacity for advocacy and lobbying work on behalf of the industry.

implementing interactivity, physics simulations, and user interactions within AR and VR environments.

- **3D Modeling and Animation:** This involves having proficiency in software such as Autodesk Maya, Blender, or Cinema 4D that enables creative users to active in the space to develop realistic, stylized 3D assets that enhance the immersive nature of AR and VR projects. This is a mandatory knowledge and skill, required for designing captivating visual elements and bringing them to life through animations.

- **User Experience (UX) Design**: UX design skills specific to AR and VR involve understanding spatial design principles, designing clear and intuitive navigational elements, and creating comfortable and immersive user experiences with the intended objective to enhance accessibility, as well as aesthetics. These skills are not only in demand, but an imperative to ensure and expand user engagement. UX designers must consider factors such as user movement, virtual object placement, and interaction mechanics to optimize user engagement and satisfaction.

Artificial Intelligence, Machine Learning, and Big Data

A recent report by the *World Economic Forum (WEF)[74], which analyses the skills needed for work amidst the ongoing technological revolution, ranks AI and big data as the 15th core skill for mass employment today. Training workers to utilize AI and big data ranks as one of the top three skills-training priorities in company strategies from now until 2027, and the topmost priority for companies with more than 50,000 employees. Being able to navigate the complex world of AI, ranging from building self-automated and decision-making programs, to constructing big data repositories and banks, requires high levels of technical competencies.

Some specific AI skills that are crucial for and being used in the creative economy include:

- **Generative Adversarial Networks (GANs):** GANs involve training two neural networks, a generator, and a discriminator, to generate synthetic content that closely resembles real data.

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[74] WEF. (2020). "The Future of Jobs Report." Link

Technical skilled professionals active in the creative economy space can leverage GANs to generate realistic images, videos, or other forms of media. For instance, GANs can be employed to create computer-generated characters, architectural designs, or generate unique and innovative visual art.

- **Machine Learning and Neural Networks:** These involve training complex neural networks to recognize patterns and make predictions. Creative professionals can use machine learning algorithms to analyze large datasets, automate tasks, and develop AI-powered applications that enhance artistic creation. For example, machine learning can be applied in image recognition, music composition, or natural language processing tasks.

- **Natural Language Processing (NLP):** Proficiency in NLP is valuable for content creation, analysis, and optimization in the creative economy. It encompasses processing and understanding human language, enabling AI systems to extract insights, generate text, and facilitate communication, which creative professionals can leverage to automate content generation, undertake sentiment analysis of social media comments, or formulate chat-based interactive storytelling experiences.

- **Data Analytics and Insights:** Possessing the skill to analyze data, can enable creative professionals can use AI tools and techniques to analyze audience data, engagement metrics, and market trends to inform decision-making, content creation, and marketing strategies. By employing AI-driven data analytics, creative practitioners can gain a deep understanding of their target audience, optimize content, and tailor their offerings to meet evolving demands.

- **Other skills** within AI involve building recommendations systems, computer vision and image analysis, and more.

The expected gains from the creative economy can only be realized if accompanied with reskilling and upskilling of youth to align with the technological needs of creative economy solutions.

Case Study 4: IADB's Creative Tech Lab

Background

The Creative Tech Lab (CTL), an IADB initiative, is an open collaboration tool that serves as a platform to bring together different individuals interested in designing the future of the creative industries. The CTL supports innovation and entrepreneurship ecosystems by (i) getting the right people together (such as artists, technologists, entrepreneurs, investors, policymakers, influencers and civic leaders) in order to (ii) collaborate, experiment, and prototype innovative solutions that (iii) solve problems faced by the creative industries and (iv) grow creative enterprises (i.e. creating new, innovative outputs and improving productivity and growth amongst creative entrepreneurs and creative firms).

The CTL was first implemented in 2019, in Jamaica. IDB's Competitiveness, Technology, and Innovation Division (CTI) piloted and brought on board 45 competitively selected individuals (25 male and 20 female) from Bahamas, Jamaica, Suriname, and Guyana. This was the very first time in the Caribbean, that developers (i.e., coders and web designers) teamed up with creative artists (in this case, musicians) to partake in an engaging four-session design sprint aimed at addressing musicians' compensation and monetization of intellectual property.

In 2020, the CTL was implemented in Haiti. It involved approximately 100 hours of online information sessions (regarding design thinking, data science, augmented reality, among others) and prototype building days. It included partners such as Facebook, Google, local Government, and the American Chamber of Commerce (which financed a 3-month incubation for the 4 finalist teams). Similarly, in 2021, it was implemented in Trinidad and Tobago. This CTL aimed to connect creatives and developers and stimulate innovation and creativity that would lead to the co-creation of innovative online carnival experiences that support the digital economy of Trinidad and Tobago.

Key Lessons Learned

Explore more relevant topics: It is important to create frameworks for the selection of topics or crowdsourcing to identify the needs of the Creative Sector in each region before engaging with a CTL bootcamp.

Need more integrated ecosystem participation: Host institutions need to have an ecosystem approach and show convening power and incentives to leverage CTL as a tool to engage the entire creative ecosystem when organizing a bootcamp in their locality; these include government, funding, universities, entrepreneurs, and corporates.

Lack of Support for Startups: Include stronger business trainings and go to market testing in the bootcamp programs. Identify incubator partners from the beginning to provide follow up support after the bootcamps. Make sure funding opportunities are accessible after the lab.

5. Challenges and Risks with the Adoption of Disruptive Tech

The impact of most technologies on jobs is expected to be net positive,[75] however, this adoption and transition does not come without associated risks and challenges. These transformations raise critical questions about existing inequalities in the access to and use of technology, ethical design of these technologies, data and privacy protection codes, monopolization of economic impacts, and the ambit of human-machine interaction within the creative process, itself.

5.1 Ethical Design

The ethics of technology are multifaceted and include principles of ownership and usage. Using these technologies risks exacerbating existing inequalities, not just in the creation of cultural content, but also in the business models for cultural and creative value chains by tilting the balance in favor of larger establishments; raising concerns about potentially oligopolistic behavior— with the market dominated by a few big players.

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[75] WEF. (2023). "Future of Jobs Report 2023." Link

Additionally, awareness about the technology's strategic importance raises concerns about its ability to make impactful decisions in a fair and transparent manner, while being cognizant of human values associated with the problem being tackled.[76] Given that AI is as good as the quality of data, inherent biases in source data present a plausible cause for concern. Such limitations perpetuate risks regarding the governance of AI's and usage mechanisms. Closely related is the use of AI in the creative process, which too, raises important technical challenges including limited data resources, management, and ownership. The success of deploying AI in the creative industries is dependent on the availability of high quality and trustworthy data, therefore access to such data is especially crucial for participants that do not have the resources to develop or access large data sets. Resultantly, creative businesses with ready access to well-organized data will face lower barriers to maximize the use and potential of AI, in comparison to those who lack resources, and thereby impact equity across markets.

Similarly, there are concerns about a lack of standardization and interoperability across blockchain systems, as well as associated regulatory uncertainty. One governance challenge, which is highly relevant to creative industries, is copyright and fair use. It remains unclear as to how human copyright owners will be compensated in domains where AI learns and produces output based on their work. This can also pose a problem with adoption, in case companies become too averse to be investing in AI given plausible legal complications regarding ownership.

Importantly, concerns about AI-powered automation and its potential threat to employment have only added to wariness about the technology. Using AI to automate tasks may threaten to replace certain categories of workers, including in industries that drive economic development. As per estimates by the *McKinsey Global Institute*, work activities equivalent to 15% (400 million) of full-time employees could be automated by 2030.[77] If key activities in the value chain (such as creation, distribution, marketing and so forth) are taken over by AI-enabled machines, there is a potential cost in terms of human jobs, talent, and innovation in the cultural and creative industries. As a result, there is a widely held desire for greater transparency and accountability regarding AI technologies, including a call for agreed ethical guidelines for their implementation.[78] Along those lines, AI data storage systems need to be able to provide more safeguards in terms of reliability, accessibility, scalability, and affordability.[79]

Box 3: Hollywood Strike Against AI: A Case of Human versus Machines

Hollywood screenwriters, supported by actors and other creative professional from the industry, secured significant guardrails against the use of artificial intelligence in one of the first major labor battles over generative AI in the workplace. During the walkout strike which lasted almost five months and ended on October 2023, no issue resonated more than the use of AI in script writing. The threat of AI vividly cast the writers' plight as a human-versus-machine clash, with widespread implications for other industries facing a radically new kind of automation.

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[76] Rossi, Francesca. 2019.
[77] McKinsey. (2017). "Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages." Link
[78] In June 2019, the G20 adopted human-centered AI Principles that draw from the OECD AI Principles.
[79] Mamoshina, P. et al. (2017). "Converging Blockchain and NextGeneration Artificial Intelligence Technologies to Decentralize and Accelerate Biomedical Research and Healthcare. Oncotarget. Vol. 9, No. 5, pp. 5665–5690.

It is imperative for governments, as well as the private sector and industries part of the creative economy to be aware of the associated risks and challenges with technology adoption. The evolution of technology will change labor demand for creative workers, and also the nature of work, but the effects will be felt differently across economies depending on the country's level of income, development, digitalization, and regulatory landscape.

5.2 Digital Gender Divide

As companies shift toward digitalization, it is important for them to ensure that digital solutions do not marginalize underserved groups such as women. As a result of the increasingly recognized "digital gender divide", women face barriers in their access to technology that limit their ability to participate in economic activities at the same rate as men *(Figure 16).* First, women are less likely to own devices such as mobile phones and tablets or have access to the Internet. Even when women do own a digital device, the high cost of using mobile Internet remains a major barrier to their connectivity. The Alliance for Affordable Internet (A4AI) estimates that buying 1 gigabyte (GB) of data in Africa cost over 7% of an individual's average monthly income.[80] In some countries, 1GB of data cost as much as 20% of the average salary.[81] Such high costs widen the digital gender divide. In MENA, for example, the gender gap in mobile Internet use is 20%, in sub-Saharan Africa the gap is 37%, and in South Asia it is 51%.[82] As more and more sectors of the creative economy begin to leverage digital tools and technologies, the digital gender divide may act as a disadvantage for women and limit opportunities for their participation in the creative economy.

Furthermore, the dearth of gender-disaggregated data itself presents a grave problem and a likely cause for gender biases to crawl into the design of disruptive technologies, especially AI. It can also exacerbate existing gender divides, feeding and reinforcing biases in access to financial and other services, economic opportunities, and even employment programs designed to address gender inequality in the creative economy space. Additionally, the overrepresentation of men in the tech field filters into content creation, with recommendation algorithms often trained on male-majority data. For creative economy businesses, gender-disaggregated data is a necessity where the aim is to build consumer-centric business strategies and enhance the company's value proposition to specific market segments, including the women's market.

Certain sub sectors of the creative economy expose workers to ad-hoc, and precarious working conditions, in what some scholars *term Flexploitation* or the *Casualisation* of work. This practice of transferring the risk from the employer to the employee has gradually come to dominate creative industries and was present for artists even before 'gig economy' was a market reality.[83] Lack of social and job security implies that opportunities for upskilling and upward mobility are limited, and the gender pay gap widens.[84] The informal nature of most creative work also limits the ability for policymakers to regulate labour of the industry governed mostly by word of mouth, networking, and industry gatekeepers.

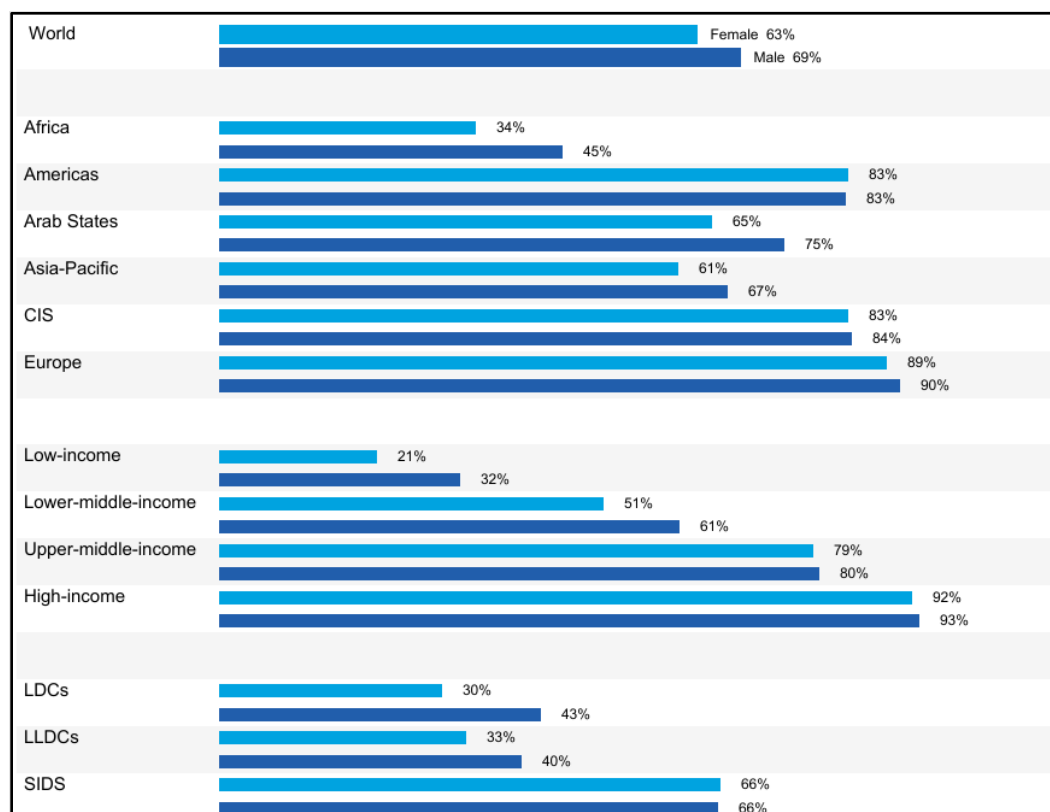[80] Alliance for Affordable Internet. (2019). "2019 Affordability Report." Link
[81] Ibid
[82] GSMA. 2020. "The Mobile Gender Gap." Link

[83] TFR. (2021). "Vulnerability of women working in the art and creative sector: recommendations for further improvement."
Link
[84] European Expert Network on Culture and Audiovisual. (2015). "Gender gaps in the Cultural and Creative Sectors." Link

Figure 16: Percentage of Female and Male Population Using the Internet, 2022

Region	Female	Male
World	Female 63%	Male 69%
Africa	34%	45%
Americas	83%	83%
Arab States	65%	75%
Asia-Pacific	61%	67%
CIS	83%	84%
Europe	89%	90%
Low-income	21%	32%
Lower-middle-income	51%	61%
Upper-middle-income	79%	80%
High-income	92%	93%
LDCs	30%	43%
LLDCs	33%	40%
SIDS	66%	66%

Source: ITU, 2022

Qualitative research on why women find it so hard to make the leap from school to work cites "hostile and robustly masculinised working cultures" as significant barriers.[85] Digital tools like social media and creative platforms have made the process of finding jobs more easier and efficient – outside the structures of agents, curators, and other intermediary actors.[86] However, these industries, due to the higher preference for the practice of "vouching" for, or homophily, tend to side-step the need for regulated digital platforms in hiring human resources. Thus, to change hiring or promotion practices, as well ensuring fair treatment and equal pay, is based on the goodwill of individual industry-leaders and the needs of the creative economy. Even more, these challenges exist alongside the political nature of the industries, where complaining or petitioning comes with great risks for future jobs opportunities and income security.

Democratising and making the industries more accessible and thus more vibrant and diverse should be of paramount importance. This can be facilitated via positive use of digital platforms (i.e., Crowd Funding), allyship and education programmes (Creative Labs, industry wide bias-sensitization for hiring and competitions), and institutional and policy-level engagement and support. Without engagement on

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[85] Allen, Kim. (2013). "What Do You Need to Make It as a Woman in This Industry? Balls!': Work Placements, Gender and the Cultural Industries." Link

[86] This practice of agents, despite costing from 15-45% of a worker's earnings, ensured good working conditions, equal pay and industry-standards to be set and upheld.

various levels, women will remain on the peripheries, both regarding the influence of their work, as well as financial and economic compensation/advancement.[87]

Case Study 5: Drone Divas - Bridging gender gaps in access to technology in South African townships

Drone Divas is a women-only drone training programme that empowers young women from townships to become successful in South Africa's male-dominated drone industry. The Goethe-Institut and Africa Beyond 4IR (AB4IR), co-developed Drone Divas as part of the project Cultural and Creative Industries.*

The four-to-six-week Drone Divas training is a collaboration between the training organisation and the private sector. It trains women on how to operate drones with applications across many creative fields such as photography, cinematography, architecture, and also agriculture, tourism, research and science. The curriculum provides hands-on training in drone operation, programming, filming, 3D modelling, and an introduction to entrepreneurship, including modules on *Design Thinking* and *Business Model Canvas*. Top ten participants are accorded a three-month internship with a company specialised in drone operation services. And of the ten first participants who completed their internship (in 2021), five received offers of permanent employment. Some lessons learnt on program design include:

- Award Remote Pilot Licences (RPLs) at the end of the course. Employers prefer candidates with RPLs, therefore this gives women the confidence to pursue a career in this male-dominated industry.
- Offer (expand) training in lesser-served provinces in South Africa Rural. Rural regions are often not as well-connected to training opportunities in digital creative disciplines than urban areas. To bridge this gap, it is advisable to offer training in lesser-served provinces in South Africa.
- Ensure greater visibility for women. Women in digital creative industries can become role models. Making their success visible can encourage other interested young women to follow in their footsteps.

5.3 Digital Divide between Developed and Developing Countries

There are concerns that advanced technologies like AI may widen the gaps between countries, reinforcing the current digital divide.[88] AI leaders (mostly in developed countries) could increase their lead in AI adoption over developing countries given better resources, capabilities, and existing digital infrastructure. Many developed countries may be more incentivized to develop their local AI industry to capture higher productivity growth as their GDP growth momentum slows (virtue of being at a higher level of development), a phenomenon which also happens to relate with aging populations, often.

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[87] Reader, Jaslyn. (2023) "Potential challenges for women in the CCI." GIZ. *To be Published*

[88] World Bank Group. 2016. "World Development Report 2016: Digital Dividends." Link

Moreover, wage rates in these economies are high, providing more incentive than in low wage developing countries to substitute labor with machines.

On the other hand, developing countries are more likely to face critical constraints to the adoption of AI solutions. This is because of a less developed digital economy, a limited entrepreneurial ecosystem capable of driving innovation and attracting financing; a scarcity of local AI expertise; and a lack of government support in key areas such as open access to data, system interoperability, trust, and acceptance of trial and error, among other factors. While basic AI applications such as credit scoring and online platforms (mobile-based or fixed) can rely on traditional connectivity like 2G, advanced AI applications such as facial and speech recognition require broadband connection to transmit bandwidth consuming files such as images and audio. Data centers are critical infrastructure for data storage and high-speed computation and parallel computing, yet they remain deficient in many emerging markets, particularly in Africa.[89]

In terms of entrepreneurial ecosystems, few emerging markets have AI startups. As of 2018, 20 countries hosted 95% of worldwide AI enterprises, and only three of them are emerging markets. China is second with 1011 AI enterprises, India is 5th with 152, and Russia is 20th with 17.[90] Furthermore, a lack of access to expertise and data often discourages private investors from pursuing AI projects in emerging markets. Scarce AI expertise in low-income countries increases the cost of implementing any AI project. Even basic connectivity – determined by internet and mobile connectivity – varies significantly, with 94% of the 'unconnected' living in low-middle income countries (LMICs).[91] Furthermore, in LMICs, adults in rural areas are still 33% less likely to use mobile internet than those living in urban areas.[92]

The digital divide has historically been driven by factors including lack of Internet access (either due to lack of infrastructure or cost), lack of basic digital literacy and lack of net neutrality,[93] and may further be reinforced with disruptive technology. Furthermore, it risks widening the gap in capacity to shape the digital environment between countries not to mention the fate of artists and cultural professionals where certain roles would be taken over by technologists. As underlined in the newly adopted *UNESCO Recommendation on the Ethics of Artificial Intelligence*, 'AI technologies can enrich cultural and creative industries, but can also lead to an increased concentration of supply of cultural content, data, markets and income in the hands of only a few actors, with potential negative implications for the diversity and pluralism of languages, media, cultural expressions, participation and equality.'[94]

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[89] IFC. (2021). "ARTIFICIAL INTELLIGENCE IN EMERGING MARKETS Opportunities, Trends, and Emerging Business Models." Link
[90] China Institute for Science and Technology Policy at Tsinghua University (CISTP). (2018). "China AI Development Report 2018." CISTP, July 2018.
[91] GSMA. (2022). "The State of Mobile Internet Connectivity 2022." Link
[92] Ibid.
[93] 'Net neutrality' refers to the need for an equal treatment of all data online, for instance by Internet Service Providers. It was established to provide fair competition for online content, promote freedom of expression and standardize transmission on the Internet. It is based on the idea that everyone – users and content providers alike – should be able to freely spread their own views, and consumers can choose which services to use and which content to consume, without the interference of governments or corporations.
[94] UNESCO. (2022). "Reshaping Policies for Creativity." Link

6. Conclusion

Disruptive technologies have the potential to create income-generating opportunities for millions of creative professionals, worldwide, and contribute to the growth of creative economy in terms of global GDP. The transformation is well underway, with many industries and sectors part of the creative economy (well outside the ICT sector), such as film, music, architecture, museums, etc. already leveraging different technologies to revamp their processes and methods and in turn maximize growth and reach. At the individual level, creative professionals are using these avenues to grow and enhance both the quality and quantity of their work.

The boundary between the creative economy and digital economy is increasingly dissipating, with the emergence of organizations which are operating across sectoral boundaries. This rapidly evolving landscape highlights the need for professionals with technologically advanced skillsets to work in industries that are part of the creative economy. Similarly, there is need for creative professionals to become more apt, digitally, to remain relevant and leverage the mediums through which creative products are created and consumed.

The transformation, however, does not come without associated risks and challenges. There are concerns about the reliability, security, scalability, and more so the inclusivity of these technologies. These concerns are compounded by lack of use-case standardization, regulatory uncertainty, accountability mechanisms, and the rapid speed at which these technologies are growing. Furthermore, the access to and use of these technologies is hugely contingent upon existing digital infrastructure which varies both within and between countries. Such disparity may fuel various divides such gender, rural-urban, skilled-unskilled, etc. and widen the gap between those who are able to benefit more than others.

There is little doubt that the emergence and adoption of disruptive technology comes with enumerated benefits for the creative economy. However, it is imperative for all participants and stakeholders to be cognizant of the pitfalls. There is need for governments and private sector players to develop a deep understanding of how disruptive technology plays out and interacts with the creative economy in order to maximize the gains it has to offer and minimize the associated negative impacts.

S4YE is a multi-stakeholder coalition that aims to provide leadership and resources for catalytic action to increase the number of young people engaged in productive work. S4YE's partners include the World Bank Group, Accenture, The Rockefeller Foundation, Mastercard Foundation, Microsoft, Plan International, International Youth Foundation (IYF), Youth Business International (YBI), RAND Corporation, the International Labour Organization (ILO), the Governments of Norway and Germany, and the UN Office of the Secretary-General's Envoy on Youth. The S4YE Secretariat is housed in the Jobs Group within the Social Protection and Jobs Global Practice at the World Bank Group. This Note does not necessarily reflect the views of the World Bank or each individual S4YE partner. For additional resources on S4YE youth employment publications, please visit: https://www.s4ye.org/s4ye-publications.