

CREATIVE INDUSTRIES

FORRESIGHT 2030



Creative Industries Foresight 2030

Sustainability
Industry 4.0

April 2020

Disclaimer

Certain information set forth in this study contains 'forward-looking information' including Creative Industries Sector economic and employment projections (collectively referred to herein as forward-looking statements). These forward-looking statements are provided to allow readers the opportunity to understand the authors' views in respect of the future so that they may use the information as one factor in decision-making.

Actual performance in future periods may differ materially from any projections and undue reliance should not be placed on them without additional verification. The forward-looking statements are based upon assumptions, and there can be no assurance that these forward-looking statements will prove to be accurate, as such statements necessarily involve unknown risks and uncertainties.

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Foreword

Today, the Creative Industries in the UK lead the world, and are at the forefront of local, regional and national economic growth. The trend is for the Creative Industries (and the ecosystem around them) to become more important to the UK economy over the coming decade, with growth rates in terms of employment and exports likely to exceed those of many other industries. The social and cultural value of the Sector is, perhaps, incalculable, and creativity is surely at a premium as the UK transitions out of the European Union (EU), and we deal with the uncertainty and fall-out caused by the COVID-19 pandemic in 2020.

The Business School for the Creative Industries at the University of the Creative Arts (UCA) is the first business school of its kind in the UK. Our courses combine creative development with business approaches, and increasingly, Sustainability and Industry 4.0 trends will feature in our education and research programmes. This study shows the extent to which Sustainability and Industry 4.0 are already having an impact on the UK Creative Industries e.g. use of artificial intelligence in fashion design, Sustainability initiatives such as BAFTA's Albert in TV and film, blockchain

for music rights protection etc. How might these trends change the Creative Industries landscape in the UK in 2030, and how policy makers should tackle the emerging issues is a pressing question.

In the lead-up to the United Nations (UN) International Year of Creative Economy for Sustainable Development in 2021, we believe that to maintain UK's status as a global player, there is a need to develop specific policies for Sustainability and Industry 4.0 in the Creative Industries that reflect the unique nature of the Sector (such as the micro and small businesses that form the backbone of the Sector). This means encouraging development of relevant capabilities and technology solutions, promoting successful business models, removing barriers to adoption, and reducing environmental impact and enhancing social value.

Hence, this Research England Strategic Priorities Fund supported study is the first report to examine the link between Sustainability and Industry 4.0 together, and what this means for policies in the Creative Industries.





Executive summary

Executive Summary

Supported by Research England's Strategic Priorities Fund, a brief foresight 2030 study was conducted between January and March 2020. The study set out to envisage what the Creative Industries in the UK might look like in 2030, and what role Sustainability and industry 4.0¹ play. Note that the study is snapshot of Sustainability and Industry 4.0 taken over three months, relying on input from desk research, two workshops and four follow-up interviews. There are a number of important general issues that the Sector faces, such as the opportunities and risks arising from EU exit, but these are out of scope of the report.

Key findings

2030 Projections

- Creative Industries set to grow faster than the rest of the UK economy reaching a Gross Value Add (GVA) of around £300bn by 2030, an increase of £180bn compared to 2020²
- By 2030 there will be over 350,000 micro, small and medium sized businesses in the Creative Industries, 95% employing fewer than 10 people
- Exports to exceed £100bn worldwide by 2030 from approximately £46bn today
- Fragmentation of the Sector in terms of diverse sub-Sectors and creative practices results in multiple, overlapping initiatives for Sustainability and Industry 4.0, and makes engaging creative businesses in policy making challenging
- CreaTech is growing 10 times faster than the Sector average and could account for nearly 40% of employment in the Creative Industries by 2030
- Technology companies more generally are entering the Creative Industries and further blurring the boundaries between sub-Sectors

Growth must be decoupled as much as possible from negative environmental effects as the footprint of the Creative Industries today is already significant. The environmental cost of fashion, for example, is well recognised, but even the shooting of a major film can produce 10,000 tonnes of Carbon Dioxide (CO₂). Meeting the UK government target of net-zero carbon emissions by 2050 requires full support from across the Sector.

Industry 4.0 technology is certain to play a major role in addressing Sustainability as well as offering exponential potential for growth and productivity

improvements. For example, Industry 4.0 technologies have led to the emergence of a new Creative Industries sub-Sector, CreaTech, at the intersection of creativity and technologies such as artificial intelligence (AI), and augmented and virtual reality (AR/VR).

Fragmentation in the Creative Industries has led to multiple, overlapping initiatives for Sustainability and industry 4.0. Particularly for Sustainability, many initiatives are driven from within a sub-Sector such as film or fashion and not as a direct response to enforcement through legislation or regulation, or industry

standards. A comprehensive review of initiatives is needed, coupled with an effective process for sharing knowledge and practices across the Sector.

Facing fragmentation, a policy approach is required that creates a situation in which creativity flourishes, rather than centralized, top-down prescriptions³.

Priority policy areas identified are shown in Box 1.

Sustainability	Industry 4.0
<ul style="list-style-type: none"> ■ Lower taxes for creative businesses that demonstrate improved Sustainability ■ Promotion of partnerships with environmental technology companies ■ Incentivising 'virtual consumption' ■ Duty of environmental responsibility on every organisation in Sector 	<ul style="list-style-type: none"> ■ Tax reliefs for all Creative Industries to assist with Industry 4.0 adoption ■ Regional and Local investment opportunities for Industry 4.0 start-ups ■ Professional education programmes for Industry 4.0 ■ A specialist visa scheme along the lines of the Global Talent Visa launched recently for research and innovation

Box1. Policy Areas

Fragmentation also makes it challenging to engage people in policy-making. Micro and small businesses currently have little or no involvement in policy-making. Hence, government support is needed to establish a new 'federation' focused on Creative Industries entrepreneurs. The Creative Industries Federation and Creative England would retain the Sector advocacy role, while this new body would focus on building capacity and capability in the Sector. Without this there is a significant risk that the entrepreneurs will not get the support they need for Sustainability and Industry 4.0 or other more general business issues that emerged such as exporting.

In addition, more young people from the Sector should be involved in policy-making, beyond what is described in the 'Well-being of Future Generations Bill'⁴. Millennial and GenZ voices are now clearly present on the global stage at the forefront of a new 'green' wave, and they

are also the most technology-literate generations. They are demanding action from all Sectors, including the Creative Industries.

There is a need to improve the fit between what the Sector needs from undergraduate, postgraduate and executive education over the next decade, and the educational and learning offerings. This applies to course content, formats and delivery e.g. 'bite sized chunks', exploiting virtual classrooms should be used as much as possible. This can commence immediately building on the increased usage of, and experimentation with, online delivery of education driven by COVID-19. Sustainability and Industry 4.0 should be embedded into all new courses and existing curricula as specific modules.

The study confirms a skill gap in the Sector that by 2030 could undermine the ability of the sector to deliver on Gross Value Added (GVA), employment and export expectations. Hence, a 2030 Creative Industries skills-map is required, including a review of managerial and executive skillsets, as well as the vocational needs of those employed within the Creative Industries and the broader ecosystem. The government should fully recognise the synergy between 'creative' subjects and Science, Technology, Engineering and Mathematics (STEM) and how this underpins the future value of the Creative Industries to the UK economy. This should include greater appreciation of the role of the Arts i.e. STEAM (Science, Technology, Engineering, *Arts* and Mathematics).

As well as the pipeline of future talent there is an immediate need to address the Sustainability and Industry 4.0 education, training and executive education needs of the two million workers in the Creative Industries today.

The 2030 scenarios developed also reveal the importance of the UK and international investment community to the Sector e.g. funding start-ups in CreaTech. However, these institutions have a poor understanding of the Sector and so should also be a priority for executive education.

The Creative Industries Sector Deal⁵ does not take a long enough perspective to support the 2030 scenarios presented in this report. The government should take the lead in developing a Creative Industries 2030 growth strategy that encompasses all national, regional and local perspectives. This strategy should update the taxonomy for the Sector to reflect the current scope of the Sector and its broader ecosystem. For example, CreaTech is not a universally recognised, discrete sub-Sector, definitions will only get more difficult as Industry 4.0 technologies converge and become embedded in creative and business processes.

Measurement of the Sector needs to be reviewed to address current challenges with measurement of the Sector in areas such the boundaries between sub-Sectors and overlap with other Sectors such as Information Technology and Communication Services. An updated measurement approach would allow for more accurate core metrics such as employment, GVA, exports, as well as providing a basis for comparisons with other Sectors and countries. To support the government's levelling up approach there is a gap in terms of being able to measure the creativity or 'creative potential' of a location, a city or a Region.

A key measurement area to address is progress on Sustainability and Industry 4.0 in the Creative Industries. There is no agreed UK or international baseline

measurement and so new Indexes or scorecards are needed to reliably monitor improvement and / or adoption of specific technologies and practices.

Afterword

The COVID-19 pandemic has shown the value of the Creative Industries is beyond its monetary value and is acting as a showcase for the ingenuity of UK creatives (e.g. 3D printing of protective equipment). Particularly during the movement restrictions imposed to contain COVID-19 many are already using Industry 4.0 technologies to be creative in new ways and to connect with audiences and consumers, and seeking new ways to monetise the technology (e.g. digital tip-jars for musicians).

2021 will be the UN International Year of Creative Economy for Sustainable Development. There will be an end to the 2020 pandemic and the harm it is causing to society as whole, and to the Creative Industries. Normality will return, or a new normal will emerge, and the Creative Industries will have a central role economically and culturally in the UK and internationally. This may be a good time to review the Sector and to take in the lessons from the legacy of Cool Britannia and Creative Britain.

Endnotes

1. “Sustainability” in this report refers to both the ‘Triple Bottom-Line’ of Sustainability (environmental, economic and social), and 17 the United Nations Sustainable Development Goals (UN SDGs). “Industry 4.0” (used interchangeably with “4th Industrial Revolution”) is used to describe smart production facilities based on technologies such as artificial intelligence (AI), the Internet of Things (IoT), and robotics and automation
2. Projections in this Executive Summary and the main document are based on publicly available data from the Department for Digital, Culture, Media and Sport (DCMS), the Creative Industries Federation, and the United Nations Conference on Trade and Development (UNCTAD)
3. This requires a wide range of interventions from creativity education for all to developing “Creative Districts” building on the concept of Innovation Districts incorporating links to Creative Hubs and Clusters, Digital and Creative at the Knowledge Transfer Network, and the investment community. This will enable the Creative Industries to deliver their full potential for inclusive, equitable and resilient growth, and support the government’s intent to level-up.
4. A Bill to make provision for requiring public bodies to act in pursuit of the environmental, social, economic and cultural well-being of the United Kingdom in a way that accords with the Future Generations principle
5. <https://www.thecreativeindustries.co.uk/media/462717/creative-industries-sector-deal-print.pdf>



Fast Forward

12mins Reading Time

Introduction

- A brief foresight 2030 study was conducted between January and March 2020 using desk research, interviews and workshops. The study set out to envisage what the Creative Industries in the UK might look like in 2030, and what role Sustainability and industry 4.0 might play. The study is snapshot of Sustainability and Industry 4.0 taken over three months, relying on input from desk research, two workshops and four follow-up interviews
- It is recognised that there are other key issues for the Sector, such as the opportunities and risks arising from EU exit, but the focus of the study and report is Sustainability and Industry 4.0
- 'Sustainability' in this report refers to both the 'Triple Bottom-Line' of Sustainability (environmental, economic and social), and 17 the United Nations Sustainable Development Goals (UN SDGs). 'Industry 4.0' (sometimes used interchangeably with '4th Industrial Revolution') is used to describe smart production facilities based on technologies such as artificial intelligence (AI), the Internet of Things (IoT), and robotics and automation
- Research for this study using Department for Digital, Culture, Media and Sport (DCMS) data from 2018 and Creative Industries Council sources prior to the COVID-19 pandemic suggests that the UK

Creative Industries were set to grow much faster than the rest of the UK economy (possibly up to three times faster), reaching a Gross Value Add (GVA) of around £300bn by 2030. This is an increase of £180bn compared to 2020 estimates and would amount to between 9 and 11% of the UK GDP in 2030

Performance

- Extrapolating from DCMS and United Nations Conference on Trade and Development (UNCTAD) data, exports of creative goods (e.g. fashion, interior design and jewellery goods) and services (e.g. technology services for the Creative Industries, film, TV, video, radio) could be expected to exceed £100bn worldwide by 2030 (from approximately £46bn today)
- There is an expectation of a lasting, positive impact on the UK's Creative Industries from the UK Industrial Strategy and the Creative Industries Sector Deal. For example, first of a kind, immersive audience experiences may result directly from the £58m investment announced in 2018 (from the Industrial Strategy Challenge Fund) for capturing new audiences with technology such as Augmented Reality (AR) and Virtual Reality (VR). Creative businesses, no matter their size and location, will have benefited from improvements in national digital infrastructure (specifically clean energy for data centres and businesses, 5G and gigabit-capable full fibre broadband to the most rural and remote locations in the UK by

2033). This is much needed, as the sharp rise in consumption of bandwidth due to the COVID-19 pandemic in 2020 is revealing. These upgrades will enable new business and operating models (e.g. rental and subscription fashion), as well as innovation in content, distribution and audience engagement

- The Creative Industries should be less vulnerable to what is sometimes called the 'Amazon effect' meaning that the lowest skilled jobs will be eliminated (increasing the number of people on benefits), with many job roles being restructured as intelligent and automated systems become more competent (suppressing wages). However, the pace of developments in Industry 4.0 is difficult to predict, and adoption even more so as it depends on levels of awareness and understanding, availability of skills to create prototype and production hardware and systems for creative content and creative workflows, and the willingness and capacity to change to new ways of working

Fragmentation

- This study estimates that by 2030 there will be over 350,000 micro-businesses and SMEs in the Creative Industries, employing over 3 million people, with more than 95% employing fewer than 10 people. Each will be impacted by Sustainability considerations and Industry 4.0 (although the extent may well be dramatically different for each).

However, the entrepreneurial and independent creatives that attended the foresight workshops had little (or no) involvement in policy-making and insufficient scale to engage in the policy-making process. The study also identifies a lack of engagement in Public Sector offerings such as the Knowledge Transfer Network (KTN), yet even the smallest businesses in the Creative Industries have a vested interest in UK R&D spend (e.g. in areas such as AI), infrastructure investments (e.g. clean energy, 5G roll-out) and social policies (e.g. creation of new creative hubs as part of levelling-upⁱ across the UK). Given the fragmentation of the industry there was also a lack of awareness of what might be happening in other verticals in the Sectors, such as market entry by technology companies

- The current policy-making process and governance relies too heavily on central government and the larger creative businesses that can afford dedicated roles aimed at engaging in the policy making process. This is not ideal given the fragmented nature of the UK Creative Industries, and not just in terms of size of business, but also geographical dispersion and nature of practice. The risk is that independent artists, creatives and entrepreneurs, who need to quickly engage with Sustainability and Industry 4.0 technologies (as well as other changes that affect the Sector such as the opportunities and risks arising from EU exit), will not get the support they need

ⁱ. The phrase 'levelling up' featured prominently in the 2019 Conservative Manifesto and is understood to mean policies that spread UK wealth to other regions of the UK and away from London

Sustainability

- The UK government has signed a target of net-zero carbon emissions by 2050 into law, becoming the first of the G7 to do so. The UK Creative Industries are set to grow much faster than the rest of the economy, and so it is essential that this growth should be decoupled as much as possible from negative effects as the footprint of the Creative Industries today is significant. During the shooting of a major movie over 50,000 plastic bottles of water might be consumed, and 10,000 tonnes of Carbon Dioxide (CO₂) is produced. Technology is certain to play a major role in addressing Sustainability challenges and, in parallel, we are living in a time when technologies such as artificial intelligence (AI) and blockchain (plus a myriad other technologies) appear to offer exponential potential for growth and productivity improvements
- The Creative Industries are already acting on Sustainability but it is highly fragmented. Many of the initiatives identified have been driven from within the industry (often by passionate individuals or groups), and not as a direct response to enforcement through legislation or regulation, or industry standards. This means that there is a tendency for the responses to be diffuse and ad hoc depending on the organisation and the artist/creative involved. There is also little cross-fertilisation of approaches across the verticals. At this moment it is difficult to assess how far many of these practices have been adopted or their longevity
- Millennial and GenZ voices (younger people in general, not just students and professionals) are now clearly present on the global stage at the forefront of a fourth 'green' wave (the first was the environmental activism of the 60s, the second centred on the rise of green consumerism in the 80s and 90s, and concerns over the ozone layer leading to the Rio Earth Summit, and the third the last two decades of anxiety over global climate change and the acknowledgement of humanity's contribution). They are also the most technology-literate generations, and they are demanding action and their voices to be heard
- Four trends are identified that could re-shape Sustainability and the Creative Industries in the UK over the next decade:
 1. Automation to support creatives, and improve productivity as well as drive energy and resource efficiency (note: Creative Industries are viewed as resilient against job losses due to automation)
 2. Growing awareness of the urgency to address climate change, and appreciation of the need for more action by the Creative Industries
 3. Growing social engagement in the Creative Industries (local, regional and national)
 4. Innovative design (specially to address the needs of products, services and experiences in a more Circular Economy)

- Policy suggestions to address these trends include:
 - Lower taxes for businesses that demonstrate improved Sustainability performance, greater use of public procurement to create a stable demand for more sustainable products, services and experiences, and demand for virtual and digital offerings that are potentially more eco-efficient compared to conventional offerings
 - Incentives for small creative businesses to put in place sustainable practices e.g. grants to improve energy efficiency or increase the use of renewable energy, and business tax reductions
 - Promotion of partnerships with environmental technology companies to exploit new processes and materials e.g. fashion brands such as Volcom partnering with Unifi to design garments using 100% recycled Repreve© fibre
 - Incentivise 'virtual consumption' e.g. home consumption of theatre or music performance using virtual reality to minimise travel impacts etc
 - Duty of environmental responsibility on every organisation in the Creative Industries. For example, the Extended Producer Responsibility (EPR) scheme for fashion is discussed in the European Commission's Circular Economy Action Plan 2.0 published in March 2020. Environmental responsibility could be extended to a duty of ethical responsibility for data use and application of techniques such as facial recognition
- Key insights on the role of education in the Sustainability journey to 2030 include:
 - Universities and business schools should help shape opinions, making better use of case studies and examples to better connect with those in the Creative Industries. This should include bringing in more industry people to talk about Sustainability success stories within businesses in the Creative Industries
 - An action focus for Sustainability education and skills development to give people in the Creative Industries tools that allow them to make a difference quickly. This could mean education and training designed to be granular, bite-sized, or micro-modular and immediate, more like 'Life hacks'. This might be based on a blended learning model e.g. a mix of online and face-to-face content
 - Since the Creative Industries are so fragmented cross-vertical collaboration on Sustainability is important, and after the current period of social distancing this may be easier to achieve with online conferencing and other virtual tools
 - Sustainability education should be mandated and integrated in all undergraduate courses

- For B2B (Business-To-Business) sub-Sectors such as advertising and architecture, client expectations and demands regarding Sustainability practices may be a primary force for change (for example, think of a small creative agency supplying a multinational with a powerful Sustainability mission, such as Patagonia)

Industry 4.0

- In recent years Industry 4.0 technologies have led to the emergence of a new Creative Industries sub-Sector at the intersection of creativity and technology: CreaTech. Examples of CreaTech are businesses exploiting innovations in immersive and transformative entertainment (such as the 'Space Descent VR' at the Science Museum), and personalised and seamless user and audience experiences (for example, use of augmented reality and robotics in games to create your own virtual battlefield). In the Financial Services Sector, FinTech companies have brought new ways to connect to consumers and to deliver Financial Services. This is the fastest growing sub-Sector of the Creative Industries and based on calculations for this study, this vertical could account for nearly 40% of employment in the Creative Industries by 2030, as well as being a major driver of exports
- Over the next ten years it is highly likely that the Creative Industries will benefit from convergence of foundational technologies that are

relevant to the Creative Industries such as machines and objects that talk to each other directly (machine-to-machine (M2M)) and over the Internet of Things (IoT), social and collaborative systems for both design and production (people-people, people-machines), insights from Big Data, Advanced Analytics, Machine and Deep Learning (the key elements of AI today), and robotics and automation

- Many creative businesses (e.g. businesses engaged in the Creative Industries) wanting to invest in Industry 4.0 start with 'debt financing' i.e. funding from friends and family, or a bank loan, or an overdraft. However, to build pace and scale for widespread adoption of Industry 4.0 technologies by 2030 the Creative Industries need to learn lessons from the Technology Sector and Fintech. However, a common factor in successfully acquiring finance for Industry 4.0 investments is having the business and finance skills to succeed and this is viewed as a Sector weakness that should be addressed
- Four trends are identified that could re-shape Industry 4.0 and the Creative Industries in the UK over the next decade:
 1. UK Creative Industries export growth (economic and cultural value)
 2. Greater competition for audience and consumer attention, making for a more competitive environment (referred to as the 'attention economy'ⁱⁱ)

ii. In the attention economy human attention is a scarce commodity. The American economist Herbert Simon wrote 'in an information-rich world, the wealth of information means a dearth of something else: a scarcity of whatever it is that information consumes. What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it.'

3. Digital creation (e.g. of content, product designs etc)
 4. Sustainable design, also raised in the Sustainability workshop, specially to address the needs of products, services and experiences in a more Circular Economy (and drive de-carbonisation)
- Policy suggestions to address these trends include:
 - Tax reliefs for all Creative Industries to assist with Industry 4.0 adoption or specific tax breaks for small / new creative businesses exploiting Industry 4.0
 - Industry 4.0 literate industry bodies to connect micro organisations
 - Regional and Local investment opportunities for Industry 4.0 start-ups
 - Professional education programmes for Industry 4.0
 - A specialist visa scheme along the lines of the Global Talent Visa launched recently for research and innovation
 - Key insights on the role of education in the Industry 4.0 journey to 2030 include:
 - There is an immediate need for a digital upskill for executives in Creative Industries
 - Technology companies may be sources of investment and education delivery. Industry 4.0 is capital intensive and changes rapidly so there is a need to find new ways to fund initial outlay and an on-going refreshment, so students are always trained on the latest technology
 - Standalone venues and centres within universities and / or science museums need to be developed to showcase, demonstrate, and enable a hands-on feel for new technologies. This could be part funded by the technology industry, or new subscription rentals developed for continuous upgrading to new iterations or version of the technology (as Apple does for iPhones)
 - Vocational training for Industry 4.0 should not be ignored as there are many technical, trade and artisan roles in the Creative Industries and a shortfall of candidates. It is worth noting that an increasing number of people enter the Creative Industries with no formal Creative Industries skills education; they have either learnt from sources such as YouTube (e.g. video editing skills) or working in informal groups (e.g. a common entry point for music)
 - In addition to specific policy recommendations for Sustainability and Industry 4.0, the participants in this study also made general suggestions for the Creative Industries Sector, and a selection is listed below:
 - As part of an increased focus on regionalisation or 'levelling-up' in the UK, there is an opportunity to establish tax-free Creative Industries Zones in UK regions (these could be modelled on the current Enterprise Zones in the UK)

- (including financial incentives such as 100% first-year allowances for capital expenditure))
- Enhance the existing Innovate UK business engagement programmes for micro, small and medium-sized businesses, but shaped around the characteristics and needs of the Creative Industries
 - Stimuli for exporters: tax breaks for creative exports, an export market research scheme, and trade missions for creative businesses targeted at micro, small and medium-sized businesses (100% funding)
 - Prioritise grants for smaller creative businesses and freelancers; provide free knowledge hubs so that small creative businesses can connect, collaborate and exchange best practices
 - Government support to establish a new 'federation' focused on Creative Industries entrepreneurs in micro, small and medium-sized businesses. The existing Creative Industries Federation and Creative England would retain the Sector advocacy role, while this new body would focus on building capacity and capability in the Sector amongst micro, small and medium-sized businesses.
 - More young people to be involved in policy-making. Indeed, the 'Well-being of Future Generations Bill'ⁱⁱⁱ (currently waiting its second reading) has specific requirements for engaging with younger

members of society in respect of policy and legislation and, if passed, will establish a Commissioner for Future Generations for the United Kingdom

2030 scenarios

- Sustainability and Industry 4.0 are inextricably intertwined with participants' expectations over how the Creative Industries in the UK will develop over the next 10 years. Whilst each topic can be addressed individually, there are powerful synergies and many interdependencies in the underlying trends, the policy makers involved and, of course, the people in the wider Sector ecosystem (not just the creatives).
- From the multiple scenarios generated by the experts, two umbrella scenarios for 2030 are presented:

Invest to sustain: This supply-side scenario focuses on addressing Sustainability in the UK Creative Industries by accelerating investment in Industry 4.0 to transform the sector's end-to-end value chains. This involves smarter use of sensors, and intelligent and automated equipment to integrate all digital and physical elements from inspiration to the end experience (or point of consumption). This will enable new and more effective ways of co-creating and collaborating at every step, and automatically generate reliable data

iii. From Hansard: 'A Bill to make provision for requiring public bodies to act in pursuit of the environmental, social, economic and cultural well-being of the United Kingdom in a way that accords with the Future Generations principle; to require public bodies to establish and meet well-being objectives and report on these and their actions; to require public bodies to publish Future Generations impact assessments and account for preventative spending; to establish a Commissioner for Future Generations for the United Kingdom to...continued

that can be used to optimise the energy and resources used. In addition, these investments should stimulate entrepreneurship and innovation, and create the optimal conditions for social, environmental and economic leadership (the Triple Bottom-Line) for creative businesses of all sizes.

New ways to grow: This demand-side scenario addresses perceived limits to growth of audiences and customers (for B2B and B2C companies^{iv}) in a global 'attention economy' through innovations in demand generation and fulfilment. When it comes to products, services and experiences in any single market there are limits to consumer spending and the hours available to consume music, film, games etc. But many markets for creative output are now global, and this means that UK creative businesses have to grow by exporting and also face-off international competition for the attention of UK citizens and companies (this affects B2B as well as B2C companies). However, if approached with current thinking, tools and resources this competition could be at the expense of Sustainability as increasing demand means more energy and resources being consumed too (e.g. electricity and increased CO2 emissions for streamed content, increased water pollution and waste for fashion). Whether shooting a film or creating a garment, designers need to exploit digital techniques to untether growth in demand from as many of the negative effects on supply chains as possible.

Getting to 2030

- Adoption of innovative and sustainable design practices in the Creative Industries will require people to think and work differently and adoption of Industry 4.0 tools for digital creation e.g. auto-generation of buildings, people, and products using new AI techniques such as Generative Adversarial Nets (GAN) that have proven successful for creating and modifying images. Industry 4.0 predictive analytics and automation can reduce energy and waste, and help to eliminate unwanted inventory for products as illustrated by UK success stories such as Unmade. Industry 4.0 technologies such as AI, IoT and sensors will increasingly be used to improve energy utilisation in theatres and studio. However, with increased stand-alone and embedded technology, it will be important to ensure that this equipment is designed to be more circular (e.g. design for preventative maintenance, repair, refurbishment, remanufacturing before materials recycling) to ensure that e-waste is minimised. This may require new or extended legislation (e.g. the Waste Electrical and Electronic Equipment legislation - WEEE)
- In many other UK industrial Sectors there is a single trade body that can act as a voice in policy making. In the UK Creative Industries there are multiple trade federations and related bodies that seek to represent specific interest-groups, segments or the

iii. cont...advise, assist and oversee public bodies in doing things in accordance with this Act; to provide for the establishment of a Joint Parliamentary Committee on Future Generations; and for connected purposes.'

iv. Business-to-Business (B2B) and Business-to-Consumer (B2C)

industry as a whole, but their membership appears to be more representative of the medium-sized and larger creative businesses. The Federation of Small Businesses and Chambers of Commerce are too broad or parochial to service the needs of the freelancers and micro, medium-sized businesses in the Sector. Even the Creative Industries Federation (now together with Creative England) with around 10,000 members today, is engaging directly with less than 5% of the creative practices in country. A radically different approach is needed for the Creative Industries

executive education over the next decade, and the existing educational and learning offerings. For participants, it wasn't just about the content of courses, rather it was also about formats and delivery. In terms of executive education and training, the very large number of micro, small and medium-sized businesses in the Sector, and the tendency for creative businesses to be deadline driven, means that there is little time or inclination to acquire new skills and knowledge unless it can be accessed in times where individuals are less busy, or the knowledge and skills can be directly applied

Education for the Sector

- There is an immediate need to address the education, training and executive education needs of the two million workers^v in the Creative Industries today, including core business skills such as finance. Those working in the Creative Industries are time constrained and need bespoke training and education that is more like 'consultancy' i.e. mentoring or customised advice. Hence, there is an urgent need for a Creative Industries skills map for 2030. As well as the more practical skills this should include a review of managerial and executive skillsets, as well as the vocational needs of those employed within the Creative Industries ecosystem
- The experts made repeated reference to the need to improve the fit between what the Sector needs for undergraduate, postgraduate and
- There is also need for broad spectrum of awareness, education and training interventions for both Sustainability and industry 4.0. The expert participants again suggested that the approach for people working in the industry (i.e. executive education) had to be structured appropriately as 'bite sized chunks', exploiting virtual classrooms as much as possible. Ironically, the COVID-19 pandemic may provide much of the impetus to developing content that can be delivered remotely. For undergraduate and postgraduate courses, the suggestion was that Sustainability and Industry 4.0 should be embedded into new courses and existing curricula (e.g. in specific modules)
- A surprising finding was that investment community in the UK and internationally should become a priority for providers of executive education to that Sector as the

v. DCMS data for 2018

Creative Industries Sector is poorly understood from a business perspective. Executive education for this target group should aim to change the perception amongst the investment community that UK Creative Industries are just a 'cottage industry' with no potential scale or 'hit-based' (meaning that commercial success is somehow unknowable) and extraordinarily risky

- CreaTech is growing 10 times faster than the Sector average and will increasingly rely on the synergy between 'creative' or arts subjects and STEM. Hence there is a strong argument for referring to STEAM (Science, Technology, Engineering, Arts and Mathematics) as better way of expressing the strength of the dependencies and connections. In this context it is worth noting the Augar Report^{vi} talks of 'accidental overinvestment in some subjects' (i.e. Design and the Creative Arts) and questions whether the current level of government support to Creative Industries 'constitutes good value for taxpayers' money' based on the likely salaries of workers in the sector. This could be read as a suggestion to defund the Creative Arts or to transfer funding to STEM. This needs to be re-addressed by government to fully recognise the connection between creative subjects and STEM, the sector growth potential and the future value of the Creative Industries more generally, to the UK economy nationally, regionally and as an export engine

Conclusions

- The mass of the Sector (and the broader ecosystem that supports it) is based on independent talent, freelancers, micro and medium-sized businesses. Hence, formulating and implementing policy ideas that are relevant to the Sector requires creativity, and may require an organisation that represents the needs of freelancers and micro, small and medium-sized businesses that will still represent the majority of the Sector in 2030. Having so many verticals in the Creative Industries may make conversations about policies frustrating, but at the same time it is powerful and rewarding to get the different sub-Sectors together for policy connections as well as knowledge sharing
- The COVID-19 pandemic has also shown the value of the Creative Industries beyond its monetary value e.g. it is acting as a showcase for the ingenuity of UK creatives. Imagine what it would be like to be 'locked-down' with no access to music, TV, film etc? Thankfully the UK has artists and creative teams that, in many cases, have climbed a steep learning curve to get content to UK citizens often at their own cost. This enforced 'digital transformation' may actually become a survival tactic for some of the smaller creative businesses, who are using Industry 4.0 technologies to connect with audiences and consumers and generate revenues. Perhaps this will be seen in hindsight as market development, a test of the

vi. A report from the independent panel to the review of post-18 education and funding (<https://www.gov.uk/government/publications/post-18-review-of-education-and-funding-independent-panel-report>)

wider potential for streaming and other forms of virtual delivery. What is now being offered free may soon become a paid for subscription alongside more traditional experiences (such as concerts or a visit to the theatre). It could be that we are seeing a rapid evolution of a new normal for the Creative Industries

- The pandemic has also brought into sharp relief the precarious nature of the gig economy and being freelance: this is how the majority of people are employed in the Sector. It is possible that a result of the pandemic will be to drive people out of the Sector; let's hope not. Some of the policies identified seek to remove some of the risk for these individuals by connecting them more effectively to policy makers through a new industry body so their voices can shape the next wave of policies that will take the UK Creative Industries to 2030
- The experts involved in this study would like the government to embrace the long-term view of the economic development of the Sector. This could take the form of a growth strategy for 2030 that is specific to the Creative Industries and encompasses national, regional and local perspectives. Despite the current shape of the Sector in terms of company size and the prevalence of the gig economy, it's important to remember that micro and small companies can become the next large enterprises. Experience shows that they need sustained support over a number of years to get there as they move from seed-funding to a high growth phase. For example,

Improbable (the multi-player game company took seven years and £400m of investment to earn its Unicorn status)


- Measurement is a recurring theme in the findings: measurement of the Sector (boundaries, employment, GVA, exports, cultural value), comparisons with other Sectors and countries, and fundamentally measurement of the creativity or 'creative potential' of a location, a city or a Region (as one possible lead-indicator of start-up success). Of course, measuring the value-add of the proposed policies is also important. The experts felt that it is time to review the taxonomies used to measure the Sector as they may not be revealing the full extent of the Sector contribution to the UK economy.
- There is no agreed UK or international baseline for Sustainability and Industry 4.0 in the Creative Industries. Maybe 'indexes' or 'scorecards' are needed to baseline performance and then monitor improvement and / or adoption of specific technologies and practices. The qualitative assessment of the 'hot spots' for progress in Sustainability (using the SDGs and the Triple Bottom-Line) and Industry 4.0 (by technology) across the Sector, and by vertical, used in this study could be developed further too
- The experts involved in workshops and interviews anticipate a skill gap in the Sector in 2030 that could undermine the ability of the sector to deliver on GVA, employment and

export expectations. There is also concern that higher education and executive education are not delivering course content that will close the gap in critical areas such as finance and technology skills. Similar comments were made about the direction of applied research. This suggests a comprehensive review is required of the skill needs for the Creative Industries

- For the Creative Industries to deliver their full potential for inclusive, equitable and resilient growth, it is important to have a policy approach that is focused on creating an environment in which creativity flourishes, rather than solely relying on top-down prescriptions. There is also a need to assist individuals and companies commercialise and monetise creative outputs from an innovation process. This can be achieved in multiple ways. This could be creativity and innovation education for all, in every course. It could also be developing 'Creative Districts' building on the concept of Innovation Districts. Some Innovation Districts in the UK, such as Leeds, already include a Creative Arts building so why not go further and incorporate links to Creative Hubs^{vii}, Digital and Creative at the Knowledge Transfer Network, and the investment community, specifically to support entrepreneurship in the Creative Industries
- The 2030 scenarios outlined envisage an environment for the Creative Industries where international trade is more important and may be more complex depending on the Trade Deals negotiated as the UK continues to exit the EU. The experts had concerns that more in-person and virtual support is needed, especially for the micro, small and small creative businesses. At the very least free webinars could be organised and promoted that highlight specific trade opportunities and challenges for each vertical (e.g. fashion is different to film is different to craft)
- 2021 will be the UN International Year of Creative Economy for Sustainable Development. There will be an end to the 2020 pandemic and the harm it is causing to society as whole, and to the Creative Industries. Normality will return, or a new normal will emerge as noted above, and the Creative Industries will have a central role economically and culturally here in the UK and internationally. Yes, there are immediate policy actions needed, but this also a good time to prioritise the 2030 policy formulation and implementation needs related to Sustainability and Industry 4.0 in the Creative Industries. It is also an appropriate time to increase engagement in policy making by, for example, under-represented groups e.g. micro, small and medium sized businesses, and youth.

vii. The British Council define a Creative Hub as 'a physical or virtual place that brings enterprising people together who work in the creative and cultural industries'





Structure of document

This document contains a wealth of information from experts across the Creative Industries.

This section is a guide to assist readers in navigating to the information they want.

Section 1, 'Introduction', provides more context on the study and explains the rationale for a focus on Sustainability and Industry 4.0 foresight now, and shows why more needs to be done in every sub-Sector.

Section 2, 'The trends that matter', sets out the trends at a global and UK level that are likely to influence the Creative Industries over the next decade. This section also highlights the lasting legacy of the UK Industrial Strategy and Creative Industries Sector Deal.

Section 3, 'Creative Industries outlook', presents estimates of the size of the Creative Industries in 2030 in terms of economic performance (including exports) and as an employer. This section also describes how creative trends such as story-telling with immersive technologies are re-shaping the Sector.

Section 4, 'What is the Creative Industries approach to Sustainability?', presents a qualitative assessment of the progress in the Sector against the 17 UN Sustainable Development Goals (SDGs). This is broken down by sub-Sector and goal and is illustrated by examples from across the Sector.

Section 5, 'What is the Creative Industries approach to Industry 4.0?', presents a qualitative assessment of the progress in the Sector in adopting Industry 4.0 technologies individually and collectively. This is broken down by technology and is also illustrated by examples from across the Sector.

Section 6, 'Foresight from the workshops' documents the findings from the two workshops held (28th February 2020 and 6th March 2020) to engage people working in the Sector, and expert policy makers and academics, in generating foresight and policy ideas. The section is broken down into three main blocks: Sustainability, Industry 4.0, and the Sector as a whole. Within each block, the report presents possible scenarios, the policy ideas and the policy makers that need to hear them, and the links to education and research.

Section 7, 'Discussion of findings', analyses the evidence from the workshop and interviews used to flesh out some of the issues raised. Two umbrella scenarios are used to frame the discussion and to identify common themes between the foresight for Sustainability and Industry 4.0 and the Creative Industries in 2030.

Section 8, 'Conclusions', seeks to sum-up the document and share questions that still need to be answered after this short study. The document ends by acknowledging the richness of the contributions from all involved, and a call for prioritisation to start now.



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Audience &
purpose

Audience & purpose of this document

This document is intended for:

- People involved in policy making for the Creative Industries in the UK who want practical suggestions for developing policy and ensuring that it is adopted by the Creative Industries
- Those in higher education, specifically those developing the next generation of curricula relevant to the Creative Industries for undergraduates, postgraduates, executive education and research

The purpose of the document is to set out the findings of a short foresight 2030 study conducted between January and March 2020 using desk research, interviews and workshops. The study set out to envisage what the Creative Industries in the UK might look like in 2030, and what role Sustainability and industry 4.0 might play. Note that the study is snapshot of Sustainability and Industry 4.0 taken over three months, relying on input from desk research, two workshops and four follow-up interviews. There are a number of important general issues that the Sector faces, such as the opportunities and risks arising from EU exit, but these are out of scope of the report

Definitions used in this document

Sustainability

Use of the word 'Sustainability' in this report refers to both the 'Triple Bottom-Line' of Sustainability (environmental,

economic and social), and 17 the United Nations Sustainable Development Goals (UN SDGs) that have their origins in the broader concept of sustainable development:

'development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'

Brundtland Commission in 1987

In the Triple Bottom-Line, 'environmental' includes climate change, access to water, resource scarcity and waste (the circular economy), and biodiversity.

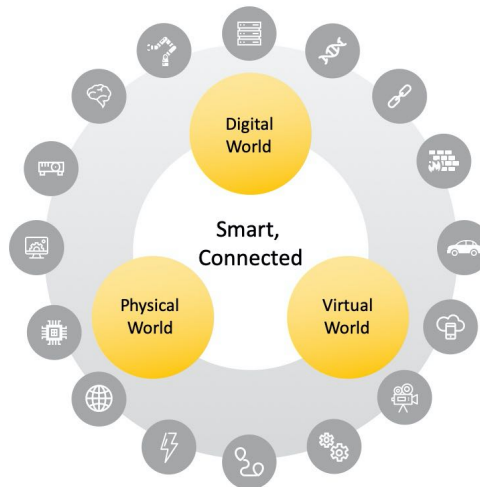
Industry 4.0

The term 'Industry 4.0' (sometimes used interchangeably with '4th Industrial Revolution') has its origins in manufacturing and is used to describe smart production facilities based on technologies such as artificial intelligence (AI), the Internet of Things (IoT), and robotics and automation. In these smart factories, equipment is capable of autonomously exchanging information machine-to-machine and, together with new industrial processes such as additive manufacturing (3D printing), there is the potential for significant improvements to the processes and life cycles of goods.

It is a future of 'cyber-physical systems' where machines can safely operate by themselves and robots collaborate with humans, and everything can be customised and be flexible at scale (see Figure 1).

Foundation - Interconnected, Smart and Autonomous systems

1. Machines and objects that talk to each other Machine-to-Machine (M2M) and over the Internet of Things (IoT)
2. Social and collaborative systems (people-people, people-machines)
3. Design and production insights from Big Data, Advanced Analytics, Machine and Deep Learning
4. Robotics and automation
5. Cloud & platform technologies



Maturing Technologies

- “AI”
- Blockchain
- Digital to Physical Transfer / 3D printing / additive manufacturing
- AR/VR/Mixed Reality
- Volumetric capture and Immersive simulations
- 5G networks
- Edge Computing
- Quantum computing

Figure 1. Industry 4.0

Creative Industries scope

There are multiple definitions used for the Creative Industries. For this study the working definition is ‘those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property.’

The Creative Industries are a key component of the broader Creative Economy, an evolving term embracing an economic system based on novel and imaginative ideas (as opposed to more traditional resources such as capital).

Figure 2 lists the industry verticals or sub-Sectors (these terms are used interchangeably in this report) in scope for this project. Essentially this is the same

as the UK Department for Digital, Culture, Media and Sport (DCMS) definition for Creative Industries, excluding Museums, Galleries & Libraries.

The boundaries between the sub-Sectors can be porous. For example, design and production of events and experiences occurs in multiple verticals. Similarly, it is important to note that there are many overlaps with the wider economy, especially where digital business models are involved (e.g. advertising, media, streamed content). The so-called FAANGs¹ have been major disrupters in the Creative Industries globally over the past decade, exploiting deregulation to capture market share, and globalised financial engineering to reduce taxation. Baidu, Alibaba, Tencent, Xiaomi (BATX) are shaping up to be disrupters in the next decade.

1. FAANGs specifically refers to Facebook, Amazon, Apple, Netflix and Google, but can be interpreted as referring generically to Big Tech platform companies with media interests. These companies have a particular importance in the Creative Industries ecosystem as they can combine content creation and distribution with the devices used for consumption (e.g. iPads)

Creative Industries	
1.	Advertising & Marketing
2.	Architecture
3.	The Arts & Culture
4.	Crafts
5.	Technology Services ² & CreaTech
6.	Design
7.	Fashion Design
8.	Gaming
9.	Music, Performance & Visual Arts
10.	Publishing
11.	Film & TV

Figure 2. Creative Industries taxonomy used for this study

Note:

Essentially the same as the DCMS definition for the Creative Industries, excluding Museums, Galleries and Libraries

Other large technology companies such as Microsoft and IBM are encroaching on the Creative Industries. As examples, Microsoft have their gaming platform and advertising network; IBM have the Watson cognitive platform that has been used for media workflows, fashion design and creating movie-trailers. These Technology Services² companies continue to move into adjacent spaces through a variety of strategies. Common approaches include acquisitions, partnerships, financing start-ups, and building out networks of users and developers devoted to their hardware or software.

Another example of blurred boundaries is CreaTech, which the Creative Industries Council define as ‘the umbrella term for activities built around the interaction of technology and creativity to produce new value-added products, services or experiences.’ Since the trend is for various advanced information and communication technologies to be embedded into otherwise more traditional products, services and experiences, the broader term of Technology Services (see above) should also be used conjunction with CreaTech (e.g. an AI subscription platform that predicts the likely audience reaction to a new movie is an example of a Technology Service).

Creative businesses

Many businesses can claim to be ‘creative’ but for this study the definition employed is based on DCMS work to classify the Creative Industries. The defining characteristic is the idea of ‘creative intensity’ in terms of the proportion of people in a business doing creative work,

2. Technology Services is the term commonly used to describe business services that make information technologies easier to use or consume. This typically involves some level of support and management, as opposed to simply selling packaged software product or hardware that the user has to install

in a business where the specific creative activity takes place. A DCMS review in 2013 suggested that this should be set at 30% or greater. As an example, this definition would include fashion design but exclude most fashion retailing.

This definition is helpful for this study, but needs updating as more creative businesses are developing Business to Consumer (B2C) operations and disintermediating distributors and retail operation. In summary, in this report we use the term creative businesses to refer to people who are employed in the Creative Industries (as freelancers, the self-employed and in companies) allowing for the definitional challenges with the sector.

Policy makers & stakeholders

In this study 'policy maker' is used to describe all of the people involved in creating and amending public policy at a national, regional or local area. Examples

of policy makers relevant to this study are departmental and non-departmental bodies, such as the Arts Council and Innovate UK, as well as some academics, who have a recognised role in policy making by virtue of their expert knowledge of a particular area (e.g. fashion, the Cultural Economy etc).

In the context of this report, the term 'stakeholder' is used to refer to those organisations that have a vested interest in the policy making process and the outcome of policies, such as owners of creative businesses within the Creative Industries and trade bodies. Stakeholders are not passive, instead they will usually try to influence or shape policy to suit their own needs.





1. Introduction



Introduction

Why focus on Sustainability and Industry 4.0 now?

The UK government has signed a target of net-zero carbon emissions by 2050 into law, becoming the first of the G7 to do so. The UK Creative Industries are set to grow much faster than the rest of the economy, and so it is essential that this growth should be decoupled as much as possible from negative effects on emissions, climate change, biodiversity and social systems. In addition, there is increased interest and adoption in Industry 4.0 and its enabling technologies in the Creative Industries (e.g. artificial intelligence for image enhancement and automation for fashion).

More needs to be done in every sub-Sector

The footprint of the Creative Industries today is significant. During the shooting of a major movie over 50,000 plastic bottles of water might be consumed, and 10,000 tonnes of carbon dioxide (CO₂) is produced. An hour of TV might produce over 10 tonnes of CO₂ (and over 100m hours of TV content is consumed in the UK every day). A stadium music event might attract an audience of over 100,000 and free events and multi-artist festivals over one million people, with people travelling to and from the event by a wide variety of means. In the fashion industry over 300,00 tonnes of clothing waste goes to landfill each year in the UK as consumer's change their wardrobes (and

globally, fashion produces more CO₂ emissions than aviation and shipping combined). Making a pair of jeans can consume as much as 20,000 litres of water.

Technology can accelerate change

Technology is certain to play a major role in addressing Sustainability challenges and, in parallel, we are living in a time when technologies such as artificial intelligence (AI) and blockchain (plus a myriad of other technologies) appear to offer exponential potential for growth and productivity improvements. Industry 4.0, starting from its origins in industrial manufacturing, is now making headway in design and development and other areas associated with the Creative Industries. It is feasible that accelerated adoption of cyber-physical systems in the Creative Industries, based on convergence of virtual, physical and digital worlds, will make a positive contribution to all of the Sustainable Development Goals (SDGs). Headlines concerning over-hyped successes, algorithmic bias and broader concerns over data and cybersecurity suggest it will not be straightforward. What should policy makers be proposing to help the Creative Industries? Finally, the information and communication technologies involved are not impact neutral: they use energy and therefore produce emissions throughout the creative lifecycle, scarce critical raw materials (CRMs) are consumed, and e-waste is produced. Therefore, as the adoption of Industry 4.0 accelerates there

is a parallel need to ensure the technology itself is designed to become low carbon and circular.

Emergence of CreaTech

In recent years Industry 4.0 technologies have led to the emergence of a new Creative Industries sub-Sector at the intersection of creativity and technology: CreaTech. In the Financial Services Sector, FinTech companies have brought new ways to connect to consumers and to deliver Financial Services. Something akin to this is clearly happening in the Creative Industries, attracting investment funds to the UK (especially in areas where we are world-leading, such as AI). In 2019, the Creative Industries Federation published 'Ones to Watch'³ which provided case studies for 50 leading UK businesses in the CreaTech space, highlighting the current strength and diversity of this vertical.

CreaTech businesses range from start-ups to multi-nationals. In the UK there are well-known international names such as Industrial Light and Magic alongside domestic businesses such as Engineered Arts who produce robots for communication and entertainment and Improbable who provide a platform for building multi-player gaming worlds.

CreaTech growth is also fuelled by innovations in immersive and transformative entertainment (such as the 'Space Descent VR' at the Science Museum), and personalised and seamless user and audience experiences (for example, use of augmented reality and robotics in games to create your own virtual battlefield).

It is already an important contributor to the economy and based on calculations for this study, this vertical could account for nearly 40% of employment in the Creative Industries by 2030, as well as being a major driver of exports. However, CreaTech businesses are typically service and experience providers that rely heavily on global data centres. These data centres are still using electricity generated from fossil fuels in many countries, including the UK and US. Currently, around 10%⁴ of the global electricity supply is consumed by information and communication technologies, and fossil fuels still account for 60% of the electricity generated.

As clean energy generation increases over the next decade, it is to be hoped that the carbon dioxide (CO₂) impact should be offset. However, this depends on government targets for renewables, the Sustainability plans of major cloud providers⁵ (such as Amazon, Microsoft and Google), demand for content, and the growth rate of content-based verticals in the Creative Industries.

The definition and boundaries of CreaTech are shifting quickly as technology advances and becomes embedded in business (and creativity) as usual. Perhaps, in combination with immersive story-telling techniques and mixed reality, for example, a new form of creative practice will appear together with new audiences (much as motion pictures did in the 20th Century). Alternatively, CreaTech may become more diffuse, more like Technology Services for the Creative Industries.

3. https://www.thecreativeindustries.co.uk/media/529970/ones_to_watch_v4_singles.pdf

4. <https://www.climatechangenews.com/2017/12/11/tsunami-data-consume-one-fifth-global-electricity-2025/>

5. <https://www.greenpeace.org/usa/microsoft-google-amazon-energy-oil-ai-climate-hypocrite/>

New voices demanding to be heard

Finally, Millennial and GenZ voices (younger people in general, not just students and professionals) are now clearly present on the global stage at the forefront of a fourth 'green' wave (the first was the environmental activism of the 60s, the second centred on the rise of green consumerism in the 80s and 90s, and concerns over the ozone layer leading to the Rio Earth Summit, and the third the last two decades of anxiety over global climate change and the acknowledgement of humanity's contribution). They are also the most technology-literate generations. What will be the impact of these 'digital natives' on policy, business and civil society in 2030, generally and specifically within the Creative Industries? How do they view Sustainability and Industry 4.0 trends, and what do they expect from policy makers?

Improving the understanding of policy needs for the next decade

This short study sets out to frame some of the opportunities and challenges for the UK Creative Industries ahead to 2030, and to identify key policy areas, education needs and research directions.

Research questions to address (or at least, better understand) include:

- What is the most likely set of scenarios for the Creative Industries in 2030? What is the role of Sustainability and Industry 4.0?
- What combination of trends (global,

local, sustainability, technology) will be most influential in the future success of the UK's Creative Industries?

- How can Sustainability and / or Industry 4.0 help the Creative Industries in the UK innovate and become more competitive, further increasing their global influence and trade in goods and services?
- Which local, regional and national policies could help the micro and small businesses that are the core of the Creative Industries in the UK?
- How does development of new Creative Hubs⁶ in new locations help?
- Where do we need new or changed policy and support in areas such as infrastructure, skills, intellectual property rights (IPR), taxation?
- What should be the role and shape of undergraduate, postgraduate and executive education?
- How should we approach research to accelerate adoption of Sustainability and Industry 4.0 in the Creative Industries?

Listening to the experts

Based on the project focus of specifically exploring both Sustainability and Industry 4.0 in the Creative Industries in 2030, it was decided to take a workshop approach involving a rich mix of expert policy makers, industry thought leaders, entrepreneurs and academics. Separate workshops were organised on Sustainability and Industry 4.0 using scenario planning foresight techniques to open up the discussion around policy, research and education for the Creative Industries leading up to 2030.

⁶. According to the British Council, a Creative Hub is 'a physical or virtual place that brings enterprising people together who work in the creative and cultural industries'

To ensure everyone was starting from the same understanding, and to aid discussion and idea generation in these diverse groups, detailed pre-reading on both Sustainability and Industry 4.0 in the Creative Industries were provided in advance including input, for example, on global and local trends. This material was based on desk research during January and February 2020, and the purpose was to give each expert a briefing before each workshop to increase the richness of discussion.

In addition, a small number of additional interviews were held to more fully explore some of the scenarios and topics raised (e.g. accessibility, inclusion). Appendix A provides a list of the organisations represented.

WAV/MP3



4





2. The trends that matter

The trends that matter



Figure 3. Megatrends

The UK Creative Industries do not operate in isolation from global trends. This section summarises the most relevant global and regional trends that are likely to create opportunities and challenges commercially (domestically and internationally) and in terms of societal impact. The next decade is likely to see a number of trends re-shaping the economic, social and environmental landscape for the Creative Industries in the UK and, inevitably, there will be additional unexpected events or ‘black swans’⁷ beyond what we are dealing with in COVID-19 in 2020.

2030 global context

Based on a scan of published works, a representative set of megatrends has been derived from several, reputable sources⁸, and these are illustrated in Figure 3 and described more fully below.

Transformative technologies and the rise of Industry 4.0

It almost goes without saying that we’ve seen enormous progress in areas such as Artificial Intelligence (AI), the Internet of Things (IoT), mobile devices et cetera. The next 10 years will see newer technologies such as blockchain,

7. <https://www.investopedia.com/terms/b/blackswan.asp>

8. Synthesis of reports from McKinsey, PwC Consulting, Deloitte, and IBM

Augmented and Virtual Reality (AR/VR) and 3D printing (and other forms of additive manufacturing) rapidly mature and gain wider acceptance in the Creative Industries in the UK and globally. There are already multiple start-ups using blockchain for Intellectual Property Rights, craft jewellers using 3D printing et cetera. It's always difficult to second-guess emergent technologies, but quantum computing⁹ is certain to feature in the next 10 years and will almost certainly see the start of bio-hacking¹⁰ becoming more mainstream.

The rise of Africa and Asia as markets and as sources of talent

By 2030 the global population may be 8.5 billion people, with the majority of the growth taking place in Africa which will account for about a quarter of the world's population (Nigeria, as an example, is on track to exceed the population of the USA by 2050). The growth in Africa is primarily driven by the youthfulness of the population (a third of all Africans will be under 15 by 2030)¹¹.

2030 China's economy is likely to be 30% larger than the USA and emerging economies could account for more than 50% of world GDP. India will be the most populous nation and will also be the youngest among the 10 largest economies with a median age of 31.

Accelerating urbanisation

The planet has already passed the tipping point at which more than half the human race is living in cities or urban areas. This trend will continue (two thirds of the global population will live in urban areas by 2030) and the trend is likely to have a particularly transformative effect in Africa. By 2030 five of the 43 megacities in the world¹² will be in Africa. Of the remainder, eight will be in China and seven in India. In total, 9% of the world's population will live in these cities of 10 million inhabitants or more.

Demographic shifts

For the first time in history, by 2030 there will be five generational cohorts in the workplace at the same time in much of the world (Baby Boomers, Generation X, Millennials, GenZ, and Generation Alpha – those born after 2011). GenZ will be the largest cohort (2.2bn) and together with Millennials will represent about 65% of the global, working-age population.

India will be the most populous nation and also be the youngest among the 10 largest economies with a median age of 31 (in contrast a third of all Africans will be under 15).

The increase in India's working age population in the next decade will account for more than half of the total increase across Asia¹³. However, in contrast to the youthfulness of Africa and India, the

9. Quantum computing exploits the properties of quantum physics to process information in a fraction of the time that a conventional computer could. For an explanatory video, click below:

<https://www.ibm.com/quantum-computing/learn/what-is-quantum-computing/>

10. Bio-hacking is do-it-yourself modification of body chemistry, biology and physiology. Examples range from using nutrition to change cognitive function through to more radical changes such as inserting electronics into the body to allow someone to hear music without headphones

11. Extract from '2030: Technology and Society' presented by Trevor Davis at Sustainable Innovation 2019 Conference

12. UN Department of Economic and Social Affairs: World Urbanization Prospects, 2018 (<https://population.un.org/wup/Download/>)

13. Deloitte Insights, Voice of Asia: Third Edition (September 2017): p. 17

number of working age people in China will have declined by a few percentage points from today. The retirement-age population in Europe will be larger than the working-age population¹⁴.

Action on Sustainability

The United Nations General Assembly established 17 SDGs in 2015 (see Figure 4) and, although some criticise the lack of focus on resource scarcity, biodiversity etc, they have gained widespread acceptance as a holistic framework to interpret and measure progress on Sustainability.

Different Sectors and organisations have progressed to focus more on certain selected SDGs. For example, the fashion world is currently focused on Responsible

Consumption and Production (SDG #12). In contrast, film and TV have pursued initiatives aligned with Affordable and Clean Energy (SDG #7) as this vertical is a major consumer of energy in the form of lights, building and transport (and behind the scenes, content delivery and consumption is a major energy user and therefore producer of CO2). The trend is for businesses to move past measurement and guidelines to build strategic action plans and frameworks for change around the SDGs, and to adopt Triple Bottom-Line thinking (e.g. the Unilever Sustainable Living Plan is a well-publicised example).

In addition, the action plans that businesses have been putting in place for the next few years and longer are now more likely to include specific actions to



Figure 4. The 17 Sustainable Development Goals

14. https://ec.europa.eu/eurostat/statistics-explained/index.php/Population_structure_and_ageing

address SDGs that have broader societal impact such as Reduced Inequalities and Gender Equality. This may continue during and post the COVID-19 pandemic.

On the pressing climate and environmental challenges ahead, there is a growing consensus that current approaches to economics and business models are not delivering the requisite changes needed across a swathe of urgent concerns (e.g. limiting global heating to 1.5 Celsius).

The work of influencers and the Intergovernmental Panel on Climate Change (IPCC) have combined to become a rallying cry for advocacy groups worldwide (e.g. Extinction Rebellion and the school strikes movement led by Greta Thunberg). What differentiates these groups from their predecessors is the demand for concrete and immediate action on single-issue topics and climate change more specifically. In 2020 the UK was due to hosting the UN Climate Change Conference, COP26, but it now has been postponed due to COVID-19. The web site for the conference set out a call for action, declaring 'people across the world are calling out for change. School children are striking and people from all walks of life are demonstrating in the streets' and '2020 is a critical year for our planet. The science is clear, climate change is real and it is threatening our future.' Despite the postponement the trend will continue, and new innovation and behavioural changes will be needed if the UK is to meet its net-zero carbon goals.

This call to action is likely to intensify as these groups have already started to broaden their focus to biodiversity loss, water scarcity, ocean acidification and land-use change, as well as more specific issues related to climate change.

Millennial and GenZ voices (younger people in general, not just students and professionals) are now clearly present on the global stage at the forefront of a fourth 'green' wave¹⁵. In the 2019 Deloitte Millennial Survey both GenZ and Millennials placed their personal concerns over climate change as the number one issue to be addressed (in 2017 it was 5th). Another study looking at the relationship between GenZ and brands showed that the desire for eco-friendly and socially responsible behaviour from companies, influencers and creators is even stronger in fast growing markets in Asia, the Middle East and Africa¹⁶.

In the next ten years expect support for the transition to Circular Economy (resource efficiency and productivity, and access to critical raw materials) to gain more traction as nations put in place legislative and non-legislative policy action plans. An example is the new EU Circular Economy Action Plan 2.0 (CEAP 2.0) published in March 2020 (a building block of the European Green Deal)¹⁷ which aims to scale up the circular economy from the 'front-runners to the mainstream economic players' as a way of decoupling economic growth from resource consumption. It is important to note that these plans will stress the need to eliminate, reduce or minimise environmental impacts at the design phase, where 80% of a product's

15. The first was the environmental activism of the 60s, the second centred on the rise of green consumerism in the 80s and 90s, and concerns over the ozone layer leading to the Rio Earth Summit, and the third the last two decades of anxiety over climate change and the acknowledgement of humanity's contribution

16. Gen Z brand relationships: Authenticity matters, IBM and National Retail Federation, 2017

17. <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN>

environmental impact is determined, rather than allowing the 'take-make-use-dispose' mindset to continue.

As well as voluntary initiatives there are likely to be a swathe of bans or near bans designed to nudge consumption and production towards more sustainable behaviour. Examples include the European Commission Single-Use Plastic Directive (EU) 2019/904 coming into member state law between 2021 and 2024 (that will effectively put in place a ban on certain types of plastics), and forthcoming Right to Repair legislation that was highlighted in CEAP 2.0.

More connected and informed citizens

Informed citizens are essential to the functioning of organisations and institutions. Keeping up to date is easier than ever through social media and sources of knowledges such as wikis. Despite issues with fake news and a more general decline in trust of the media, the trend for citizens, consumers and audiences to be connected to organisations, public institutions and to each other is likely to increase as content innovation (e.g. mixed reality news) and technological change (e.g. 5G, AI) continue at pace.

For citizens, the benefits are access to people, goods and services in a convenient manner. There is also an element of self-protection concerning fake news and scams: in times of uncertainty people can connect with the people they trust and verify what they hear and see before making decisions. Over time AI tools are likely to provide additional protections too.

For organisations and institutions, the benefits are a combination of improved insights about the needs and observable behaviour of citizens, and productivity gains in their communication processes with the ability to personalise services. The next decade is likely to see tough discussions over the acceptable limits of state (and private sector) surveillance techniques as the technologies are increasingly deployed (e.g. facial recognition, tracking of movement via mobile devices). Of course, societal norms may be heavily influenced by the success of such surveillance in 2020 to eliminate the COVID-19 pandemic (e.g. Israel using cyber-tools developed for military application to track infected civilians).

Political uncertainty

Recent years have seen a number of significant shifts in politics round the world. In the UK, there is Brexit and transition away from the EU. Internationally there is the rise of populism, and a resurgence in more extreme forms of political expression. Confidence in politicians is at an all-time low, and public discourse has become prone to outbursts in social media, and partisan positioning of policies around emotive issues such as migration. It's becoming harder and harder to predict the outcomes of elections and movements of markets.

Volatility and uncertainty in international affairs have increased as a result of economic shocks, extreme weather events, conflicts all happening in parallel. Now there are the difficulties of predicting the progress of the COVID-19 pandemic in 2020 where the long-term

political impact of a substantial downturn in the global economy is yet to be seen.

Alongside these uncertainties it is probably fair to say that some of the large democracies are showing signs of stress, and what is thought of as long-established, stable institutions (e.g. parliamentary systems, the courts, publicly-owned media) are being challenged or even threatened. As a minimum there is likely to be fundamental changes to the way that democratic states operate.

Next stage of globalisation (globalisation 2.0)

The world is moving to a new stage in the evolution of globalisation. For the last few decades globalisation has been characterised by a system of global governance, dominated by the G7, that has implemented a set of trading rules that enable easy movement of finance and people and goods across borders. This in turn has facilitated cheaper goods for consumers through mechanisms such as labour arbitrage and integrated supply chains.

However, this hasn't necessarily been to the benefit of all. Often purely economic considerations have overtaken local societal and political needs, and there is pressure to find a more equitable model without losing the gains.

A new, more decentralised model of globalisation, that maybe further accelerated by the measures put in place to contain COVID-19, is starting to appear based on:

- A multi-polar (i.e. not just dictated by a single nation or a small number of powerful players) and more diverse approach to governance of trade that can drive economic growth more fairly for each nation. Implicit in this is a changing balance between addressing domestic demand and exports on a country by country example
- A stronger role for the G20 and emerging nations in governance (e.g. countries and regions ensuring their political interests are addressed whilst not undermining global trade)
- Decentralisation of a wide variety of trade and financial institutions, including dissolution and renegotiation of a number of free trade agreements. This process is likely to be accelerated as decentralised approaches to trade and finance (e.g. crypto-currencies and smart contracts on blockchains) become more acceptable
- Industry 4.0 technologies reshaping the way that global trade works. For example, fashion businesses such as Adidas have been able to move production back from China to Germany as fully automated manufacturing sites, close to the end consumer, means lower costs and faster delivery
- Greater focus on trade in services (especially those that rely on digital content and distribution). This has led to the development of digital platforms which tend to ignore national borders and favour global business models. Amazon is a prime example, offering streamed video internationally from a single platform

UK trends

As well as the megatrends there are specific UK trends that are likely to have a marked influence on the Creative Industries.

Even with the economic impact of COVID-19 and leaving the EU, the UK is expected to remain a top 10 world economy in 2030. The assumption remains that negotiations will change trade agreements and regulations in the UK's favour post-Brexit, particularly with the US and vibrant new markets in Asia and Africa.

The USA and EU are likely to continue to be the largest export markets for the UK's Creative Industries, with Asia and Africa taking an increased share by 2030. The UK's historical trade links to the Middle East and Japan will make them important markets for the Creative Industries as well.

However, the UK Creative Industries verticals that rely on digital content, production and delivery (e.g. TV, film, music, games) will need to compete in the face of stiffer international competition due to on-going globalisation of consumer markets.

Of the expected population of 70 million in UK by 2030, 44 million will still be working despite the number of over 65's rising 30% from today. The average age will be around 41. An additional 2.2 million people are likely to have immigrated to the UK, but the balance between EU and non-EU migration will change (away from EU).

The lasting impact of the UK Industrial Strategy and Sector Deal

By 2030 current government policies aimed at levelling decision-making power and investment across the UK, in combination with the Industrial Strategy¹⁸ and Sector Deal¹⁹, should create new capabilities and capacity in the Creative Industries across the nation. This could result in:

- The UK's Creative businesses in 2030 offering world-class, innovative new products, services and experiences. For example, first of a kind, immersive audience experiences may result directly from the £58m investment announced in 2018 (from the Industrial Strategy Challenge Fund) for capturing new audiences with technology such as Augmented Reality (AR) and Virtual Reality (VR)
- Commercialisation and monetisation of creative outputs (innovation) in the Sector should also have benefited from the working party announced in the Sector Deal tasked to better understand how to improve take-up of R&D investment in the Creative Industries (including exploring the barriers to securing funding, and how to overcome them). This opening up of R&D funding (especially to micro and smaller businesses), together with expansion of R&D tax credits, and increasing R&D investment in areas of benefit to the Creative Industries (especially where the UK already has leadership, such as AI and data) should benefit the Sector generally and also in terms of Sustainability and Industry 4.0

18. <https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future>

19. <https://www.gov.uk/government/publications/creative-industries-sector-deal>

- A business environment that values the Creative Industries contribution to the economy appropriately through creative use of tax reliefs, a tough stance on Intellectual Property (IP) protection and valuation, and priority access to finance across the country (especially outside of London)
- Creative businesses e.g. companies engaged in the Creative Industries, no matter their size and location, will have benefited from improvements in national digital infrastructure (specifically clean energy for data centres and businesses, 5G and gigabit-capable full fibre broadband to the most rural and remote locations in the UK by 2033). This is much needed, as the sharp rise in consumption of bandwidth due to the COVID-19 pandemic is revealing²⁰. These upgrades will enable new business and operating models (e.g. rental and subscription fashion), as well as innovation in content, distribution and audience engagement
- Even though productivity is usually not the prime metric for creative businesses, they do run business and production processes and, in some cases, manufacturing e.g. fashion, that will benefit from improved output per capita. Hence, the upgraded infrastructure should also address long-standing productivity gaps (especially in the UK's Core Cities) and help to make UK's micro, small and medium-sized businesses more competitive in global markets
- Stronger economic performance and employment growth rates outside of London and the South East of England as companies benefit from local industrial strategies, and financial support for new Creative Clusters across the nation. This is likely to be accompanied by new partnerships between universities and creative businesses at a local level (e.g. a likely outcome of Arts and Humanities Research Council (AHRC) programme to deliver such partnerships with the backing of the new national Policy and Evidence Centre)
- Fit for purpose support for exporters of all sizes from initiatives such as the Trade & Investment Board for Export, the Trade Access Programme and Music Export Growth Scheme. This will require, for example, the Department for International Trade (DIT) to offer specific guidance for the Creative Industries as a whole (as of 2020 it does not)
- New, industry-led creative careers programmes across the Sector focused on a healthy pipeline of next generation talent. Unlike many other Sectors, many of the highly skilled creative jobs in the Sector are resilient to automation or even benefit from what Industry 4.0 can offer in terms of augmentation of skills. However, it is likely that closing key skill-gaps in the Creative Industries in areas such as design and technology, creating more paid apprenticeships (as a progressive move away from unpaid internships), and delivering a step change in the diversity of the workforce will still be underway in 2030. These will require further public investment in the next decade to address some of the structural issues and sustain progress

20. <https://www.theguardian.com/business/2020/mar/18/vodafone-rise-data-usage-more-people-work-from-home-coronavirus>

This is, of course, a positive view of the likely outcomes of existing and new future government policies that we know about. Some of the more challenging aspects of the journey to 2030 include:

- The changing trade flows for the UK as we transition out of the EU and develop new trade deals. For freelancers, micro and small companies (i.e. most of the Sector) this will no doubt bring additional administrative complexities, and there is currently little clarity for the position of the Creative Industries in these deals in terms of tariffs
- There will also be a new UK regulatory environment coming into place. The two fastest growing verticals in the Creative Industries are CreaTech and fashion, and these are also the most likely to carry the burden of regulation in areas such as data, waste, and 'Right to Repair'. Fashion in particular is coming under intense pressure to address a wide range of Sustainability issues, and industry-led action is giving way to calls for regulation (for example, calls for fashion businesses to be held legally accountable for the waste they create)
- The Creative Industries should be less vulnerable to what is sometimes called the 'Amazon effect' meaning that the lowest skilled jobs will be eliminated (increasing the number of people on benefits), with many job roles being restructured as intelligent and automated systems become more competent and suppressing wages. However, the pace of developments in

Industry 4.0 is difficult to predict, and adoption even more so as it depends on levels of awareness and understanding, availability of skills to create prototype and production systems, and the willingness and capacity to change to a new way of working

- As noted in the introduction, the UK has set world-leading targets (i.e. net-zero by 2050) for a transition to a clean, low-carbon economy. To a certain extent the Creative Industries have gone under the radar from a Sustainability policy making perspective, and the working assumption is that the Sector could grow without constraint based upon a combination of electricity production from renewables and a transition to the Circular Economy (increased resource efficiency and productivity, and access to critical raw materials). However, this ignores the practicality of doing so at pace in a Sector of freelancers, micro and small businesses, and the 'gig economy'. As an example, the scale of the challenge can be seen as the fashion sub-Sector grapples with the full ramifications of CEAP 2.0²¹ such as potential curbs on fast fashion and increases in textile recycling. How will people acquire the skills, knowledge, tools and technologies to address these issues? Not to mention the behavioural and leadership challenges that vary by sub-Sector depending on their footprint
- The UK government's progressive decarbonisation policy could have a short-term downside for UK

21. In March 2020, the European Commission announced a proposed Strategy for Textiles in the Circular Economy Action Plan (CEAP) 2.0 that aims to address fast fashion and boost the EU market for sustainable and circular textiles, including textile reuse

businesses if competing nations choose to defer the costs of energy infrastructure changes by displacing their emissions abroad through offset schemes and offshoring (i.e. paying companies in other countries to incur the carbon debt). This is prevalent in the fashion vertical where garments can be designed in the UK but manufactured in Asia (with associated emission and pollution impact)

- There is also the issue of addressing those SDGs that encompass social topics such as Decent Work, Reduced Inequalities, Gender Equality, and Good Health and Well-Being, all areas where the UK Creative Industries can still improve, and 'level-up' across the UK (e.g. using new Creative Hubs and Clusters to bootstrap change). How does the full set of SDGs fit into the Creative Industries picture in 2030?





3. Creative Industries outlook 2030

Creative Industries outlook 2030

A significant contribution to the UK economy

Research for this study using DCMS data from 2018 and Creative Industries Council sources prior to the COVID-19 pandemic suggests that the UK Creative Industries were set to grow much faster than the rest of the UK economy (possibly up to three times faster), reaching a Gross Value Add (GVA) of around £300bn by 2030. This is an increase of £180bn compared to 2020 estimates and would amount to between 9 and 11% of the UK GDP in 2030.

Extrapolating from DCMS and United Nations Conference on Trade and Development (UNCTAD) data²³, exports of creative goods (e.g. fashion, interior design and jewellery goods) and services (e.g. technology services for the Creative Industries, film, TV, video, radio) could be expected to exceed £100bn worldwide by 2030 (from approximately £46bn today).

There are challenges with estimating the current and future size of the Sector, even without the pandemic introducing uncertainty about health and employment. The boundaries between different verticals in the Creative Industries tend to overlap and blur through natural processes of collaboration and co-creation. CreaTech companies and jobs in particular do not fit into well-established taxonomies used to generate UK government figures, and this is a

particularly important area to resolve as CreaTech is growing faster than any other vertical.

The Creative Industries Council²⁴ have captured some of the challenges with CreaTech by dividing the sub-Sector into segments such as Immersive Entertainment (new ways of telling stories and presenting content using technology) and Personalised Tools (using technology to automate processes). However, it is likely that this does not fully capture the full range of companies involved in using Industry 4.0 to produce creative products, services and experiences, or provide technology services for the Creative Industries. For example, technology companies such as IBM employs several hundred user experience and visual designers in the UK alone, and a professional services business - Accenture - is now the 6th largest Agency worldwide²⁵ combining 'creative agency and technology powerhouse'.

At the time of writing this report COVID-19 has already had a profound impact on employment in the Creative Industries Sector. Temporary cessation of UK TV and film production has led to many freelancers working in 'below the line' roles suffering financial hardships or losing their jobs²⁶. In terms of employment projections, even with increasing automation and on-going changes to the way content is consumed (e.g. more global streaming, less local

23. CREATIVE ECONOMY OUTLOOK, Trends in international trade in Creative Industries 2002–2015

24. https://www.thecreativeindustries.co.uk/media/529970/ones_to_watch_v4_singles.pdf

25. <https://newsroom.accenture.com/news/accenture-interactive-ranked-worlds-largest-digital-agency-network-by-advertising-age-in-annual-agency-report-for-fourth-year-in-a-row.htm>

26. <https://deadline.com/2020/03/uk-union-bectu-46-freelancers-lost-money-coronavirus-1202887363/>

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broadcasting for creative content) employment was expected to increase by approximately one million to 3.1m, but this should be treated as an upper bound estimate.

Trends in creative products, services and experiences

Creative businesses are evolving all the time. As part of this study, publicly available documents on trends which are specific to creative products, services and experiences were analysed using machine learning. These documents

included studies published by the UK government (departmental and non-departmental sources), reports from professional service businesses such as McKinsey, trade bodies and special interest groups such as the Creative Industries Council and The Royal Institute of British Architects (RIBA), and social media posts from industry sources such as Advertising Age and Creative Review.

Nine trends directly relevant to the Creative Industries²⁷ were identified as having a higher occurrence in the literature, and these are shown in Figure 5 and detailed below:



Based on Analysis of 77 Online Sources for this Workshop

Figure 5. Trends in creative practice

27. A trend was identified as 'relevant' if there was a high level of agreement between several sources for the trend

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- 1 New ways to tell stories:** By 2030 creative combinations of locations, interactivity experiences, immersive narratives and mixed realities will be captivating audiences in new ways. The trend is for on-going improvement in content and experiences that use AR/VR and simulations, not just on screen, but in physical locations with a story to tell e.g. heritage locations.
- 2 Embedded technology:** Today, most people in the Creative Industries experience advanced technologies such as AI and robotics as stand-alone applications. By 2030, the expectation is that many of the Industry 4.0 technologies will have converged (it won't be clear to the user which technologies are actually involved) and will be embedded into the equipment and processes that we work with every day. For example, scheduling of complex live events may be automated using AI techniques, accessed by voice through a smartphone with a user experience similar to today's chatbots. This will change workflows, and some part of jobs, but also create new jobs (e.g. 'bot trainer').
- 3 Beyond de-carbonisation:** The expectation is that several of the Creative Industries sub-Sectors will have achieved net-zero or be close to it by 2030. Hence, the Sustainability agenda will have moved on to areas such as biodiversity, Circular Economy et cetera. Architecture, and the verticals that operate fixed-buildings such as film studios or temporary structures such as music festivals, are ahead in this respect. However, there is significant scope for improvement as many buildings and festivals in the Creative Industries still do not meet best practice standards.
- 4 New collaboration and co-creation norms:** a recent survey by Adobe on the future of creative collaboration²⁸ shows that while most creatives recognise the benefits of new ways of collaborating using technology, only 36% are actively using these tools. However, there are strong commercial and technological drivers for collaboration and co-creation and this will lead us to new norms. For example, a new generation of product lifecycle management (PLM) systems coming through for fashion that exploit 'digital twins' (software models) of individual consumers

28. The Future of Creative Collaboration, Whitepaper, Adobe, 2020

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so that garments can be designed to fit right first time. The demand for more and more content from dispersed teams will force adoption of collaborative messaging platforms such as Slack, and visual thinking tools such as MURAL (as has happened in software development).

The increased use of digital and virtual environments for co-creation should also aid in developing export markets, without the need for excessive travel. Again, architecture have been early adopters in this respect, using Computer-Aided Design (CAD) collaboration tools for co-creation of designs, and to facilitate end-to-end planning and construction processes.

- 5 **Cross-fertilisation:** The need to connect with existing audiences in new ways, and find new audiences, is encouraging greater cross-fertilisation of ideas, approaches, and people between verticals. Skill shortages in technology and digital capabilities, also promotes exchanges between the verticals. A common example is the crossover between gaming, TV and film. A recent example being Lucasfilm's use of gaming engines to create 3D virtual

environment that can be rendered in real-time with the correct camera perspective²⁹.

Given the increasing role of technology, the Sector is likely to draw increasingly on ideas and talent generated by the UK Industrial Strategy and investment in STEM. This will encourage cross-fertilisation outside of the Sector too (much as ideas from physics have been applied to Computer Generated Imagery-CGI-to provide naturalistic motion and cause and effect). We also shouldn't ignore the fact that arts and culture are already on the same trajectory. Hence, discussion over STEAM (Science, Technology, Engineering, Arts and Mathematics) may increasingly move from conferences into practice.

- 6 **Authentic experiences:** Much as we've seen with large consumer brands and news media, society's broader concerns over transparency and trust are turning into trends that lead organisations to have greater focus on authenticity and provenance. Technologies such as blockchain are key enablers and, as an example, can sit comfortably next to a weaver's loom to provide customers with the confidence that

29. <https://www.slashfilmfilm.com/the-mandalorian-stagecraft/>

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a garment is authentic and traceable back to the field from which the cotton was harvested. Use of technology to bolster trust in authenticity will only increase.

- 7 **Community engagement:** Again, referring to the Sector Deal, the government is expected to succeed in creating multiple new Creative Hubs across the UK³⁰. This will allow the Creative Industries to more easily access sources of professional creative talent around the UK. This should also encourage regional and local community engagement in the entire creative life-cycle (not just local audiences).

As demonstrated by YouTube and tik-tok, the desire to express oneself creatively is widespread. As more digital tools for content creation and distribution become available to general public, it's likely that there will be further expansion of citizen and community led creativity. This in turn will create talent pipelines and new career paths into the Creative Industries (e.g. along the lines of Britain's Got Talent), and challenge some of the more traditional approaches to education and career development in the Sector.

- 8 **Digital business:** In the last decade, the FAANGS (Facebook, Amazon, Apple, Netflix, and Google) have been the major disrupters in several verticals of the Creative Industries (Advertising, fashion, TV, film and music sub-Sectors all having been affected). The next decade will almost certainly see another wave of disruption in digital business as new technologies emerge and become dominant (for some, blockchain is the most likely candidate), or as the FAANGS and their Chinese counterparts (e.g. Alibaba) make their next moves (e.g. could Apple buy Disney?). There may even be a shakeout of some of the incumbents (e.g. Netflix).

Innovations in digital business should benefit the micro and smaller creative businesses as there will be a democratisation of the more sophisticated technologies such as AI i.e. there will be less need to rely on a limited pool of highly qualified experts as simpler to use platforms become available (as happened with ecommerce). It's also likely there will be a significant drop in cost associated with the rise of these platforms and hence more productive use of digital assets

30. For a comprehensive review of Creative Hubs in the UK see:

https://media.nesta.org.uk/documents/creative_nation-2018.pdf.

Also relevant is the £80 million Creative Industries Clusters Programme, which is being funded by the Industrial Strategy and delivered by the Arts and Humanities Research Council on behalf of UKRI:

<https://ahrc.ukri.org/innovation/creative-economy-research/the-creative-industries-clusters-programme/>



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across the whole creative life-cycle.

And, of course, in a 2030 scenario where exports are even more important, enhanced digital business and operating models can give British businesses a welcome advantage. Although already under discussion by the UK government, it is suggested that there is more work to be done in revising the tax system for data rich companies in the Creative Industries to ensure that tax revenues actually do flow into the UK and benefit the UK economy.

9 Customisation at scale: Another important theme for 2030 is the use of analytics to personalise products, services and experiences for audiences and

consumers. For instance, when someone books a theatre ticket, analytics can be used to personalise their experience on the night so that it is more enjoyable or fulfilling for them based on more than just their account preferences. This could be as simple as changing the information they receive ahead of the event using an analysis of their social media (e.g. customised information about the show by email), but it could be changing what they experience on the night e.g. using AR headsets to modify the set or change costumes, or making dialogue visible for people have problems hearing dialogue or want translations.





4. Creative Industries approach to Sustainability

■ Creative Industries approach to Sustainability

Despite the diversity of goods, services and experiences in the Creative Industries, all sub-Sectors share a lifecycle from inspiration and creative endeavour, through design, making and production activities to the eventual experience or act of consumption. Along that lifecycle energy and resources are consumed, buildings occupied, people move around and have to be fed, and energy is consumed (lighting, IT, heating etc). In the case of TV and film, then there is also location work and the construction of sets (and these can be permanent or temporary).

The importance of artists and creators

The Creative Industries and high-profile individual creators have historically been proactive in tackling Sustainability issues related to climate and the environment (as well as SDG areas such as poverty and hunger); Sting campaigning with tribes in the Amazon in the 80's, Coldplay recently suspending touring over environmental concerns.

This continues today, with GenZ stars such as Billie Eilish demonstrating their environmental activism by greening her tour (with the help of non-profit Reverb) and an eco-friendly clothing collaboration with H&M. Indeed, recent surveys of Millennial and GenZ attitudes show a marked increase in concern over climate change and the need for businesses to

act. In turn this is reflected in support for grassroots activism. In the 2019 Deloitte Millennial Survey both GenZ and Millennials placed their personal concerns over climate change as the number one issue to be addressed (in 2017 it was 5th). Another study looking at the relationship between GenZ and brands showed that the desire for eco-friendly and socially responsible behaviour from companies, influencers and creators is even stronger in fast growing markets in Asia, the Middle East and Africa³¹.

Processes, products, services and experiences

The Creative Industries cover a wide spectrum of products and services, and combinations of both. As with any other industry there are business and production processes executed that consume energy and resources. For example, in the lead-up to a dance performance there will be design and build processes for the venue, sets and costumes. On the day, there will be merchandise that has been designed, procured and transported. The venue itself will consume electricity, provide water, food and alcohol, and visitors will produce packaging waste, etc. The audience will travel to and from the event. Hence, there are a wide range of process, product and service opportunities for tackling Sustainability issues with or without technology.

31. Gen Z brand relationships: Authenticity matters, IBM and National Retail Federation, 2017

Examples where ways of working or business processes have been changed to address Sustainability include:

- Industry-led initiatives such as BAFTA Albert and PACT e.g. recording voice-overs remotely, solar charging of equipment on location, inclusion and green riders³² in artist contracts
- Awards for acting on climate and environmental issues (e.g. Creative Green Awards) and a focus on ensuring existing awards (e.g. BAFTAs) are carbon-neutral
- New touring models e.g. Massive Attack working with the Tyndall Centre to develop zero emission strategies for concerts
- Education and awareness for creators e.g. Accelerator Programme from Julie's Bicycle
- Switching to green energy and LED lighting in venues and production
- Asset 'sweating' of equipment through life extension, repair and refurbishment techniques e.g. recording equipment, cameras, lenses
- Zero waste to landfill, re-use and recycling of TV, film and theatre set materials
- Use of mixed reality capture studios and other 3D volumetric studios to reduce long-distance travel for location shoots
- Electric Vehicles on movie lots and festival sites
- Carbon offsetting, such as the band, The 1975, planting a tree for every ticket sold through One Tree Planted initiative (<https://onetreepanted.org>)
- Financial levers e.g. moving pensions and other investments away from fossil-fuels

Examples where the products (e.g. garments), services (e.g. provision of catering at events) or experiences (e.g. engaging with fans at a concert) have been changed to address Sustainability include:

- Education and awareness for audiences e.g. the Billie Eilish eco-village at festivals where she is performing
- Adopting more sustainable design practices for products, garments, creative services, artwork and crafts e.g. modular designs, design for disassembly, design for the Circular Economy
- Selection of materials based on their impact e.g. recycled textiles, bio-materials such as Pinatex (plant-based leather) instead of animal based or oil-based leather substitutes, Econyl 2nd life polymers (rather than virgin polymers)
- Merchandise using sustainable materials e.g. the band, The 1975 stopping printing new t-shirts and instead repurposing old merchandise, and encouraging fans to bring their old t-shirts along to concerts for to be over-printed and so re-used (rather than new garments being produced specifically for the tour)
- Requirement for food service companies supplying concerts, festivals, TV and film production to produce and supply food and drink products based on plant-based diets (e.g. the EAT-Lancet Planetary diet) as a way of significantly reducing deforestation, emissions and water consumption
- Food sellers at festivals adopting

32. A rider is an attachment to a contract that modifies the original

green practices for plastic use and food miles e.g. Glastonbury banning single-use plastics, and promoting local sourcing

Fragmented approaches

Many of the actions listed above have been driven from within the industry (often by a single organisation with a mission, or passionate individuals or groups), and not as a direct response to enforcement

verticals. At this moment it is difficult to assess how far many of these practices have been adopted or their longevity. Is the current wave of initiatives part of a reactive response by Creative Industries to the 4th green consumer wave or part of longer-term changes? This fragmentation can be clearly seen in Figure 6 which shows the current status by industry vertical for each of the SDGs (see Appendix B for the main initiatives identified). Each coloured block in Figure



Figure 6. Heat-map of Sustainability initiatives

through legislation or regulation, or industry standards. There are also consortia-led initiatives such as Albert from BAFTA which seek to create industry-specific or mission-led responses based on their membership. This means that there is a tendency for the responses to be fragmented and ad hoc depending on the organisation and the artist/creative involved. There is also little cross-fertilisation of approaches across the

6 represents a qualitative assessment of initiatives in a particular vertical in terms of maturity and adoption.

There is also a lack of international standards and alignment. ISO 20121 provides guidance for sustainable events, and BSI BS 8909 for Sustainability management in film; these represent the few widely adopted standards in the Creative Industries.

2020: De-carbonisation, climate change, responsible production



2030: greater focus on climate change, access to water, resource scarcity, waste, biodiversity and the Circular Economy



Figure 7. Mapping to Sustainable Development Goals

It is unclear how far more generic standards such as ISO 14001 for environmental management systems have been adopted, and whether organisations in the Creative Industries are getting certified (as opposed to using them as guidance documents or to drive supplier behaviour).

There is momentum for action on Sustainability (notably from younger business leaders such as the Global Shapers at the World Economic Forum in Davos which is a network of almost 10,000 young people in 154 countries driving dialogue, action and change in areas such as climate change), but again there are fragmented approaches and, in some cases, multiple, overlapping initiatives in the Creative Industries.

Changing focus on specific SDGs

Looking at the different initiatives and actions in the Creative Industries, the current focus is still on clean energy and de-carbonisation more generally, climate change, and more responsible production within SDG #12 (this latter dominating many fashion discussions). The ‘climate emergency’ has gained much more focus over the last few years, especially with younger creators and artists, but by 2030, expect prioritisation of water access, biodiversity, and resource scarcity and waste (the Circular Economy). Figure 7 shows how the mapping to SDGs is likely to evolve ahead of 2030.

The special case of B2B creative businesses

For B2B (Business-To-Business) sub-Sectors such as advertising and architecture, client expectations and demands regarding Sustainability practices may be a primary force for change (for example, think of a small creative agency supplying a multinational with a powerful Sustainability mission, such as Patagonia).

If Agencies reflect their clients' briefs, then these may well change in a more positive direction as GenZ and Millennials are promoted to decision-making positions and exert their influence in selecting projects and vendors.

More generally, multiple surveys of shareholder and consumer³³ awareness, understanding, and behaviour show how the importance of Sustainability is changing, and this groundswell will also influence the way that B2B companies act to protect their brand reputation.

33. <https://www.credit-suisse.com/about-us-news/en/articles/news-and-expertise/millennials-drive-sustainability-201702.html>





5. Creative Industries approach to Industry 4.0

Creative Industries approach to Industry 4.0

The phrase 'Industry 4.0' is relatively new (it was first used in 2011³⁴). Until recently the focus has been on industrial manufacturing and production management, rather than design and development and other more creative areas. However, this is changing quickly as the technologies and standards mature, and the definition has shifted to consider the increasing role of design of services, either in their own right or associated with products.

It is easy to see how the Industry 4.0 concept applies to say, automotive manufacturing, but what does this mean if you're in the games industry, or film? There is not yet a consensus on what Industry 4.0 will look like in each of the sub-Sectors of the Creative Industries (or what will be common). Clearly there are

repetitive processes in each of the verticals or sub-Sectors that lend themselves easily to the concept of 'smart factories' for services. For example, many of the steps involved in production of an animated film or the design of a building or a garment.

However, what about the parts of the innovation process that we think of as more creative; those that require inspiration or ideation? Even here there are examples, such as fashion designer Jason Grech in Australia using artificial intelligence (AI) to help find original design ideas from a massive back catalogue of photographs, patterns and cuttings³⁵. In film there are companies such as Greenlight Essentials offering tools to support early stage development using AI and Big Data.

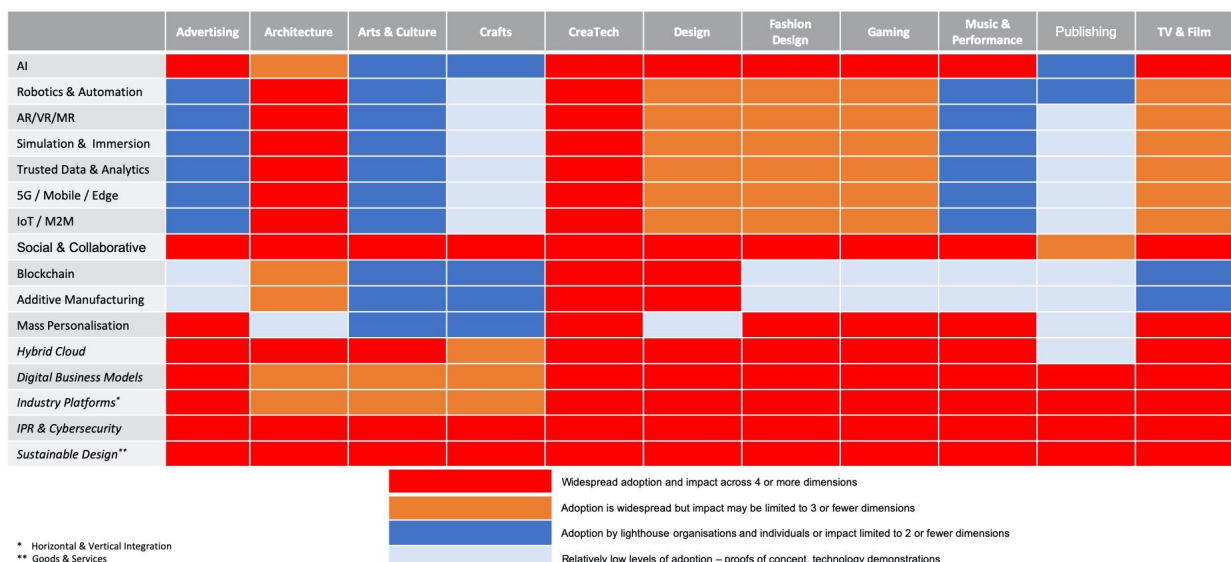


Figure 8. Heat-map of Industry 4.0 initiatives

34. First used as a term in 2011 by the German government. It was all part of an industrial strategy to transform and revitalise large parts of the industrial base. The term is used interchangeably with the idea of a 4th industrial revolution where data is the source of all competitive advantage

35. <https://www.ibm.com/case-studies/jason-grech>

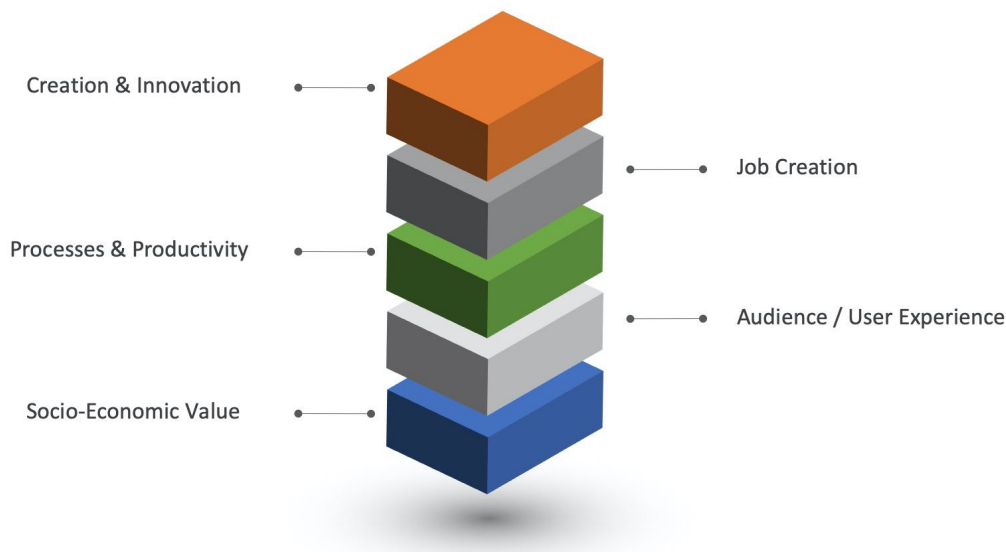


Figure 9. Dimensions for Industry 4.0 adoption

The future is already here

Figure 8 maps the verticals in the Creative Industries to Industry 4.0 as a way of revealing the current state of adoption in the UK (Figure 9 explains the use of the term 'dimensions'). The colour coding is based on a qualitative assessment of the extent to which initiatives in the verticals have been adopted and how many of the dimensions in Figure 9 are being addressed.

Appendix C lists the main industry initiatives identified that impinge on Industry 4.0 and the Creative Industries.

Author William Gibson said 'The future is already here – it's just not evenly distributed' and that is definitely true for Industry 4.0 in the UK Creative Industries. Here are just a few examples:

- The Royal Shakespeare Company (RSC) collaborated with Imaginarium Studios and Magic Leap to create a 'tabletop theatre' performance of the Seven Ages of Man speech from 'As You Like It'. This requires the audience to wear a special headset which presents a foot-high actor giving this speech about the stages of life against a digital backdrop showing a tree blooming and fading. A technique called volumetric capture was used to make the piece ensuring that the actor's performance was perfectly realised in three dimensions
- Beatchain is a combined AI and digital marketing platform for the music industry. This platform enables artists to promote their music and helps fans to discover those artists. For emerging artists in particular, the

platform provides tools to build a fan base and to supply them with music and other forms of content, tickets and merchandise from one, integrated platform. The benefit for the artist is the control over their career that the analytical insights provide e.g. who is listening to their music, who clicked through on which ads etc?

- As part of a vision for a fairer music industry, artist Imogen Heap continues to develop her Creative Passport/ Mycelia project. Blockchain technology is used to keep records of an artist's work, automate payments and ensure that artists retain ownership of their data. This is a decentralised model for trusted content which can be connected to various distribution systems and used by anyone looking to license an artist's music. A secondary benefit is a reduction in the administration and accounting costs
- Cinelytics is an AI-driven decision support system for TV and film financing and production. This platform uses proprietary data together with predictive analytics based on machine learning and deep learning to help studio executives make better business decisions, for example, about casting and content. The system is real-time, allowing, as an example, an on the spot decision to be made about which film to buy at a film festival (a human being might take days to weigh up all of the variables)
- Polymotion Stage is an innovative mobile studio in a truck or a dome that

has been created by UK company Mark Roberts Motion Control together with Dimension Studio. It has a wide range of uses from broadcast media, game production and fashion shoots. The studio captures high-quality volumetric video, and can create 2D and 3D images and virtual humans at up to 4K, with integrated motion capture

- MekaMon, from UK company Reach Robotics, is a gaming robot that is described as 'a real-life video game character' that brings virtual and physical worlds together using AR

All of these examples show some level of convergence between different Industry 4.0 technologies, and this is a trend that is likely to continue in the Creative Industries.

Further convergence

Over the next ten years it is highly likely that there will be a unification and integration of certain foundational technologies that are relevant to the Creative Industries:

- Machines and objects that talk to each other directly (machine-to-machine (M2M)) and over the Internet of Things (IoT)
- Social and collaborative systems for both design and production (people-people, people-machines)
- Insights from Big Data, Advanced Analytics, Machine and Deep Learning (the key elements of AI today)
- Robotics and automation

The underlying technology enablers for convergence are now better understood. For example, the IT sits in the cloud, new technologies such as blockchain are used to track design data and objects end-to-end, and AI takes a leading role in generating insights across the entire lifecycle.

This convergence will not be evenly distributed across the verticals as the starting point and creative and business needs differ. In some verticals this convergence may lead to new, industry platforms, in others it will mean there will be an app for everything.

Certain segments, such as fashion design and craft textiles, can replicate the full end-to-end models developed for industries such as automotive. The UK business Unmade is one of the best examples of Industry 4.0 in action in the Creative Industries at the moment. Unmade provide an on-demand fashion and sportswear platform called UnmadeOS. This platform connects individual customer demand to customised designs and short-run production on automated equipment (the company has developed tight integration to machines on the factory floor).

The Unmade business model exploits their platform to enable designers to collaborate and co-create with each other, and with potential customers. The result is personalised and unique garments made on demand.

To generate and manage demand, their platform offers integration across all retail channels (so-called 'clicks and mortar'). Unmade provide sophisticated design

tools to create purely digital stock (garments are rendered photo-realistically) and so there is less risk of unwanted inventory (e.g. at the end of a season or promotion). Customers pay before production starts and this approach helps with cashflow, a particular challenge for fashion businesses as they get started (i.e. they usually have to pay their suppliers first).

This end-to-end, digital model is likely to become more prominent going forward, and not just in fashion.

The importance of investors

When it comes to technology, talent and ideas are usually not sufficient as Industry 4.0 can be capital intensive. Businesses often start with seed-funding and a minimum viable prototype, then scale in stages with additional injections of funds, and not always from the same source as the seed-funding.

Unmade is also a good example of the role of investors when creative start-ups get underway. The three co-founders met while studying at London's Royal College of Arts and received seed funding from backers (including Connect Ventures, Felix Capital, Farfetch CEO Jose Neves and Zegna's head of digital Edoardo Zegna).

Many creative businesses wanting to invest in Industry 4.0 start with 'debt financing' i.e. funding from friend and family, or a bank loan, or an overdraft. This can only take a business so far, and various forms of crowdfunding and peer-to-peer lending have become more

popular in recent years for companies and artists (and has the added benefit of audience engagement for artists). However, additional funding sources are typically required to build pace and scale for widespread adoption of Industry 4.0 technologies. Hence, by 2030 the Creative Industries need to have learnt lessons from the Technology Sector and Fintech. Additional sources of finance for existing businesses investing in Industry 4.0 technologies, and for start-ups, include:

- Public funding e.g. grants from Innovate UK, R&D tax credits
- The British Business Bank (government-owned development bank for growing businesses)
- Accelerators and incubators³⁶ (intensive mentoring and support programmes that help entrepreneurs develop an idea into an investor-ready proposition). This may or may not involve staged investment in return for equity. The UK has many such programmes e.g. the one run by Founders Factory
- Private equity (investment funds and investors who invest directly into private, unlisted companies). Cinven is a London-based example
- Business Angels (wealthy, sophisticated investors who take an equity stake in return for their investment)
- Venture Capital (investment companies specialising in the Creative Industries e.g. Station 12)
- Corporate Partnerships e.g. with technology companies such as Microsoft, Google etc

- Philanthropic Sources, particularly relevant where Industry 4.0 is used specifically to address Sustainability

In addition to the sources listed, there is typically access to a variety of finance sources via the Creative Cluster and Creative Hubs across the UK (e.g. including from Local Enterprise Partnerships and Enterprise Zones).

However, a common factor in successfully acquiring finance for Industry 4.0 investments is having the business and finance skills to succeed i.e. a great idea is not enough.

For a comprehensive guide see the Institute of Chartered Accountants in England and Wales publication 'Creative industries – routes to finance.'

36. <https://www.techrepublic.com/article/accelerators-vs-incubators-what-startups-need-to-know/>





6. Foresight from the workshops

Foresight from the workshops

Separate workshops for Sustainability and Industry 4.0 were organised on 29th February 2020 and 6th March 2020, and the findings analysed separately and then together to look for commonality.

Following input on the trends given earlier in this document, participants were asked to work in groups to identify the most relevant drivers of change, and the scenarios that might emerge over the next 10 years.

This section documents the outputs from the Sustainability and Industry 4.0 workshops. and follows the flow of the workshops. First, the trends identified as relevant to the Creative Industries and the resulting 2030 scenarios, then identification of policy makers and policy suggestions, finishing with education and research connections.

At the end of this section, there is a summary of a number of Sector-wide policies raised by the participants that are not specific to Sustainability and Industry 4.0.

Expert views on Sustainability and the Creative Industries in 2030

2030 Sustainability scenarios

After presenting global, UK, Sustainability and Creative Industries specific trends to the participants, working groups were asked to identify two trends that

represented for them the key drivers of change towards 2030 for Sustainability and the Creative Industries. Between the two working groups, the following four trends were seen as most likely to re-shape the Creative Industries in the UK over the next decade:

1. Automation to support creatives and improve productivity (note: the Creative Industries are viewed as resilient against job losses due to automation e.g. increased application of technology won't necessarily lead to job losses)
2. Growing awareness of the urgency to address climate change, and appreciation of the need for more action by the Creative Industries
3. Growing social engagement in the Creative Industries (local, regional and national)
4. Innovative design specially to address the needs of products, services and experiences in a more Circular Economy

These trends were then translated by participants into multiple scenarios using the scenario-mapping tool in Appendix D. Finally, each working group was asked to identify the most likely scenario for 2030. The two working groups identified the following scenarios (A and B) for Sustainability and Creative Industries in 2030 as the most likely (note: that the titles are those given by the experts to the scenarios):

‘Eco-activists on the rise’

A

Eco-social innovations such as community swap-shops, repair cafés and plant-based diets in schools help to address the UK.'s social divide chasm whilst delivering business as usual. This scenario assumes a medium to high level of social engagement in creative practices.

The scenario is characterised as follows:

- a. advertising can create new ‘woke’ style adverts³⁷
- b. architecture can respond to social change by ‘eco-social housing innovation’
- c. for technology services there is a need to develop skills e.g. getting young people into the gaming industry
- d. fashion design needs to pay more attention to concepts such as community swap shops, repair cafés, item exchange, reuse, recycling etc.
- e. music and performance need to become more accessible as well as less materialistic and product based

‘The penny finally drops on automation and Sustainability’

B

Government and business ramp up investment in automation in the Creative Industries to address / mitigate / reverse climate change. This scenario assumes automation becomes a focus for addressing climate change.

The scenario is characterised as follows:

- a. advertising can be ‘a force for good’ by changing demand (for more sustainable goods and services)
- b. architecture can improve efficiency in the construction Sector by off-site construction and modular design
- c. designers can incorporate more user experience into their designs, and design product functionality to accommodate future technology

37. Woke is a vernacular term that describes awareness or consciousness of the truth behind (primarily) social injustices. For more, read <https://en.wikipedia.org/wiki/Woke>

Sustainability policies

The expert participants were also asked to identify broad groups of stakeholders and policy makers that they saw as relevant to discussions concerning Sustainability in the Creative Industries. A total of 32 individual or types of stakeholders / policy makers were identified:

- 10 local, regional or central UK government departments (BEIS, DCMS, DWP, DEFRA, No.10 / Cabinet Office, FCO, Treasury, Local Authorities, City Regions, Local Enterprise Partnerships or LEPs)
- 7 for-profit organisations or named trade bodies (BBC, Sky, ITV, Channel 4, Commercial Banks, Pension Funds, Trade Bodies such as BAFTA)
- 3 UK non-departmental bodies (HFCE, Research Councils, Arts Council)
- 2 international governmental organisations or similar (G20 countries in Commonwealth, European Commission)
- 2 inter-governmental organisations or similar (OECD, IEMA)
- 2 types of regulators (government and industry e.g. Advertising Standards Authority (ASA), Ofcom and Broadcast Standards, Ofwat, Ofgen etc)
- 1 local citizen representation (i.e. Citizen's Assembly)
- 1 not for profit organisations (Creative England)
- 3 charities / non-governmental organisation (The Design Council, Greenpeace, Soil Association)
- 1 class of academic stakeholder (Universities)

After voting, the top stakeholders / policy makers (multiple votes) relevant to discussions over Sustainability in the Creative Industries were:

- UK Central government, esp. BEIS
- Individual (micro, small and medium-sized) businesses
- Banks (commercial, investment and international development)

Additional highlighted stakeholders/policy makers (single votes only) were:

- Universities
- The Design Council
- Research Councils
- Broadcast media: BBC, Sky, ITV, Channel 4
- The Treasury
- HEFCE (now Office for Students and Research England)
- Greening UK (including Greenpeace etc)

After thinking about of all the possible stakeholders and policy makers, the experts generated policy ideas related to Sustainability and Creative Industries in 2030. The responses specific to Sustainability and Creative Industries were:

Taxes and penalties

- Lower taxes for sustainable businesses i.e. those that can demonstrate they are reducing waste and energy
- Penalties and fines for polluting the environment
- Consumption-based taxes on resources and carbon
- Change the way we value materials e.g. by taxing material inputs

Incentives

- Greater use of public procurement to create a stable demand for more sustainable products, services and experiences, and demand for virtual and digital offerings
- Incentives for small creative businesses to put in place sustainable practices e.g. energy grants, business tax reductions
- Promotion of partnerships with environmental technology companies to exploit new processes and materials e.g. fashion brands such as Volcom partnering with Unifi to design garments using 100% recycled Repreve® fibre
- Incentivise 'virtual consumption' e.g. home consumption of theatre or music performance using virtual reality to minimise travel impacts etc
- Incentives to shift public opinion and culture towards higher awareness of Sustainability and modified buying behaviour among the general public
- Embed Sustainability into every course in every educational institution

Education and skills

- Sustainability skills for the Creative Industries (education and skills development, especially where it can be demonstrated that there is an actual impact for the Creative Industries)
- Industry champions to write sustainable degree courses

Regulations and standards

- Duty of environmental responsibility on every organisation in the creative Sector (e.g. Extended Producer Responsibility (EPR) scheme for fashion). This could be extended to a

duty of ethical responsibility for data use and application of techniques such as facial recognition

- Develop a coherent map of Sustainability codes within Creative Industries sub-Sectors
- Guidance standards on a Sectoral basis (to address fragmentation)

Education and research connections for Sustainability

Skill gaps and access to Sustainability educational content were major areas of discussion. Key insights on the role of education in the journey to 2030 were:

1. Universities and business schools should help shape opinions, making better use of case studies and examples to better connect with those in the Creative Industries
2. There should be more industry people brought in to talk about success with Sustainability in their creative businesses
3. For sustainability education and skills-development it is important that it should be action-oriented. People in the Creative Industries need tools that allow them to make a difference quickly. This could mean education and training designs need to be granular and immediate, more like 'life hacks'
4. Since the Creative Industries are so fragmented, cross-vertical collaboration on Sustainability is important
5. Sustainability education should be mandated for all undergraduate courses i.e. 'integrated'

In addition, a major research gap that was identified for the Creative Industries is the

need for further investigation of the on-going challenges with equality and diversity in the Creative Industries (SDGs #5 and #10). Specifically, how to successfully implement equality and diversity policies into companies that range from micro to multinational in scale.



Expert views on Industry 4.0 and the Creative Industries in 2030

2030 Industry 4.0 scenarios

After presenting global, UK, Industry 4.0 and Creative Industries specific trends to the participants, working groups were asked to identify two trends that represented, for them, the key drivers of change towards 2030 for Industry 4.0 and the Creative Industries.

Although the workshop was designed around Industry 4.0, Sustainability issues and trends featured strongly in participant dialogue. This may reflect the fact that some participants had previously attended the Sustainability workshop a week earlier, or it could be the mix of attendees present, or it could further validate Sustainability as a major issue.

Between two working groups, four trends were seen as most likely to re-shape the Creative Industries in the UK over the next decade.

1. UK Creative Industries export growth in terms of economic and cultural value
2. Greater competition for audience and consumer attention, making for a more competitive environment; the 'attention economy'³⁸
3. Digital creation e.g. of content, product designs etc
4. Sustainable design (as with the Sustainability workshop), especially to address the needs of products, services and experiences in a more Circular Economy

As with the Sustainability workshop, these trends were then translated by participants into multiple scenarios using the scenario-mapping tool in Appendix B. Finally, each working group was asked to identify the most likely scenario for 2030. The two working groups identified the following scenarios for Industry 4.0 and Creative Industries in 2030 (see call-out boxes A and B on the following page) as the most likely (note that the titles are those given by the experts to the scenarios).

Industry 4.0 policies

The expert participants were also asked to identify broad groups of stakeholders and policy makers that they saw as relevant to discussions concerning Industry 4.0 in the Creative Industries. A total of 21 individual or types of stakeholders / policy makers were identified:

- 4 central UK government departments (BEIS, DCMS, DIT³⁹, No.10)
- 6 for-profit organisations or named trade bodies ('The Media', Content Creators, Content Platforms, Private sector Finance, 'Corporations', Trade Bodies)
- 2 sources of advice for the UK Government (Creative Industries Trade and Investment Board – CITB, Thought Leaders)
- 5 UK non-departmental bodies (British Council, Innovate UK, Arts & Humanities Research Council – AHRC, Engineering and Physical Sciences Research Council – EPSRC, Economic and Social Research Council - ESRC)

38. In the attention economy human attention is a scarce commodity. The American economist Herbert Simon wrote 'in an information-rich world, the wealth of information means a dearth of something else: a scarcity of whatever it is that information consumes. What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it.'

39. Department for Business, Energy and Industrial Strategy (BEIS), Department for Digital, Culture, Media and Sport (DCMS), Department for International Trade (DIT)

‘We’ve closed the loop on the creative economy’

A

Sustainable design practices, combined with the latest techniques in digital creation, make circularity the norm in the Creative Industries and the wider creative economy.

The scenario is characterised as follows:

- a. sustainably designed products are not just an elitist luxury i.e. common and available to all
- b. digital content is created and delivered without data centres ‘killing the planet’
- c. designers and creators have access to the skills, knowledge and tools to close the loop, even in the smallest businesses and the gig economy

‘Scarcity is the driver of value’

B

Increasingly limited cognitive bandwidth (the capacity to think clearly, pay attention and to make decisions) as more and more digital content and experiences become available to audiences and consumers. This is particularly true for CreaTech, Design, Gaming, Music & Performance, and TV & film.

The scenario is characterised as follows:

- a. strong domestic market but reliance on exports for economic growth (e.g. access to global markets to overcome limits of audience size and attention in domestic market)
- b. high perceived cultural value of UK creative output in terms of experiences, consumption and engagement
- c. avoidance of actions that drive down economic value, such as unimaginative or ubiquitous output that drives down the perceived aesthetic or economic value*
- d. avoidance of factors that reduces the perceived cultural value of UK exports, such as political opportunism (e.g. removing state subsidies from heritage and cultural intuitions that feed the talent pipeline and act as the backdrop to so many of our visual exports)

*A famous example of this is the decline of the Pierre Cardin fashion brand into a generic label prone to counterfeiting in the 1980s as a result of extensive licensing and merchandising deals

- 1 international governmental organisation or similar (Foreign Governments involved in trade deals)
- 1 inter-governmental organisation or similar (Standards Bodies such as ISO)
- 1 source of local influence (including celebrities)
- 1 class of academic stakeholder ('Educational establishments')

After voting, the top stakeholders / policy makers (multiple votes) that were seen as relevant to discussions about Industry 4.0 in the Creative Industries were:

- Foreign Governments via Trade Deals / negotiations
- Private Sector Finance (globally)
- Creative Industries Trade Bodies / Creative Industries Trade and Investment Board (CITB)
- Content Creators
- Educational Establishments

Additional highlighted stakeholders/policy makers (single vote only) were:

- Corporations (in the Creative Industries and / or focused on Industry 4.0 tech')
- No. 10
- Industry 4.0 Thought leaders
- DIT
- Content Platforms
- British Council
- Innovate UK

Thinking then of all the possible stakeholders and policy makers identified, the experts generated policy ideas related to Creative Industries and Industry 4.0 in 2030. The responses specific to the Creative Industries and Industry 4.0 were:

Taxes and penalties

- Tax reliefs for all Creative Industries (to assist with Industry 4.0 adoption)
- Specific tax breaks for micro and small / new creative businesses exploiting Industry 4.0

Incentives

- Innovation funding for sustainable technology and processes exploiting Industry 4.0
- Funding for commercialising industry 4.0 technology for the Creative Industries, targeting micro and small to medium size businesses
- Incentivise open source activity
- Free/subsidised ultrafast broadband for creative companies exploiting Industry 4.0
- Low interest loans or grants to help creative start-ups scale up Industry 4.0. Variations on this include public funding specifically for the commercialisation or scale-up of new technologies, and more local and regional funding e.g. via the Local Enterprise Partnerships (LEPs) and Cities.

Education and skills

- A review of education policy for Creative Industries (i.e. including Industry 4.0 content)
- Professional education programmes for Industry 4.0
- In addition to more permanent jobs, there is a need for streamlined entry for visiting artists and other creatives e.g. film and music festivals, stadium tours by professionals, one-night gigs in small venues by the next generation of talent, etc. This could take the form

of a specialist visa scheme along the lines of the Global Talent Visa launched recently for research and innovation.

Infrastructure

- Government funding for cloud infrastructure and cyber-security measures required for success with Industry 4.0 in the Sector
- Hubs for cross domain knowledge transfer e.g. best practices for Industry 4.0. In the workshop, Digital and Creative at the Knowledge Transfer Network being identified as difficult for the smallest creative practices to engage with

Business support

- Support for micro, small and medium-sized to tailor their current digital products and services to exploit Industry 4.0
- Business mentoring scheme for Industry 4.0
- Industry 4.0 literate industry bodies to connect micro organisations
- Local venture capital funding opportunities for Industry 4.0 start-ups

Education and research connections for Industry 4.0

Skill gaps and access to Industry 4.0 educational content were major areas of discussion. Key insights on the role of education in the journey to 2030 were:

1. There is an immediate need for a digital upskill for executives in Creative Industries
2. Technology companies may be sources of investment and education

delivery. Industry 4.0 is capital intensive and changes rapidly so there is a need to find new ways to fund initial outlay and an on-going refreshment, so students are always trained on the latest technology

3. Standalone venues and centres within universities and / or science museums need to be developed to showcase, demonstrate, and enable a hands-on feel for new technologies. This could be part funded by the technology industry, or new subscription rentals developed for continuous upgrading to new iterations or version of the technology (as Apple does for iPhones). This could be part funded by the technology industry
4. Training is required in human + machine creative leadership (man:machine interface)
5. As Industry 4.0 changes the nature of work in the Creative Industries, it is necessary to think about the work ethic and the search for meaning
6. Academics and students need easy access to conceptual (not technical) knowledge packages on the components of Industry 4.0
7. There is a need to capture learning in case studies and best practices from outside the traditional Western models (e.g. how China has used Industry 4.0)
8. Industry 4.0 cross-domain education 'testbeds' or sandpits to encourage play, experiments and group failures (see 3. above)

In addition, a major research gap identified was the connection between academic and industry research. The expert participants suggested that industry input to the 2030 picture for

Industry 4.0 research was essential for a productive outcome.

It was also noted that there is a need for research on Industry 4.0 to be practical and applicable in the short to medium term (as 10 years to 2030 is not that long, and the technologies are changing rapidly).

Shared policy makers between Sustainability and Industry 4.0

While there are distinct differences in the policy makers and stakeholders for Sustainability and Industry 4.0, there is a common set:

be seen in the inclusion of foreign governments and international finance organisations as stakeholders, and this also reveals an underlying uncertainty about future trade deals.

The importance of the inclusion of the very smallest creative businesses as major stakeholders simply reflects the reality of the Sector, but also identifies a challenge in terms of effectively involving them in policy making. Similar comments were made concerning connecting the smaller creative businesses to sources of finance, whether this is banking or other forms of investor (such as angels or venture capital). Indeed, the global nature of finance was discussed as both a

tremendous opportunity for our world leading creative businesses, but also problematic as a process.

Regional and local policy makers were identified during the study (e.g. LEPs and

Priority Policy Makers	Main Stakeholders
<ul style="list-style-type: none"> • UK central government e.g. BEIS, DCMS, DIT⁴⁰, No.10 • Creative Industries Trade and Investment Board (CITB)⁴¹ 	<ul style="list-style-type: none"> • Individual (micro, small and medium-sized) creative businesses • Banks (commercial, investment and international development) • Private sector investors (globally) • Foreign governments during negotiation of trade deals • Creative Industries trade bodies (e.g. BAFTA) • Major content creators (e.g. the BBC, Sky, C4 etc) • Educational establishments

The central government policy makers listed are, perhaps not surprising. However, the inclusion of both the DIT and CIBT show the importance that participants in the study give to international trade in their 2030 scenarios for the Creative Industries. This can also

Cities), but were not given the prominence that central government departments received. This may be a limitation of the group involved in the study, or may reflect that there is still more work to be done to connect these policy makers to the Sector.

40. Department for Business, Energy and Industrial Strategy (BEIS), Department for Digital, Culture, Media and Sport (DCMS), Department for International Trade (DIT)

41. Agreed in the Creative Industries Sector Deal in 2018 as an industry-led advisory board for the UK government. A primary aim is to stimulate trade

Thinking of the prominence given to levelling-up across the UK, and the trend to devolution of investment and certain government powers, it is likely that these regional and local policy makers will grow in importance in the lead up to 2030.

As well as a common set of policy makers, participants in the study highlighted a common problem: the fragmented nature of the Sector (and the large number of micro-businesses and freelancers) makes engagement with policy makers difficult. In fact, some participants said they had no contact with policy makers at all.



Expert views on policies for the Sector as a whole

In addition to specific policy recommendations for Sustainability and Industry 4.0, the participants also made general suggestions for the Creative Industries Sector. These are listed below:

- As part of levelling-up, to establish tax-free Creative Industries Zones in UK regions (these could be modelled on the current Enterprise Zones in the UK (including financial incentives such as 100% first-year allowances for capital expenditure)
- Enhance the existing Innovate UK business engagement programmes
- Stimuli for exporters: tax breaks for creative exports, an export market research scheme, and trade missions for creative enterprises targeted at micro, small and medium-size enterprises (100% funding)
- Prioritise grants for smaller creative businesses and freelancers; provide free knowledge hubs so that small creative businesses can connect, collaborate and exchange best practices
- More support in grants for apprenticeships leading to jobs in the Creative Industries
- Formal schemes for mentoring between large and small creative businesses
- Establish governance and tools for IP valuation for intangibles as leverage for capital investment within the Sector. This could involve legislation to ensure UK creators can protect their intellectual property effectively, especially in a digital world, and to

ensure it is valued correctly

- More young people to be involved in policy-making. Indeed, the 'Well-being of Future Generations Bill' (currently waiting its second reading) has specific requirements for engaging with younger members of society in respect of policy and legislation and, if passed, will establish a Commissioner for Future Generations for the United Kingdom
- Government support to establish a new 'federation' focused on Creative Industries entrepreneurs in micro, small and medium-sized businesses. Existing organisations such as the Creative Industries Council and the Creative Industries Federation would retain the Sector advocacy role, while this new body would focus on building capacity and capability in the Sector

Younger artists, entrepreneurs and employees are often working in situations that lack financial stability (e.g. the gig economy, freelance, funded by friends and family). The 2020 COVID-19 pandemic has highlighted this clearly. Of course, it would be ideal to address the underlying structural problems, but in the next 10 years interviewees and workshop participants favoured more immediate policies that could assist these younger workers (e.g. subsidised tuition fees, apprenticeships, extending free public transport et cetera).

In terms of the policy making process for the industry it was expressed that it would be better to create conditions for innovation and let the creativity of the Sector drive growth, rather than focus too heavily on top-down prescriptions. This is worthy of further investigation.

The participants also made suggestions about education for the Sector, and how that should change to meet the unique characteristics of the Sector (freelancers, micro, small and medium-sized businesses, 24/7 working and deadline pressures) as well as the likely economic and social changes leading to 2030:

1. There is an urgent need for a Creative Industries skills map for 2030. As well as reviewing more practical skills this should include a review of managerial and executive skillsets
2. It is recognised that UK nationals may not be able to satisfy the demand for talent and creative positions implicit in the anticipated growth in the Sector. This could put a brake onto the two fastest growing sub-Sectors: CreaTech and fashion. A similar situation applies to music, TV and film content leading to 2030
3. There is a need to address the education, training and executive education needs of the two million workers⁴² in the Creative Industries today. These people are time constrained and need bespoke training and education that is more like 'consultancy'
4. Undergraduate, postgraduate and executive education would benefit from a different approach to course design. More short courses, better use of online content (refreshed reliably, with tutors trained to facilitate online discussion)
5. UK creativity and creativity education is valued worldwide. UK universities need to offer global connectivity together with the best possible

education and training experience. Online learning tools and resource portals need to be tailored to appeal to people who work in the Creative Industries

6. Core business competences remain a gap in many companies in the Creative Industries (e.g. finance skills). If the industry is to grow, then the UK needs better business skills for entrepreneurs in the Creative Industries
7. Sponsorship and mentoring from experienced practitioners, together with interdisciplinary knowledge sharing and informal education, is more important in the Creative Industries than many other Sectors
8. Vocational training for Industry 4.0 should not be ignored as there are many technical, trade and artisan roles in the Creative Industries and a shortfall of candidates. It is worth noting that an increasing number of people enter the Creative Industries with no formal Creative Industries skills education; they have either learnt from sources such as YouTube (e.g. video editing skills) or working in informal groups (e.g. a common entry point for music)


Given the importance of the Creative Industries to the UK economy in 2030 it was suggested that creativity and creative thinking should be incorporated in how all subjects are taught (i.e. perhaps starting a new wave of adoption following in the footsteps of Osborn, De Bono and Buzan who previously championed creative problem solving as life skills).

42. DCMS 2018 data

There was even the suggestion that that there should be subsidised tuition fees for creative subjects at university.

Of course, these workshops were held before the current COVID-19 pandemic, no doubt additional policy and education suggestions would be forthcoming today. For example, how to protect the livelihood of freelancers in challenging times.





7. Discussion of findings

Discussion of findings

The aim of this short study is to identify policy areas for further development. The study has identified distinct policy area suggestions for Sustainability and Industry 4.0 (see above), but there are also several areas where the scenarios and policy suggestions overlap or complement each other.

It is important to understand the limitations of the approach taken. For example, in terms of participation, the Architecture, Craft, Games and Publishing sub-Sectors were under-represented. There was limited regional or local policy maker involvement. The facilitation process did not allow for lengthy elaboration or testing of trend choices or scenarios, and the policy suggestions relied on the opinions of those in the room, and so no doubt some bias crept in. Hence, the expert participants developed their foresight for the Sector within these limitations.

Umbrella scenarios

The scenarios created reveal insights about how the Creative Industries may change over the next decade, and help policy makers and stakeholders understand how different development paths might play out. Ultimately, they provide a thinking framework for policy making and action.

In this study there are many similarities between the drivers identified by the

experts for Sustainability and Industry 4.0 in the Creative Industries. For example, Sustainability in design is a cornerstone of the industry 4.0 scenarios, and technology appears as a force for change in the Sustainability scenarios but there are potential trade-offs related to increased energy use and CO2 emissions, and e-waste.

Also, some of the scenarios are more concerned with the nature of demand for content, products, services and experiences, and others with the ability of the Creative Industries to supply them. Hence, to focus the discussion, the scenarios from the workshops (and some additional commentary from interviews) have been summarised into two umbrella scenarios which are labelled 'invest to sustain' and 'new ways to grow' (note: the workshop participants were not involved in development of these scenarios):

Invest to sustain: This supply-side scenario focuses on addressing Sustainability in the UK Creative Industries by accelerating investment in Industry 4.0 to transform end-to-end value chains. This involves smarter use of sensors, and intelligent and automated equipment to integrate all digital and physical elements from inspiration to the end experience (or point of consumption). This will enable new

and more effective ways of co-creating and collaborating at every step, and automatically generate reliable data that can be used to optimise the energy and resources used. The UnMade example used earlier is good illustration of how this is already working for the Fashion vertical.

In addition, this investment should stimulate widespread entrepreneurship and innovation, and create the optimal conditions for social, environmental and economic leadership (the Triple Bottom-Line) for creative businesses of all sizes.

A key enabler of this scenario is convergence of Industry 4.0 technologies and the rise of industry platforms that will make Industry 4.0 more accessible to all working in the Creative Industries (including freelancers and micro-businesses). Open Source software and hardware can accelerate convergence and availability at greatly reduced cost. In terms of industry platforms, DIY design platforms are already emerging in the Advertising sub-Sector (e.g. Celtra's Creative Management Platform) which provide creatives with a simple, highly automated workflow for high calibre, original content.

Implicit in this scenario is that widespread adoption of Industry 4.0 is aligned to, and accelerates, Sustainability and hence attaining the SDGs as well. For example, a gaming company can use AI to both improve their games and monitor the

health and well-being of their gamers worldwide (SDG #3). In another example, a fashion business could use remote sensors to monitor their production in Bangladesh, and the impact of their cotton supply on agricultural land and drinking water in India (SDGs #12, #14, #6). However, adoption should also consider the ethical dimensions of the technologies involved. Data usage should follow the best practices embodied in legislation such as the General Data Protection Regulations (GDPR), and use of AI and advanced forms of analytics should be free from bias. Autonomous systems should be designed to prioritise human well-being (SDG #3, and as outlined in the Institute of Electrical and Electronics Engineers publication on Ethically Aligned Design of Autonomous and Intelligent Systems).

To be successful by 2030 this scenario requires sustained and widespread public and private investment in technology and infrastructure specifically for Sustainability and Industry 4.0 in the Sector to create a business environment where growth can flourish long-term. Given the fragmented nature of the industry, this requires a fresh, more integrated approach to investment such as smart enterprise zones with buildings suited to the needs of film-makers, crafts-people etc, well equipped and properly staffed Maker Spaces and Repair Cafés, Garages and Fabrication Labs⁴³, extensive networks of sensors and beacons

43. Maker Spaces and Repair Cafés are collaborative workspaces that offer creative people a variety of equipment ranging from traditional hand tools to. Garages are common in the technology world. They are often (but not always) physical spaces aimed bringing entrepreneurs and seed funding or early stage venture capital together to develop software and hardware. A Garage will have a robust process for starting up a business. Fabrication Labs are high technology, small-scale workshops with the capability 'make anything' using digital fabrication (3D printers, laser cutters, digital numerically controlled lathes and milling machines)

nationwide, intelligent and clean energy grids, gigabit fibre broadband prioritised for the Creative Industries, and open data platforms).

Another key enabler for this scenario is easier access to finance from public funds, Private Equity, Venture Capital, banks etc for the smaller creative businesses and entrepreneurs with new start-up ideas for the Sector. For example, hotlines with staff who understand the Creative Industries.

The scenario is not just about technology. It also requires co-ordinated action by all educational establishments and employers to change skills and mindsets to support new work patterns (e.g. co-creation and collaboration for design), digital business models and processes (e.g. marketplaces, access over ownership, subscriptions, freemium⁴⁴), and the way that creative businesses can improve their businesses and generate value from the data in their value chains (through techniques such as personalisation and recommendation much as the FAANGs have done). This scenario implies managing change to every course, and in every business by 2030.

This scenario also anticipates more eco-activism as the digital natives (Millennials and GenZ) take up management and leadership positions. Sustainability will become a part of the DNA of creative businesses in the UK, and this will

become a competitive advantage in the UK and in export markets.

New ways to grow: This demand-side scenario addresses perceived limits to the growth of audiences and customers (for B2B and B2C companies) in a global 'attention economy' through innovations in demand generation and fulfilment. There are human constraints on demand for B2B as well as B2C companies in the Creative Industries i.e. when it comes to products, services and experiences in any single market there are limits to consumer spending and the hours available to consume music, film, games etc. But many markets for creative output are now global, and this means that UK businesses have to grow by exporting and also face-off international competition for the attention of UK citizens and companies. However, if approached with current thinking, tools and resources this competition could be at the expense of Sustainability as increasing demand means more energy and resources being consumed too (e.g. electricity for streamed content, textiles for fashion etc).

A key enabler for this scenario is engaging with current audiences and consumers, and capturing new ones, through sustainable innovations that employ Industry 4.0 technologies. This could include using new forms of storytelling to expand the market for an existing physical experience (e.g. such as virtualising escape rooms by combining digital story-

44. Marketplaces bring buyers and sellers directly together (e.g. iTunes). Access over ownership models are a type of 'sharing economy' approach that grants temporary rights of access to products and services (AirBnB is a well-known example). Subscription models involve a recurring fee for access to products or services and so lock the buyer in to a purchase habit (e.g. Netflix). Freemium models give buyers and audiences basic access for free (e.g. Spotify). There are many other models!

telling with elements of game design), creating secondary markets and platforms for product re-use and repair (clothing being a prime example), reaching more Millennial and GenZ consumers with digital subscription-commerce models for content with inbuilt carbon offsetting (e.g. as offered by businesses such as Cloverly.com through their Sustainability as a Service platform) and marketing designs based on novel, eco-friendly materials (e.g. textiles from new plant-based sources).

These innovations create new markets and enable existing markets to be further developed beyond current cognitive and physical limits without 'killing the planet'⁴⁵ (e.g. by adding services and experiences to craft products, or through developing secondary markets for fashion). Implicit in this scenario is that substantial new markets can be created this way, and that there will be more UK Unicorns before 2030 (e.g. following in the footsteps of Improbable, the multi-player game company).

To be successful in 2030 this scenario requires targeted investment and support tailored to each sub-Sector's needs to embed Industry 4.0 technologies and accelerate the scale-up of start-ups and those existing businesses with an appetite for growth and for creating new markets. Based on what has been seen in other

Sectors, this funding can be global. Another enabler is an expansion of public and privately funded Creative Hubs, Accelerators and Incubators before 2030. These provide the physical and virtual spaces for collaboration and co-creation, where ideas, talent and finance can come together effectively. For this scenario to be successful these need to reflect the specific needs of each sub-Sector e.g. a craft jeweller may need a mix of skills training on developing a subscription business, technology training on blockchain (for provenance) and access to a laboratory for experimenting with 3D printing – quite different to the needs of a Director of Photography.

This scenario is not just about the next Unicorn, it is also concerned with giving all who work in the Creative Industries the business skills needed to access finance, create new business and operating models, and to fully exploit the Industry 4.0 technologies relevant to their job by 2030. For example, a freelance Director of Photography may need to know about robotics, whilst a textile weaver may need to understand how blockchain can help with telling a compelling origin story.

This scenario also anticipates more eco-activism as the digital natives (Millennials and GenZ) exercise their buying power as company employees, consumers and audiences. Having a brand that is independently measured as

45. A quote from the study participants meaning excessive waste or energy consumption and engaging in wasteful or harmful actions that also drive down the economic or cultural value of UK creative output (e.g. excessive merchandising)

sustainable (e.g. appearing on the Sustainable Brand Index™⁴⁶) will determine attractiveness to investors and customers.

Both of these scenarios acknowledge the role that people play as prime-movers in delivering change within the industry i.e. setting targets for Sustainability and investing in technology alone is insufficient.

Also, both of these umbrella scenarios require the UK Creative Industries to take a more active role in policy making locally, regionally and nationally. People working in the Creative Industries need greater awareness of the how policy making works and how to get involved. However, it also requires a streamlining of processes (e.g. participants suggested that processes and forms related to grant applications to Innovate UK, need to become much simpler and more accessible). This is necessary as the majority of businesses in the Sector employ less than 10 people, and the natural focus is on audiences and customers and getting paid, rather than getting involved in bureaucratic and administrative processes.

Common policy themes

The study has identified six over-arching policy themes:

1. **Fragmentation:** The estimate made for this study is that by 2030 there will be over 350,000 micro businesses and SMEs in the Creative Industries, with more than 95% employing fewer than 10 people. Each vertical will be

impacted by Sustainability considerations and Industry 4.0 (although the extent may well be dramatically different for each vertical). However, the entrepreneurial and independent creatives in the workshops had little (or no) involvement in policy-making and insufficient scale to engage in a focused round of centrally-driven discussions. Yet they all have a potentially vested interest in UK R&D spend (e.g. in areas such as AI), infrastructure investments (e.g. clean energy, 5G roll-out) and social policies (e.g. creation of new Creative Hubs and Clusters as part of levelling-up across the UK).

Given the fragmentation of the industry there was also a lack of awareness of what might be happening in other verticals in the Sector regarding both Sustainability and Industry 4.0. It would be helpful to have a comprehensive review of initiatives, coupled with an effective process for dissemination of the information.

The current policy-making process and governance relies too heavily on central government and the larger creative businesses that can afford dedicated roles aimed at engaging in the policy making process. This is not ideal given the fragmented nature of the UK Creative Industries, and not just in terms of size of business, but also geographical dispersion and nature of practice. The risk is that independent artists, creatives and entrepreneurs, who need to quickly

46. Europe's largest brand study on sustainability. The Sustainable Brand Index™ measures and analyses how sustainability affects branding, communication and business development

engage with Sustainability initiatives beyond decarbonisation, and/or adopt Industry 4.0 technologies, and address issues such as exporting, will not get the support they need.

In many other UK industrial Sectors there is a single trade body that can act as a voice in policy making. In the UK Creative Industries there are multiple trade federations and related bodies that seek to represent specific interest-groups or the industry as a whole, but their membership appears to be more representative of the medium-sized and larger creative businesses. The Federation of Small Businesses and Chambers of Commerce are just too broad or parochial to service the needs of the micro businesses in the Sector. Even the Creative Industries Federation (now together with Creative England) with around 10,000 members today, is engaging directly with less than 5% of the creative practices in country. A radically different approach is needed for the Creative Industries.

2. **Measurement:** several participants questioned the appropriateness of the taxonomy used to define the scope of the Creative Industries and measure impact. Some felt that important areas of employment where creativity is at a premium were being excluded arbitrarily (e.g. brand development and brand building marketing, some elements of coding). Others noted that different nations, and some intergovernmental organisations, had different ways of defining the Creative Industries, often blurring the distinction with the broader Creative

Economy. It was also suggested that verticals such as CreaTech were changing so quickly that government led measurement was not capable of keeping up. As creativity and technology are increasingly embedded into the job description outside of the Creative Industries as we know them today, the problem is going to get worse (see earlier comments about the FAANGS).

The nature of employment in the creative ecosystem also causes problems for measurement. A freelancer may work in the Creative Industries one day, then take a job in another Sector the next. Since the gig economy is such a significant part of the Sector in terms of employment figures, more attention is needed to capturing this data.

There is another angle to this: participants told us that even as the virtual and digital worlds grow in importance, we must not ignore geography or physical location. Cities and LEPs or new regional economic organisations are likely to grow in influence. The Government Industrial Strategy and Sector Deal will create new Creative Hubs around the UK, and more recent promises to level-up will add to that. At a local level many of the UK Creative Industries are anchored by long established-performance and craft centres, or Universities and Colleges specialising in the Creative Industries or Arts and Culture. Investments by government and multi-nationals in TV and film studios mean that certain places act as anchors and attract an ecosystem

of talent and creatives into a street, a town, an area or a region. But how do you measure the creative potential of a place, or the rate of diffusion of creativity across the UK? There is a long tradition of measuring innovation of organisations and regions based on commercial outcomes (ideas that add value), but creativity measurement has tended to be at a more personal level.

3. **Interdependence:** A key finding from the two workshops and interviews is that Sustainability and Industry 4.0 are inextricably intertwined with participants' expectations over how the Creative Industries in the UK will develop over the next 10 years. Whilst each can be addressed individually, there are powerful synergies and many interdependencies in the underlying trends, the policy makers involved and, of course, the people in the wider Sector ecosystem (not just the creatives).

For example, adoption of innovative and sustainable design practices in the Creative Industries will require people to think and work differently. It also requires adoption of Industry 4.0 tools for digital creation. An example is the automatic generation of images and videos of buildings, people, and products using an AI technique called Generative Adversarial Nets (GAN). This new technique plays two AI systems off against each other to improve visual data or even create it from scratch.

As was illustrated by the Unmade example, Industry 4.0 predictive

analytics and automation can reduce waste and help to eliminate unwanted inventory for products. Industry 4.0 technologies such as AI, IoT and sensors will increasingly be used to improve energy utilisation in theatres and studio. However, with increased stand-alone and embedded technology, it will be important to ensure that this equipment is more circular (preventative maintenance, repair, refurbishment, remanufacturing before recycling), and that e-waste is minimised. This may require new or extended legislation (e.g. the Waste Electrical and Electronic Legislation - WEEE).

A related discussion point in the workshops and interviews was the longer-term potential for collaboration working between humans and machines to boost the success of UK Creative Businesses whilst also fully addressing the SDGs.

4. **International context:** Transition out of the EU, trade deal negotiations and the global attention economy all provide export challenges and opportunities for the UK's Creative Industries. Participants hope that the UK Creative Industries can develop in line with the SDGs and in a manner that is accessible to all (particularly becoming more equal and diverse in the next decade), whilst maintaining high performance and leadership in the face of international competition. What we have found in this study is that there is growing concern over upcoming trade deals with major export markets such as the USA and how they might affect the Creative Industries. There is also concern

about the lack of support for the smaller creative businesses to enter new markets successfully. For example, if Asia, the Middle East and Africa are going to be new major export markets for the UK, then where are the trade missions to help?

5. **Education:** In the workshops there was repeated reference to the need to improve the fit between what the Sector needs from undergraduate, postgraduate and executive education over the next decade and what is on offer. For participants, it wasn't just about the content of courses, rather it was also about formats. In terms of executive education and training, the very large number of micro and small businesses in the Sector, and the tendency for creative businesses to be deadline driven, means that there is little time or inclination to acquire new skills and knowledge unless it can be directly applied.

Take the example of senior executives in the music industry who may be generally aware of the latest technological developments but do not have time to absorb the implications for them (and maybe they have a fear of missing out, but they don't have an easy way to address this). In this case, the experts indicated that short courses (virtual, physical) for busy senior executives on the linkage between Industry 4.0 and the Creative Industries could be ideal.

From the discussions there is also need for a broad spectrum of awareness, education and training interventions covering both

Sustainability and Industry 4.0. The expert participants again suggested that the approach for people working in the industry (i.e. executive education) had to be structured appropriately as 'bite sized chunks', exploiting virtual classrooms as much as possible. Ironically, the COVID-19 pandemic may provide much of the impetus to developing content that can be delivered remotely.

Again, a recurring theme was the weakness of the Sector in terms of core leadership and management competences. The example of financial skills came up, as well as the ability of creatives and talent to embrace new business and operating models associated with Sustainability and Industry 4.0. Closing these skill gaps applies to undergraduate, postgraduate and executive education evenly.

A surprising finding was that the investment community in the UK and internationally should become a priority for providers of executive education to that Sector as the Creative Industries Sector is poorly understood from a business perspective. Executive education for this target group should aim to change the perception amongst the investment community that UK Creative Industries are just a 'cottage industry' with no potential scale or 'hit-based' (meaning that commercial success is somehow unknowable) and extraordinarily risky. It is not widely understood by early stage investors that the Creative Industries are capable of delivering substantial

revenues with little or no capital investment, although that may change with the introduction of Industry 4.0 technologies.

- 6. Long-term growth strategy:** A general observation was that some creatives choose to manage their businesses around their interests and lifestyles, but those with a stronger entrepreneurial spirit want their businesses to grow. Export led-growth featured strongly in both of the workshops and most of the interviews. Indeed, the UK Creative Industries are already successful exporters accounting for about £35bn in services today. Our analysis suggests that this should rise to £100bn or more in 2030, and this would be more certain if there were a long-term strategy to build larger British creative companies that can 'punch their weight' in the market against international competition. This could include a focused investment in Cloud infrastructure and 5G connectivity for the Creative Industries.

The combination of Sustainability and Industry 4.0 also offers the prospect of a new wave of Unicorns (billion-dollar start-ups) exploiting new ways of production, storytelling and engagement with audiences and consumers (e.g. subscription fashion, mixed reality gaming, data-rich virtual experiences et cetera) with a lower environmental impact and/or enhanced social benefits. Some of our interviewees questioned whether the UK government had an adequate

long-range vision for the Creative Industries that included growing businesses that could match the FAANGS (Facebook, Amazon, Apple, Netflix, and Alphabet) in scale and reach. Also, experience across the globe shows that these highly valued businesses do not appear in isolation. They typically rely on clusters of investors, academia and business (and an ecosystem of specialist services such as marketing, information and communication technology providers, and intellectual property law) who can support start-ups through their life-stages. These clusters typically require both a long-range strategic vision and a steady flow of public and private funding for success (as was the case with Silicon Valley where US Department of Defence procurement spending over many decades formed the basis of its sustained success).

The participants do not think that the UK ecosystem is set up for this. For example, regional and national players are only interested in high growth and with the demise of the Business Links there are few people to talk to for the micro-businesses (it is all online). Overall there isn't a top-down strategy or, alternatively, a system to help connect people bottom-up. Innovate UK is recognised as having a role, as do the KTNs, however question marks exist as to their effectiveness and impact in supporting the Sector.

Will CreaTech become the new FinTech?

This is an important question to answer given the growth rate and likely scale of employment (and exports) by 2030.

However, it may be too early to tell, but the UK does have certain advantages:

- A strong domestic market (and an export heritage)
- Clusters of creative and STEM (Science, Technology, Engineering and Mathematics) talent (albeit still concentrated in the South East)
- Relatively high levels of higher education spending on the Creative Arts and for STEM. The independent panel report to the Review of Post-18 Education and Funding in May 2019 (the Augar Report⁴⁷ Report) has estimated taxpayer investment by subject for higher education: the Creative Arts spending is approximately £1.1bn, whilst STEM is about £1.5bn
- Leadership in key enablers such as AI (in part because of increased R&D investment in the Industrial Strategy and generous R&D tax credits). The UK is also viewed as one of the most attractive countries for inward investment for AI
- Protection for intellectual capital makes the UK an attractive proposition for investment. For example, UK copyright law acknowledges the possibility that creative works could be 'computer-generated' (e.g. using AI and so no human author) and protected under the Copyright, Designs and Patents Act 1988, Section 178

CreaTech is growing 10 times faster than the Sector average and will increasingly rely on the synergy between 'creative' or arts subjects and STEM. Hence there is a strong argument for referring to STEAM (Science, Technology, Engineering, Arts and Mathematics) as better way of expressing the strength of the dependencies and connections. In this context it is worth noting the Augar Report talks of 'accidental overinvestment in some subjects' (i.e. Design and the Creative Arts) and questions whether the current level of government support to Creative Industries 'constitutes good value for taxpayers' money' based on the likely salaries of workers in the sector. This could be read as a suggestion to defund the Creative Arts or to transfer funding to STEM. This needs to be re-addressed by government to fully recognise the connection between creative subjects and STEM, the sector growth potential and the future value of the Creative Industries more generally, to the UK economy nationally, regionally and as an export engine.

A key difference perhaps from FinTech, as the expert participants stressed, is that CreaTech is not a universally recognised, discrete sub-Sector. Again, there seems to be a difficulty with taxonomy (see above), and this may only get worse as Industry 4.0 technologies converge and become embedded in creative and business processes.

47. A report from the independent panel to the review of post-18 education and funding (<https://www.gov.uk/government/publications/post-18-review-of-education-and-funding-independent-panel-report>)





8. Conclusions

Conclusions

Based on the wealth of expert input, the study has identified potential scenarios for both Sustainability and Industry 4.0 in 2030, and policies areas that would be of benefit to the Sector. The scenarios generated for this study describe major technological, economic and societal changes for the Creative Industries, and this requires policies that go beyond the UK Industrial Strategy and the Creative Industries Sector Deal.

Although the experts identified several policies specific to Sustainability or Industry 4.0 there are multiple overlaps and shared policy makers. Industry 4.0 can be a key enabler for Sustainability, and a big, rich territory by itself for the Creative Industries in the UK in 2030. It is tempting to assume that Industry 4.0 equates to growth in CreaTech but based on what has been seen in other the technology will be embedded in every aspect of every Creative Industries vertical (and this is borne out by the expert opinions shared in the workshops and interviews). In addition to specific policies for Sustainability and Industry 4.0, policy (and policy making) is needed that acts on both together for the Creative Industries.

Some of the policy ideas have already turned out to be prescient, such as the need to incentivise 'virtual consumption' e.g. home consumption of theatre or music performance using virtual techniques. It has also revealed an

urgent need for quality distance learning (another area flagged by the experts).

Creative Industries after lockdown

The COVID-19 pandemic has also shown the value of the Creative Industries beyond the monetary, and is acting as a showcase for the ingenuity of UK creatives. Imagine what it would be like to be 'locked-down' with no access to music, TV, film, etc? Thankfully we have artists and creative teams that, in many cases, have climbed a steep learning curve to get content to UK citizens often at their own cost.

Timely examples include the Encore platform where people can now book a customised music video and support the NHS (<https://musicmessages.encoremusicians.com>), and the use of PayPal by busking musicians streaming concerts from their homes to create a digital 'tip jar'.

This enforced 'digital transformation' may actually become a survival tactic for some of the smaller creative businesses, who are using Industry 4.0 technologies to connect with audiences and consumers and generate revenues. Perhaps this will be seen in hindsight as market development, a test of the wider potential for streaming and other forms of virtual delivery. What is now being offered free may soon become a paid for subscription

alongside more traditional experiences (such as concerts or a visit to the theatre).

What will the UK (the world) be like when 'normality' returns after the COVID-19 dissipates? It could be that we are seeing a rapid evolution of a new normal for the Creative Industries. Certainly, people have already realised that more can be done remotely than was accepted even with current technology and infrastructure (e.g. finishing a film shoot from 1200km away, as Director Timur Bekmambetov did in March 2020⁴⁸). Clearly the benefits for Sustainability in the Sector can be enormous just from not travelling, for example, to distant film locations or for meetings. Creatives and artists are also learning that new work patterns and behaviour are as important as the technology. As the expert participants repeatedly stated, we need to educate people on how to be creative when humans and machines are in the mix together.

Tackling climate change

Perhaps another result of the COVID-19 pandemic is that there will be a further change in perception of climate change and a realisation that we can mobilise resources at enormous scale to address a common, yet mostly unseen threat. Many Creative Industries verticals have a unique communications role. They already have the capabilities to shape the Sustainability narrative and reach billions of people, and Industry 4.0 gives them the tools for greater reach and engagement. This is likely to be more important in the next decade as individuals can create and

broadcast their own content, and will increasingly be able to design and make their own stuff with the help of Industry 4.0 (there is already a global makers, modifiers and fixers movement which is illustrated by global move to the 3D printing of ventilator components and personal protective equipment (PPE) by social innovators). How in touch are policy makers with this, and are they ready to use technology to nudge the population into action?

Job security

The pandemic has also brought into sharp relief the precarious nature of the gig economy and being freelance: this is how the majority of people are employed in the Sector. It is possible that a result of the 2020 COVID-19 pandemic will be to drive people out of the Sector; let's hope not. Some of the policies identified seek to remove some of the risk for these individuals by connecting them more effectively to policy makers so their voices can shape the next wave of policies that will take the UK Creative Industries to 2030. The COVID-19 pandemic has brought a sense of urgency, hence quickly finding a new way of engaging with the majority of the Sector is important for recovery in terms of financial security, longer-term employment and economic performance.

Working with fragmentation

The UK Creative Industries are highly fragmented and are likely to remain so (it is in the structure of the Sector). The same applies to the Sustainability and Industry 4.0 initiatives within each

48. <https://www.theguardian.com/film/2020/mar/31/timur-bekmambetov-coronavirus-future-of-film>

vertical. Some of this is inevitable at some level as the Sustainability and Industry 4.0 challenges and opportunities vary by sub-Sector. Music events have issues related to travel, use of plastic bottles/waste, etc. Providers of streamed music and video content have issues with energy consumption and CO2. In architecture, product design, and fashion there are issues related to materials, waste and supply chains. However, there are common themes that cross the verticals, and sometimes intersect with other Sectors too, and there is a need to find a better, more co-ordinated way to extract maximum value from industry-led and government sponsored Sustainability and Industry 4.0 initiatives.

To re-state, the Sector is fragmented: the mass of the Sector (and the broader ecosystem that supports it) is in independent talent, freelancers, micro and small businesses. Hence, formulating and implementing policy ideas requires creativity, and may require an organisation that represents the needs of freelancers and micro businesses that will still represent the majority of the Sector in 2030. Having so many verticals in the Creative Industries may make conversations about policies frustrating, but at the same time it is powerful and rewarding to get the different sub-Sectors together.

Taking the long view

The experts involved in this study would like the government to embrace the long view of the economic development of the Sector. This could take the form of a

growth strategy for 2030 that is specific to the Creative Industries and encompasses national, regional and local perspectives. Despite the current shape of the Sector in terms of company size and the prevalence of the gig economy, it's important to remember that micro and small companies can become the next large enterprise. Experience shows that they need sustained support over a number of years to get there as they move from seed-funding to a high growth phase. For example, Improbable (the multi-player game company took seven years and £400m of investment to earn its Unicorn status). Currently, it is difficult to assess how well UK start-ups in the Creative Industries are doing as there is only reliable information when the start-up is founded on information technology: this needs to be addressed along with the broader comments on measurement below.

Valuing the Sector

For such a growth strategy to be effective there also needs to be a change in behaviour amongst policy makers and investment community towards the Sector: the experts were of the opinion that, the government and investment community undervalues the Sector. This may need to be addressed by education on the workings of the Creative Industries for Public Sector and Financial Sector. At the least it suggests greater engagement and dialogue at local, regional, national and international levels (this latter point because the investment community is global).

Competing in global markets

As markets for demand and supply of creative outputs globalise, the FAANGs (as well as industry incumbents such as Sony and Disney) have been highly successful at leveraging their investment in Industry 4.0 technologies and digital business and operating models. Along with Big Tech companies, such as Microsoft and IBM, these businesses are re-shaping the UK Creative Industries ecosystem, and we are yet to experience the next wave of large disrupters (such as Baidu, Alibaba, Tencent, Xiaomi).

These businesses typically have interests in specific verticals (e.g. Netflix in film and TV, Facebook in advertising, Microsoft in gaming), but they are often also providers of the underlying technology as well. Amazon is a good example: the company is in TV and film production (drawing on UK talent), it streams video and music content (to UK consumers), can sell merchandise through its ecommerce sites (to UK companies and retail customers), and is also the largest provider of cloud computing and storage worldwide (about 30% market share). As a cloud provider (Amazon Web Services), Amazon has already embedded itself and its technology into many of the Industry 4.0 developments in the UK. In addition, Amazon is now consistently one of the top five in terms of R&D spend in the US (as are Google, Apple and Microsoft), and out of that has come AI breakthroughs in computer vision and speech recognition that, in turn, have fed into services such as Alexa.

There have been many employment benefits for the UK Creative Industries from the arrival of these companies but they also pose a competitive threat. As we move into a new era of globalisation perhaps we need additional policy stances on non-UK technology companies and the Creative Industries in areas such as taxation and regulation.

There may also be a need for new policies to protect UK Creative Industries CreaTech start-ups specifically. Technology Services companies advance into adjacent spaces through a variety of strategies including acquisitions to add customers and capabilities to their portfolios (an example being Google acquiring DeepMind, creators of AlphaGo, in 2014), or to shut down competition early.

However, government protection from competition can only go so far in an increasingly competitive, global marketplace. There is an opportunity to develop the strengths of Sector, to keep it on the cutting edge in Sustainability and Industry 4.0 and to make it more competitive and 'fit for the future'.

Measurement

Measurement is another recurring theme in the findings: measurement of the Sector (boundaries, employment, GVA, exports, cultural value), comparisons with other Sectors and countries, and measurement of the creativity of a location, a city or a Region. Of course, measuring the value-add of the proposed policies is also important. The experts felt that it is time to review the taxonomies

used to measure the Sector as they may not be revealing the full extent of the Sector's contribution to the UK economy.

The government may also underestimate the size of the Sector in terms of revenues, employment and exports as there is also the challenge of measuring jobs or roles in other Sectors that people in those Sectors consider to be creative (e.g. software coders, engineers, scientists etc). Surely these should be included in the numbers? CreaTech is making measurement even more difficult within the Sector, but also more necessary as it will be one of the top growth engines. How should these be included in the measurements?

Setting baselines

Related to the measurement theme, there is no agreed UK or international baseline for Sustainability and Industry 4.0 in the Creative Industries. Possibly new 'indexes' or 'scorecards' are needed to baseline performance and then monitor improvement and / or adoption of specific technologies and practices. The qualitative assessment of the 'hot spots' for progress in Sustainability (using the SDGs and the Triple Bottom-Line) and Industry 4.0 (by technology) across the Sector, and by vertical, used in this study could be developed further too (see Appendix E and Appendix F).

Building capacity and skills

The experts involved in workshops and interviews anticipate a skill gap in the Sector in 2030 that could undermine the ability of the sector to deliver on GVA,

employment and export expectations. There is also concern that higher education and executive education are not delivering course content that will close the gap in critical areas such as finance and technology skills. Similar comments were made about research direction. This suggests a comprehensive review is required of the skill needs for the Creative Industries. Based on such a skill map across the Sector, education and research can be re-aligned to deliver what is truly needed (e.g. business and technical skills), and in the most effective way (e.g. bite-sized).

Creating an environment where creativity flourishes

The expert opinion is that for the Creative Industries to deliver their full potential for inclusive, equitable and resilient growth, it is important to have a policy approach that is focused on creating an environment where creativity flourishes, rather than solely relying on top-down prescriptions. This can be achieved in multiple ways. This could be creativity education for all, in every course. It could also be developing 'Creative Districts' building on the concept of Innovation Districts. Some Innovation Districts in the UK, such as Leeds, already include a Creative Arts building so why not go further and incorporate links to Creative Hubs, the Knowledge Transfer Network and the investment community specifically to support entrepreneurship in the Creative Industries.

The right environment for success also means providing the right physical, digital and human infrastructure and support

networks across the nation to provide all creatives with the freedom to develop ideas for Sustainability and industry 4.0.

Lessons from outside the Sector

Some of the lessons for the Sector in 2030 should come from other Sectors that are more advanced in relevant Sustainability and Industry 4.0 areas. In the case of Sustainability and the Creative Industries there is awareness that there is a wealth of good practice outside the Creative Industries, but no easy way to access it. Participants in the study were particularly interested in information and knowledge sharing networks around Sustainability and the Creative Industries, particularly the link to policy makers and policy making.

Support for the smallest exporters

The 2030 scenarios outlined envisage a situation for the Creative Industries where international trade is more important and may be more complex depending on the Trade Deals negotiated as the UK continues to exit the EU. The experts had concerns that more in-person and virtual support is needed, especially for the smallest creative businesses. At the very least free webinars could be created adjusted to the specific trade opportunities, challenges and for each vertical (e.g. fashion is different to film is different to craft).

Need for dialogue

This study contains policy ideas looking ahead to 2030 for Sustainability, Industry 4.0 and the Sector. However, to properly engage with government, the Creative Industries need to ruthlessly prioritise what it's asking for: as one expert said 'three things maximum, one voice and supported by evidence', so perhaps the organisations currently representing each vertical need to be more focused. Given the fragmentation of the Sector this maybe easier said than done, and lessons from earlier initiatives (such as Cool Britannia⁴⁹ and Creative Britain⁵⁰) are still being learnt or may have been lost.

End-note

2021 will be the UN International Year of Creative Economy for Sustainable Development. There will be an end to the 2020 COVID-19 pandemic and the harm it is causing to society as whole, and to the Creative Industries. Normality will return, or a new normal will emerge, and the Creative Industries will have a central role economically and culturally in the UK and internationally. Yes, there are immediate policy actions needed, but this also a good time to review the Sector, learn the lessons from the legacy of Cool Britannia and Creative Britain, and prioritise the 2030 policy requests for Sustainability and Industry 4.0 in the Creative Industries.

49. https://en.wikipedia.org/wiki/Cool_Britannia

50. Article in the Guardian newspaper from 2013

APPENDICES

Appendix A - Acknowledgements

Anne Prah Design & Innovation Consultant
Arts and Humanities Research Council
Creative England
Drake Music
Evolution Media Music
Hellon
Human Instruments
IBM UK Ltd
Industry Commons Foundation
Institute of Environmental Management & Assessment
Music Tech Fest
Nesta
Pauline Burrows Ltd
Royal Borough of Kingston Upon Thames
The Department for Digital, Culture, Media & Sport (DCMS) Nesta
The University of the Creative Arts
TIR Music
We and AI

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Thanks also to the ARC Centre community space in Islington for use of their flexible workshop space, and to the Conscious Cook for keeping everyone fed.

Appendix B - Major Sustainability Initiatives in the Sector

A Greener Festival	https://www.agreenerfestival.com
Accreditation in Sustainable Architecture	https://www.rias.org.uk/for-the-public/sustainability
AdGreen	https://www.adgreen-apa.net
Arts and Humanities Research Council's (AHRC) Environment Portfolio	https://ahrc.ukri.org/innovation/environment-portfolio/
BAFTA Albert	https://wearealbert.org
BREEAM	https://www.breeam.com
Clean Clothes Campaign	https://cleanclothes.org
Copenhagen Fashion Summit	https://www.copenhagenfashionsummit.com
Creative Carbon Scotland	https://www.creativecarbonscotland.com
Creative Climate Leadership	https://www.creativeclimateleadership.com
Creative Energy Project	https://www.goodenergy.co.uk/partner-pages/bafta/
Creative Green Certification / Creative Green Awards	https://juliesbicycle.com/creativegreen-certification/
Creative Industries Pact for Sustainable Action	https://creativeindustriestpact.com/mpipact
Cultural Adaptations (EUCAN) project	http://www.creativeeuropeuk.eu/funded-projects/cultural-adaptations
DJ's for Climate Action	http://www.djs4ca.com
EMA Green Seal	https://www.green4ema.org/ema-green-seal-production
Ethical Fashion Initiative	https://ethicalfashioninitiative.org/about
Fashion Revolution	https://www.fashionrevolution.org
Forest Stewardship Council / Sustainable Forestry Initiative	https://www.fsc.org/en
Games4Sustainability	https://www.sfiprogram.org
Global Fashion Agenda	https://games4sustainability.org
Global Reporting Initiative	https://globalfashionagenda.com
Good Fashion Fund (GFF)	https://www.globalreporting.org/information/sustainability-reporting/Pages/reporting-benefits.aspx
Green Arts Initiative / Creative Carbon Scotland	https://fashionforgood.com/good-fashion-fund/
Green Crafts Initiative	https://www.creativecarbonscotland.com
Green Stories Writing Competition	https://www.craftscotland.org/about/projects/green-crafts-initiative
	http://www.greenstories.org.uk/

Appendix B - Major Sustainability Initiatives in the Sector...continued

Greening Siamsa initiative	https://www.siamsatire.com/news/siamsa-tire-launches-its-greening-initiative
IEMA - Broadway Initiative	https://www.iema.net/broadway
Music Declares Emergency	https://www.musicdeclares.net
Net Positive Project	https://www.netpositiveproject.org
PGA Green	https://www.greenproductionguide.com
Playing for the Planet	http://playing4theplanet.org
Policy Hub	https://www.policyhub.org
Re-Imagine Europe	http://www.creativeeuropeuk.eu/funded-projects/re-imagine-europe
ReCreate Ireland	https://recreate.ie
Reel Green	https://www.creativebc.com/industry-sectors/motion-picture/reel-green/
Responsible Marketing	https://dma.org.uk/responsible-marketing
SDG Global Fund for the Creative Industries and Sustainable Development*	https://www.sdgfund.org/creative-industries-and-sustainable-development
Sustainable Apparel Coalition	http://apparelcoalition.org
Sustainable Development Goals Lions	https://www.canneslions.com/enter/awards/good/sustainable-development-goals-lions#/
The Creative Diversity Network	https://creativitydiversitynetwork.com
The Green Room	http://www.thegreenroom.fr/a-propos-de/
UK Games Fund	https://ukgamesfund.com
UK Government Creative Industries Sector Deal	https://www.gov.uk/government/publications/creative-industries-sector-deal/creative-industries-sector-deal-html
UN Alliance for Sustainable Fashion	https://unfashionalliance.org
UNESCO Creative Cities Network	https://en.unesco.org/creative-cities/
WHAT NEXT?	https://www.whatnextculture.co.uk/

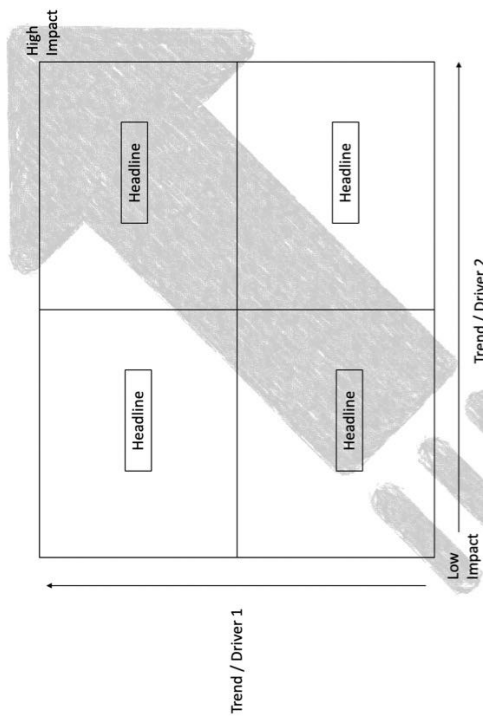
*the fund is now closed, but continues to act as a knowledge hub

Appendix C - Major Industry 4.0 Initiatives in the Sector

Arts and Humanities Research Council's (AHRC) Creative Economy Hubs programme	https://ceprogramme.com
Augmentor	https://augmentor.co.uk
British Business Bank	https://www.british-business-bank.co.uk
CreativeXR	https://creativexr.co.uk
Creative Industries Clusters Programme	https://creativeindustriesclusters.com
Creative Industries Sector Deal	https://www.gov.uk/government/publications/creative-industries-sector-deal/creative-industries-sector-deal.html
Creative Scale Up	This is a DCMS initiative empowering regions e.g. https://www.wmca.org.uk/what-we-do/culture-and-creative-economy/creative-scale-up-programme/ https://www.businessgrowthhub.com/creative-scale-up-programme
DAWO	http://www.daowo.org/?wt_ni=loncul2003
DECAL	http://decal.is/
Digital Catapult	https://www.digicatapult.org.uk
Ethics guidelines for trustworthy AI	https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai
IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems	https://standards.ieee.org/industry-connections/ec/autonomous-systems.html
Industry Commons Foundation	https://industrycommons.net/foundation/
The UK Industrial Strategy Challenge Fund for the Creative Industries Cluster*	https://bit.ly/2VRPeyM
IoTUK	
OASIS	https://iotuk.org.uk
Open Music Initiative	https://www.oasis-open.org/org
RAMI 4.0	https://open-music.org
REACT	https://www.isa.org/intech/20190405/ http://www.react-hub.org.uk/projects/prototype/

*Organised by Innovate UK

Appendix D - Scenario Tool



Scenario Tool

Name of the scenario:

Advertising	Architecture	Arts & Culture	Crafts	Technology Services & Creative	Design	Fashion Design	Gaming	Music & Performance	Publishing	TV & Film
Sub-Sector Variations										

Creative Industries Vertical Template

Appendix E - Mapping of Sustainability Initiatives in the Sector

SDGs	Advertising	Architecture	Arts & Culture	Crafts	CreaTech	Design ¹	Fashion Design	Gaming	Music & Performance	Publishing	TV & Film
6. Clean Water											
7. Clean Energy											
11. Cities & Communities											
12. Responsible Consumption & Production											
13. Climate Action											
14. Life Below Water											
15. Life on Land											
2. Zero Hunger											
3. Good Health											
4. Quality Education											
5. Gender Equality											
10. Reduced Inequalities											
16. Justice & Strong Institutions											
17. Partnerships											
1. No Poverty											
8. Decent Work & Growth											
9. Innovation & Infrastructure											

Key

- Initiatives and action are widespread in the industry vertical
- There is at least one mature industry initiative in place, but adoption may be limited to lighthouse organisations
- Relatively low levels of adoption or initiatives with low levels of maturity

¹product design, interior design, graphic design, etc

Appendix E - Mapping of Industry 4.0 Initiatives in the Sector

	Advertising	Architecture	Arts & Culture	Crafts	CreaTech	Design	Fashion Design	Gaming	Music & Performance	Publishing	TV & Film
AI	Red	Orange	Blue	Blue	Red	Red	Red	Red	Red	Blue	Red
Robotics & Automation	Blue	Red	Red	Blue	Red	Orange	Orange	Orange	Blue	Blue	Orange
AR/VR/MR	Blue	Red	Blue	Blue	Red	Orange	Orange	Orange	Blue	Light Blue	Orange
Simulation & Immersion	Blue	Red	Blue	Blue	Red	Orange	Orange	Orange	Blue	Light Blue	Orange
Trusted Data & Analytics	Blue	Red	Blue	Blue	Red	Orange	Orange	Orange	Blue	Light Blue	Orange
5G / Mobile / Edge	Blue	Red	Blue	Blue	Red	Orange	Orange	Orange	Blue	Light Blue	Orange
IoT / M2M	Blue	Red	Blue	Blue	Red	Orange	Orange	Orange	Blue	Light Blue	Orange
Social & Collaborative	Red	Red	Red	Red	Red	Red	Red	Red	Red	Orange	Red
Blockchain	Light Blue	Orange	Blue	Blue	Red	Red	Light Blue	Light Blue	Light Blue	Light Blue	Blue
Additive Manufacturing	Light Blue	Orange	Blue	Blue	Red	Red	Light Blue	Light Blue	Light Blue	Light Blue	Blue
Mass Personalisation	Red	Light Blue	Blue	Blue	Red	Light Blue	Red	Red	Red	Light Blue	Red
Hybrid Cloud	Red	Red	Red	Orange	Red	Red	Red	Red	Red	Light Blue	Red
Digital Business Models	Red	Orange	Orange	Orange	Red	Red	Red	Red	Red	Red	Red
Industry Platforms*	Red	Orange	Orange	Orange	Red	Red	Red	Red	Red	Red	Red
IPR & Cybersecurity	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Sustainable Design**	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red

Widespread adoption and impact across 4 or more dimensions

Adoption is widespread but impact may be limited to 3 or fewer dimensions

Adoption by lighthouse organisations and individuals or impact limited to 2 or fewer dimensions

Relatively low levels of adoption – proofs of concept, technology demonstrations

* Horizontal & Vertical Integration

** Goods & Services

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