CreaTech

How the fusion of emerging technologies and the Creative Industries can transform the UK's approach to skills, innovation and business.

The Royal Anniversary Trust

THE CORONATION CHALLENGE

Department for Culture, Media & Sport

CreaTech is the intersection of creativity, arts, culture, and technology, where innovative technologies are used to enhance creative processes, create new forms of artistic expression, and accelerate the economic growth and social benefits of the Creative Industries.

This paper considers CreaTech skills, CreaTech innovation and CreaTech businesses.

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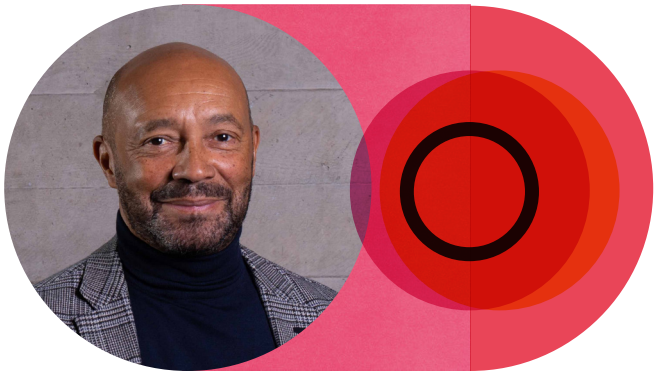
Contents

Foreword by Sir Damon Buffini, Chair of the Royal Anniversary Trust



The fusion of creativity and technology — CreaTech — isn't just an opportunity but a necessity should this government want their industrial strategy to succeed in growing the Creative Industries, and with them the UK economy. The UK stands at a crossroads where burgeoning creative talent, companies, and ideas are interacting with emerging technologies. To seize this advantage, we need bold, transformative action. Without it, we risk falling behind in a global race that is accelerating every day.

CreaTech is already delivering breathtaking possibilities: AI is reshaping storytelling in gaming; 3D printing is revolutionising fashion with sustainable materials; and immersive technologies are redefining learning and audience experiences. Yet, we've only scratched the surface. The UK has 350,000 professionals working in this space and 14,000 creative businesses leveraging emerging tech, but these numbers should — and must — grow exponentially if we are to lead globally.

This report — written in consultation with experts from academia, industry and policy — makes one one thing clear: business as usual is not enough. It's time to think bigger.

Skills: We need a radical overhaul of our education system. We must integrate creative and technical subjects into the curriculum from the earliest years. Colleges and universities must actively collaborate with industry to anticipate tomorrow's challenges, not just today's. Lifelong learning must evolve, so professionals can adapt and thrive in new markets.

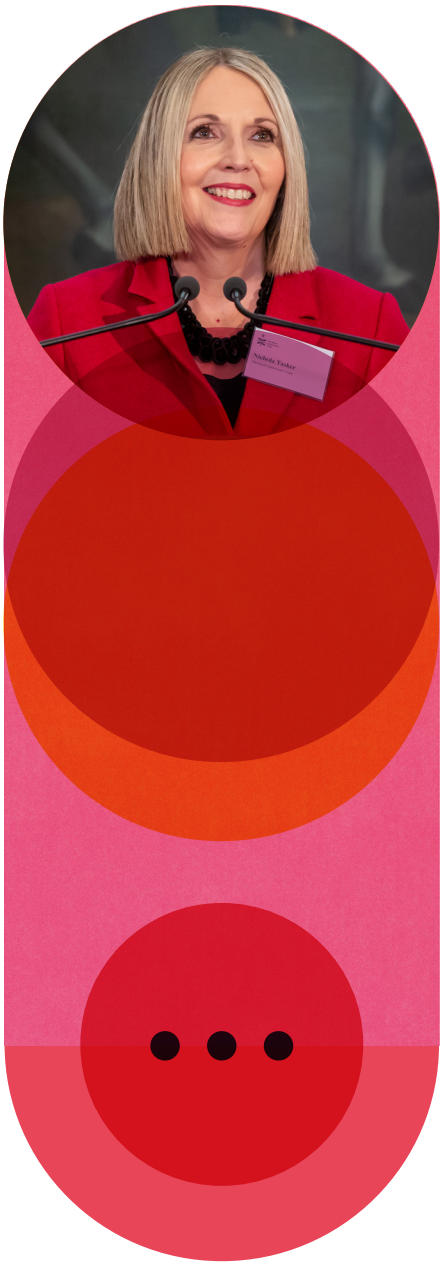
Innovation: The UK must champion CreaTech as a priority growth sector. We need a dedicated plan to turbocharge public and private R&D funding for CreaTech, matched with smarter use of tax incentives. Establishing a CreaTech Catapult will create a hub for cutting-edge experimentation, knowledge transfer, and collaboration, propelling our businesses into global leadership roles.

Businesses: It's unacceptable that our most promising CreaTech companies have to look overseas for late-stage funding. A government-backed Fund of Funds is essential to plug this gap, ensuring we retain our intellectual property, talent, and competitive edge.

The stakes are high. CreaTech isn't just a niche; it's an engine of economic growth, a driver of cultural soft power, and the future of industries from healthcare to education. As chair of BBC Studios and the National Theatre, I've witnessed the transformative impact of combining creativity with technology. Now, it's time to think bigger, act faster, and invest smarter.

The UK must claim its place as **the** global leader in CreaTech. If we act boldly and ambitiously, the rewards could shape our economy, our society, and our standing in the world for decades to come.

Foreword by Nichola Tasker, CEO of the Royal Anniversary Trust



For over 30 years, the Royal Anniversary Trust has awarded the prestigious Queen Elizabeth Prizes for Education (formerly Queen's Anniversary Prizes), the highest national honour in education. These awards represent the pinnacle of achievement in higher and further education and are unique in recognising both universities and colleges in the United Kingdom and the public benefit that their work brings.

The Royal Anniversary Trust are delighted to have been commissioned to convene the best minds in higher and further education along with industry specialists and expert practitioners within the joint endeavour of this Coronation Challenge. The UK is the home of world-leading talent and industry practice within Creative Industries technologies, with vast opportunities to further realise this potential. The Trust could not have valued more the opportunity to lend its unique convening abilities to work on routes to further growth in this field, which will benefit the nation as a whole.

The work of our Prize-winners is transformational — changing lives in local communities and saving lives across the world. Our winners have explored space, revolutionised fashion, overcome barriers to learning, and eradicated disease. Collectively, our Prize-winners are a testament to the power of education to make life better for our society, our economy and the world.

The Coronation Challenge is one of a series of research programmes delivered by the Trust where the expertise and insights of our Prize-winning alumni are brought to bear on a societal challenge which has implications for both their own institutions and for UK society as a whole.

The Coronation Challenge, led by the Trust, commissioned by the Department for Culture, Media and Sport (DCMS), and supported by expert research team Erskine Analysis, explores how CreaTech and technologies harnessed for the benefit of the Creative Industries can be supported to make an even stronger positive impact on the country's economic growth and our social and cultural identity. The twenty-two winners

"...the Coronation Challenge demonstrates what higher and further education institutions can achieve when they work together."

of the 2023 Prizes have unique and different perspectives on this issue, in particular on the role of tertiary education in driving CreaTeach innovation and skills provision. We have been hugely impressed by the insights and perspectives offered by both our Prize-winners and the project's industry and government partners in the preparation of this compelling paper on the opportunities present where emerging technologies are being used in the Creative Industries.

For the Royal Anniversary Trust as an education charity, the Coronation Challenge demonstrates what higher and further education institutions can achieve when they work together across geographical, subject, and sector boundaries, in partnership with industry to tackle an important, social issue.

The spirit of partnership has guided this project from the start and we would like to thank all those who contributed. Our heartfelt thanks to the outstanding team from Erskine Analysis who have steered this project with energy and enthusiasm, taking in the views of all participants and working with our Prize-winners to articulate a compelling and thoughtful set of policy recommendations.

We are also grateful to the independent board of experts on CreaTech, brought together by the Trust and the Erskine Analysis team, who have given us the benefit of their time and wisdom from the very beginning. And we are particularly grateful to the DCMS not only for commissioning this work, but for their unerring support throughout this project. Their commitment to fostering creativity and innovation within the UK has been instrumental in enabling this important initiative to flourish. The Department's role in championing the Creative Industries, alongside emerging technologies, will ensure that the UK is positioned to lead on the global stage and harness the full potential of CreaTech for the benefit of all.

We look forward to seeing the recommendations in this report take flight and to continuing the discussion around this rapidly evolving area of technology and innovation.

Lindsey the Tour Guide Robot
[See page 71 for more.]

Acknowledgements

We are incredibly grateful to the large number of experts who have given their guidance on this report and its contents. We wish to particularly thank the Coronation Challenge participants, our advisory board and our working group, whose insights have been invaluable to the research team. However, it is important to note that these individuals are not responsible for the contents of the paper, including its recommendations, and any mistakes are the authors' own.

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Introduction and Summary Policy Recommendations

Introduction

Photographer: Martin Shields

Museums in the Metaverse
[See page 72 for more.]

The intersection of creativity and technology is reshaping not only the UK's Creative Industries but also the broader economy. At the core of this transformation lies CreaTech, where creative people, ideas and businesses converge with emerging technology to produce new products, services, and experiences. CreaTech's influence reaches across sectors such as film, gaming, architecture, advertising, and education, illustrating its capacity to act as a powerful driver of both economic and cultural development. As the UK seeks to position itself as a leader in this space, this report examines the current state of CreaTech, highlighting opportunities for growth and areas where policy intervention is needed.

With roots in fields as diverse as graphic design, digital animation, Virtual Reality (VR), and Artificial Intelligence (AI), CreaTech reflects the expanding role of technology in the creative process. Emerging technologies are enabling new forms of expression, providing fresh tools for creators, and reshaping how audiences engage with creative content. CreaTech is already a conduit for economic growth, with more than 350,000 people already employed in roles that require both high-level creative and technological skills, and over 13,800 creative businesses leveraging emerging technologies to drive innovation.

As in other areas of the economy, technological development is likely to be one of the key drivers of long-term productivity growth in the Creative Industries, and CreaTech may be one of the few levers the UK Government can pull to support growth in the sector through its upcoming industrial strategy. However, this research makes clear that this area of economic activity faces

“The potential of CreaTech to drive economic and cultural growth is clear, but realising this potential will require a coordinated effort from government, industry, and the education sector.”

barriers that limit its potential, including gaps in funding, lack of access to skills development and lack of opportunities for interdisciplinary collaboration. Addressing these challenges requires ambitious policy interventions and a commitment to nurturing a diverse talent pipeline that spans further and higher education.

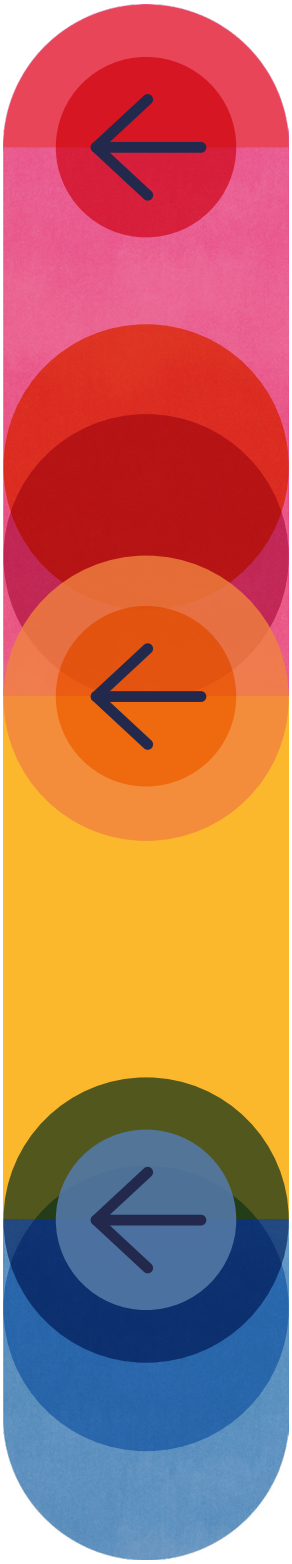
This report is informed by the contributions of representatives from universities and colleges who were winners of the Queen’s Anniversary Prizes in 2023 and who have shared their expertise and insights on how best to foster the growth of CreaTech in the UK. The institutions involved, recognised for their excellence in education and innovation, can play a crucial role in building the skills base for CreaTech and in driving forward research that pushes the boundaries of what is possible at the intersection of creativity and technology. Set alongside evidence given by industry stakeholders, their contributions serve as a foundation for the policy recommendations within this report, which aim to ensure that the UK remains a leader in CreaTech.

In order to realise the full potential of CreaTech skills, CreaTech innovation and CreaTech businesses, the UK must adopt a forward-thinking approach that addresses this area’s unique needs. This report puts forth several policy recommendations aimed at fostering CreaTech growth, strengthening the talent pipeline, and ensuring that the UK’s Creative Industries remain globally competitive. These recommendations are based on extensive research and consultations with experts from academia, industry, and government.

The potential of CreaTech to drive economic and cultural growth is clear, but realising this potential will require a coordinated effort from government, industry, and the education sector. This report outlines a vision for a CreaTech ecosystem that supports innovation, fosters collaboration, and provides a pathway for diverse talent to enter the sector. By implementing the policy recommendations outlined here, the UK can create an environment in which CreaTech can flourish, contributing to economic prosperity, cultural enrichment, and a more inclusive society.

Summary Policy Recommendations

Full detail of these recommendations is available on page 52.



[1.] Drive a CreaTech skills revolution

Education reform is needed to build a robust skills pipeline, starting with the integration of creative and technical subjects from primary to secondary school education and progressing through targeted, CreaTech-specific programmes in further and higher education. There is a need to build new models to ensure that universities and colleges can bring in those working in industry to upskill those in formal education. Additionally, ensuring that people from all backgrounds can access these educational pathways as part of lifelong learning opportunities is essential for building a workforce which benefits from the full diversity of the UK population.

[2.] Boost investment in CreaTech R&D

To support CreaTech's continued growth, policymakers, industry and funders should together build a five year plan to substantially increase the level of public investment in R&D which supports the Creative Industries, in recognition of its position as a priority "growth-driving sector" in the government's industrial strategy.[1] This would provide essential resources for both academic research and business-led innovation, helping to unlock private capital investment and propel UK businesses to a leading position in global markets.

[3.] Transform the UK's CreaTech capability by introducing a new CreaTech Catapult

The establishment of a dedicated CreaTech Catapult would create a collaborative hub, fostering connections among creative businesses, educational institutions, and technology developers. Such a facility would enable companies to access cutting-edge technology, support experimental R&D, and act as a resource for smaller businesses unable to invest in costly innovation independently.

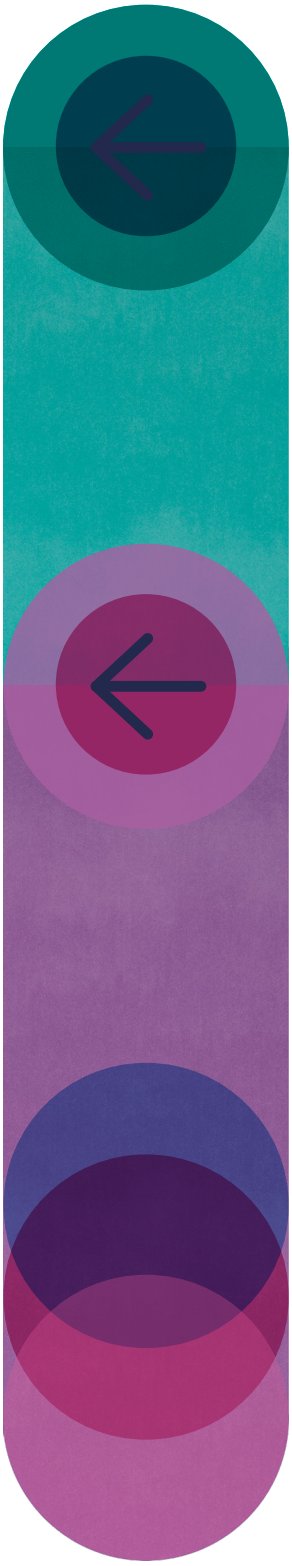
[4.] Leverage new private investment in CreaTech by supporting access to R&D tax reliefs

R&D tax reliefs can encourage greater levels of commercial investment in R&D but evidence suggests that R&D tax reliefs may be underused by the Creative Industries. An active research pilot offering support to creative businesses wanting to apply for R&D tax reliefs would deliver a base of case studies that could inform future policies and would provide the sector with greater clarity to encourage correct usage of the tax reliefs.

[5.] Create new funding mechanisms for scaling CreaTech businesses

To bridge the gap in later-stage funding for CreaTech firms, a government-backed Fund of Funds should be created, providing Series B+ investment for UK-based CreaTech companies. This would not only keep talent and IP within the UK but would also address a structural financing challenge that has prevented many CreaTech firms from reaching full scale. The Fund would allocate a proportion of total investable capital to CreaTech businesses, rather than being absolutely dedicated to these companies alone, to enable appropriate diversification. It is essential that a fund of this type is seen as one part of a wider effort to improve access to finance for creative businesses from start-up to IPO.

Although not the focus of this paper, those consulted by the research team made clear that these recommendations must also be underpinned by a legislative environment which supports both technical innovation and ensures fair pay for creative expression.




Photographer: Chris Scott

What is CreaTech?

The history of CreaTech

Photographer: Chris Scott

The history of creativity and innovation are closely intertwined. Leonardo da Vinci was a master of both art and science, using one to advance his understanding of the other. Botanist Anna Atkins, a pioneer of early photography, was inspired both by her desire to take accurate impressions of British algae and an ambition to create beautiful images.[2] The father of modern neuroscience, Santiago Ramón y Cajal, used his artistic prowess to help him to explore and depict the inner-workings of the brain.[3]

Whilst the relationship between emerging technologies and creative practice is nothing new, it has been less than thirty years that it has been recognised as an area of opportunity by the UK Government, most recently under the label of 'CreaTech'.

The Creative Industries were first defined and mapped by the UK Government in 1998. For the first time in UK policy, this new sector brought together parts of the software sector with the arts sectors in recognition of their common focus on the creation of new things — whether a new website, a new design or a new dance.[4]

In the same year, Nesta (originally, the National Endowment for Science, Technology and the Arts) was created as the first publicly supported national endowment in the UK to *"advance public appreciation of the Creative Industries, science and technology"*, again explicitly looking to exploit the opportunities lying at the nexus of emerging technologies and Creative Industries like architecture, fashion, film and games.[5]

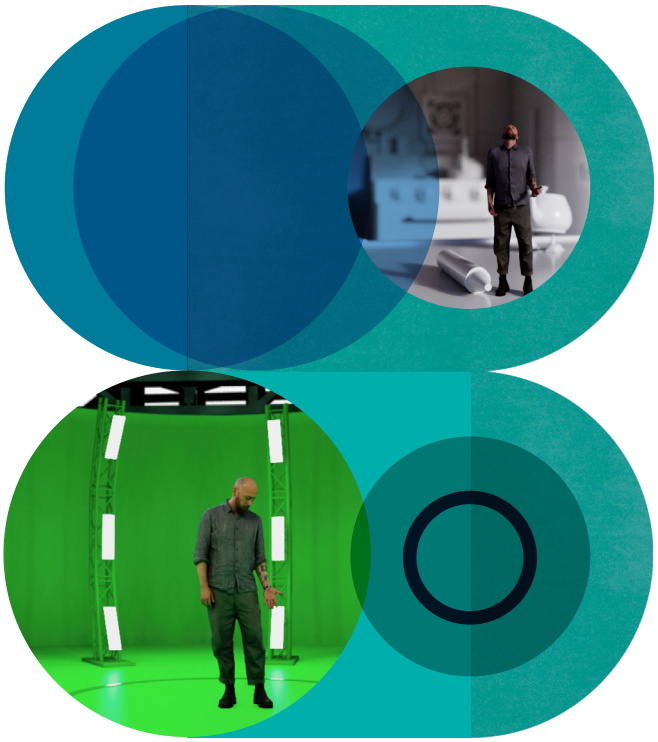
Both of these initiatives were aiming to try and maximise the economic and social benefits of the Creative Industries, but this period also saw increasing recognition of some of the challenges new technologies might pose to parts of the creative sector. In 2001, the Creative Industries sector was re-defined as *"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"* with the focus on IP particularly critical in the wake of technological innovations like Napster which arguably enabled unprecedented levels of copyright infringement in the music sector.[6]

Over the subsequent years the political interest in harnessing those areas where tech and creativity work together only grew. In 2011 the newly founded Creative Industries Council (CIC) included members from UKIE, Amazon and Google, as well as from organisations like RIBA, Warner Brothers and UK Music.[7] Creative Industries tax reliefs were announced in the 2012 budget for the video games, animation and high end television industries, as part of *"an ambition to make the UK the technology hub of Europe"*.[8]

In line with these political interventions, the research agenda also developed with the first Brighton Fuse Report published in 2013, funded by the Arts and Humanities Research Council (AHRC).[9] It presented an in-depth analysis of Brighton's creative cluster as a place where creativity and technology were fusing together to drive innovation, resulting in growth for these 'superfused' businesses.

2017 saw a change in the machinery of Government, when under Theresa May's premiership the Department for Culture, Media and Sport was renamed the Department for Digital, Culture, Media and Sport (both used the initials DCMS) and expanded to include telecommunications, data protection, internet safety and cyber skills.[10]

Whilst this department would be dissolved in 2023 (when the digital brief moved was to the newly created Department for Science, Innovation and Technology),[11] it was during this period that even greater attention was being put on the fusion of tech and creativity. Notably, the first showcase event for the Creative Industries CreaTech initiative was launched in 2017 as part of London Tech Week, successfully bringing investment from overseas into the industry.[12] This was part of a programme of work on 'CreaTech' supported by the Creative Industries Council which, spearheaded by advertising luminary Janet Hull, aimed to *"define the emerging category in which technology enables new forms of creativity"*. Another important event during this period was publication of the 'Culture is Digital' policy paper published by the DCMS, which showcased innovative digital projects in the cultural sector.[13]



Gate Ways: Immersive Technologies for Heritage Archives
[See page 69 for more.]

Perhaps the most significant intervention over this period was the Creative Industries Sector Deal published by the DCMS in 2018 (in partnership with the Creative Industries Council), which made key commitments around R&D investment in CreaTech.[14] These included a £39.3m Audience of the Future investment to support development of immersive technologies, and the Creative Industries Clusters Programme, which supported R&D partnerships between higher education institutions as key facilitating organisations and private enterprises, cultural institutions and third sector organisations around the country to accelerate growth in local Creative Industries.

When taken together, these constituted the single largest R&D investment that had ever been made in the sector by the UK Government at that time. The Clusters programme also included investment in the new Creative Industries Policy and Evidence Centre (PEC) which has since pioneered new research and conversations about CreaTech at both a local and national level.[15] Evaluation of these AHRC-funded clusters show they have already made a significant contribution to the overall growth of Creative Industries in the UK, as one of the UK's fastest growing industrial sectors, as well as building on the specific place-based activity of each of their localities.[16]

These new investments were then showcased at the first BEYOND Conference in 2021, which was developed by the Arts & Humanities Research Council's Creative Economy Programme, and brought together business leaders, creatives, researchers, policy makers, journalists and funders, and has since become an annual event.[17]

"The devolved governments have all taken their own innovative approaches to CreaTech."

In 2022 Innovate UK launched two new programmes to support Creative Industries businesses: Creative Catalyst, a £36 million programme for the Creative Industries sector of phased financial and non-financial activities to provide end-to-end innovation support for high growth potential businesses, and the Create Growth Programme (CGP), designed to support the development of Creative Industries with high-growth potential in specific regions across England, outside of London. The CGP was originally set up by DCMS with £17.5 million investment in the six original regions.

An updated strategy, the Creative Industries Sector Vision (developed in partnership with the Creative Industries Council), was announced in 2023, and again made a number of important commitments to boosting CreaTech including: support for this Coronation Challenge; increasing the budget of the Create Growth Programme to £28.4 million and doubling the regions covered; an additional £50 million for the next wave of the Creative Industries Clusters; £75.6 million to set up four new R&D labs and an Insight Foresight Unit as part of the CoSTAR programme; and £5 million for the UK Games Fund to invest in early-stage games studios.[18]

The devolved governments have all taken their own innovative approaches to CreaTech. Scottish policymakers were quick to reflect through policy intervention that the historic separations between commercial and non-profit creative companies were breaking down, and that charities and businesses were moving between creative subsectors. This led, in 2010, to Creative Scotland being created as the first public body of its type to fund the arts, screen sector and wider Creative Industries.

Wales would follow suit in 2020, with the creation of Creative Wales, the *"economic development*

agency that supports the Creative Industries in Wales"[19] which has showcased a number of CreaTech brands.[20] Whilst Creative Wales clearly embraces the place where creative practice and emerging technology meet, they have made the decision to exclude computer consultancy activities from their definition of the Creative Industries (also used by the Welsh Government) in contrast to the definition used by the UK Government.[21]

In Northern Ireland, the shape of the Creative Industries — with specialisms in film and television productions, (e.g. Game of Thrones, Derry Girls and The Line of Duty), and the digital games sector — means that CreaTech offers specific opportunities.[22] Future Screens NI, an intervention originally funded as part of the Creative Industries Clusters programme, has helped to accelerate these areas by delivering expert technical skills, opportunity and growth across film and broadcast, animation, games and immersive technologies and industries in Northern Ireland.[23]

Despite the growth in political understanding and investment in CreaTech over the last three decades across all four UK nations, the opportunity in this area still outpaces the public prioritisation and investment. This was made clear in a letter written by the Council for Science and Technology (CST) to the previous Prime Minister Rishi Sunak in October 2023, which highlighted that the Creative Industries continue to be seen as a lower priority for investment than traditional STEM (Science, Technology, Engineering and Mathematics) related sectors, despite their economic value (the latest data shows the sector producing £124.6bn GVA and employing 2.4 million people).[24]

Their recommendations included: a suggestion that public investment in R&D in the Creative Industries should better reflect the size, economic contribution, and future growth potential of the sector; that better data was needed to provide evidence of the need to broaden the definition of R&D eligible for tax relief to include arts, humanities, and social sciences research; that the Department for Culture, Media and Sport should continue to undertake research to conserve the UK's cultural assets in museums, collections, and galleries, and work with the Department for Science, Innovation and Technology to capitalise on opportunities to value and digitise UK national collections; and that the Intellectual Property Office should, as a matter of urgency, clearly set out guidance on what standards or regulations AI companies need to adhere to with respect to copyright of creative content.[25]

Now, there are new challenges and opportunities emerging. Questions are being asked about the right legislative environment to support both technical innovation and ensure fair pay for creative expression, with both Government enquiries and court cases underway. The announcement of the Creative Industries as one of the key sector focusses of the Government's new industrial strategy also offers a significant opportunity to think about which bold investments might propel CreaTech into its next chapter.[26]

We hope that the insights offered by this paper help them to do that.

Photographer: Beth Chalmers

Our definition of CreaTech

For the purposes of this project, we define CreaTech as the intersection of creativity, arts, culture, and technology, where innovative technologies are used to enhance creative processes, create new forms of artistic expression, and accelerate the economic growth and social benefits of the Creative Industries.

There are a number of ways in which this can be looked at. In this paper we focus on:

[1.] CreaTech Skills

Building on previous research by the Creative Industries Policy and Evidence Centre, we define CreaTech skills as those which inherently combine creative practice with technical know-how. These can range from graphic design to typesetting (see page 20 for more detail about our methodology).[27]

[2.] CreaTech Innovations

CreaTech innovations are our way of thinking about exciting areas for research and development which involve CreaTech skills, CreaTech companies, or see partnerships forming between specialists in emerging technologies and creative practitioners. CreaTech Innovations can be seen both inside and outside of the creative sectors, with examples including research into the use of virtual reality environments in medical education and the use of live motion capture in theatres.

[3.] CreaTech Companies

We define CreaTech companies as those companies working within the Creative Industries that drive value, scalability and repeatability using emerging technologies including AI, VR/ AR/ MR, robotics and special effects (SFX). Examples might include games companies using cutting edge AI as a core part of their business proposition, fashion businesses which use 3D printing techniques to reduce waste, or education software companies using creative tools to enhance learning experiences (see page 20 for more detail about our methodology). We also look specifically at what we call CreaTech innovators — non-software companies that are not only using emerging technologies to grow their businesses but which are building new technologies for use in the Creative Industries.

Together we hope these draw out the hallmarks of CreaTech, and provide a sense of context — developing a state of play and sense of economic contribution, as well as a clear policy strategy for supporting this exciting area at the intersection of two British industrial strengths.

Quantitative methodology

In compiling this report, the goal of our research was to obtain a granular understanding of the economic and social impact of CreaTech, identify key trends, and provide insights into the opportunities and barriers for future growth. This methodology section outlines the data sources, processing techniques, and analytical approaches applied, specifically focusing on private sector, company level data from provider Beauhurst for businesses and innovation, and professional social network data, accessed through the data provider Stratigens, for skills analysis.

Data sources

1. Firm level data for CreaTech businesses and innovation

Beauhurst provides a comprehensive database of high-growth companies in the UK, capturing business characteristics, funding history, technological adoption, and other critical metrics. Beauhurst data draws from Companies House data among other sources, and therefore captures incorporated entities, and has more detailed performance and fundraising data for those firms that meet their tracking criteria.[28] For this report, we focussed on identifying companies within the Creative Industries that are leveraging emerging technologies—a subset we refer to as "CreaTech businesses." To categorise CreaTech businesses, Beauhurst's sectoral tags were filtered to include only those aligned with Creative Industries as defined by the Department for Culture, Media and Sport (DCMS). Additionally, Beauhurst's "buzzword" tags, specifically those associated with advanced technologies like AI, VR/AR, and 3D printing, were applied to identify companies utilising innovative technological solutions within these sectors. These tags are created using a combination of automated and manual processes.[29] The data was then segmented into three layers to better understand the CreaTech business landscape:

- Layer 1: All businesses within the Creative Industries.
- Layer 2: Creative industry businesses identified as adopters of emerging technologies.
- Layer 3: "CreaTech Innovators" — non-software companies in creative sectors developing new technologies, based on criteria such as company descriptions, patents, and IP indicators.

2. Professional network and job advertisement data on CreaTech jobs and skills

For an analysis of the CreaTech skills landscape, we accessed LinkedIn, and other digital professional network data through Stratigens, a data provider specialising in labour market and workforce analytics. LinkedIn's extensive professional profile database offers detailed insights into job titles, skill sets, industry classifications, and geographic distributions, making it an ideal resource for assessing the prevalence and growth of CreaTech-related skills.

Stratigens provided access to anonymised and aggregated data for individuals with job roles or skills relevant to CreaTech, such as digital design, animation, gaming, and augmented reality. These roles and skills were identified based on a predefined set of CreaTech skill categories developed by the Creative Industries Policy and Evidence Centre (PEC) and were mapped against LinkedIn's skill and occupation taxonomy

to capture relevant profiles. The data allowed us to assess the volume and distribution of CreaTech professionals across the UK, including analyses by gender, location, and skill level.

Data processing

1. Firm level data processing

After extracting raw data from Beauhurst, we conducted several steps to ensure data quality and relevance. First, duplicate entries and non-creative industry businesses were removed. Next, businesses without evidence of recent activity, defined as those that had not secured funding or filed financial information within the past three years, were excluded to ensure that only active CreaTech firms were included. Company profiles were then manually reviewed to confirm the relevance of emerging technologies.

Furthermore, to examine funding trends and scaling potential, companies were classified by their funding stage (seed, Series A, Series B, etc.) and growth trajectory, using Beauhurst's financial and investment data. This process enabled us to identify gaps in financing across different stages of business growth, which informed the report's recommendations for targeted funding support.

2. Professional network and job advertisement data processing

LinkedIn and job advertisement data, provided by Stratigens, was aggregated at the skill and role level, which helped maintain privacy while allowing for meaningful analysis. The initial dataset included profiles from various creative and technical roles with skills such as graphic design, virtual reality, 3D modelling, and AI. Stratigens processed the data to remove outliers, normalise skill descriptions, and standardise job titles, ensuring consistency across the dataset.

The processed data enabled analysis of skill availability, diversity in the CreaTech workforce, and the geographic distribution of talent. A set of filters was applied to create segmented analyses by gender, region, and industry, providing insights into underrepresented groups in CreaTech roles and regional disparities in CreaTech skills.

Analysis

The quantitative data was analysed using a combination of descriptive and inferential statistics to provide insights into CreaTech business growth, skills demand, and regional trends.

1. Business and innovation analysis

Using the Beauhurst dataset, descriptive statistics were calculated to determine the distribution of CreaTech businesses across sub-sectors and regions. Growth trends were assessed by analysing historical funding data, while scaling potential was inferred by examining Series A and B funding rounds. Additional analysis on the prevalence of specific CreaTech technologies, such as AI and VR/AR, within the business dataset provided a view of the most in-demand technological specialisations within the sector.

2. Skills and jobs analysis

For the skills and jobs data, frequency and distribution analyses were conducted on the aggregated Stratigens dataset. Regional skill

Qualitative methodology

disparities were assessed by comparing the concentration of CreaTech roles across different UK regions, with London and the South East often used as benchmarks. Diversity metrics were calculated by analysing gender distribution and other demographic characteristics where data was available.

The Stratigens data was also cross-referenced with the Beauhurst dataset to identify potential alignment or mismatches between the skills supply and demand for CreaTech roles within businesses. For example, where high-growth CreaTech firms were located in areas with a low concentration of skilled workers, this was noted as a potential barrier to sector growth.

Limitations

This methodology has several limitations. Firstly, while Beauhurst provides extensive data on high-growth firms, it may not capture smaller, early-stage CreaTech businesses without recorded funding. Professional network data, while valuable for skill analysis, is limited to users who regularly and accurately update their profiles and may not fully reflect the entire workforce, particularly in non-digital sectors or regions with lower professional networking platform usage. Finally, while inferred ethnicity is now widely used to inform discussions around representativeness of founders, workers and leaders in various sectors (most notably in tech), it is important to note that this data is indicative. This data is therefore used in aggregate, and not broken down by specific geographies, subsectors, or roles.

In addition to the quantitative methodology described above, this report draws on detailed insights obtained through a programme of multi-method qualitative research with a range of specialist participants.

Two major in-person research events were held with representatives from the **22 Queen's Anniversary Prize-winning institutions** for 2023. These included institutions from both further and higher education, who sent academic and technical staff undertaking teaching, research and innovation in CreaTech and/or related areas. The first of these events was focussed around an analysis of Strengths, Opportunities, Aspirations and Barriers (SOAB). This analysis provided an opportunity to assess the current level of engagement amongst institutions with CreaTech-relevant education and innovation, in which areas of activity this might be developed, and, importantly, some of the barriers to doing so.

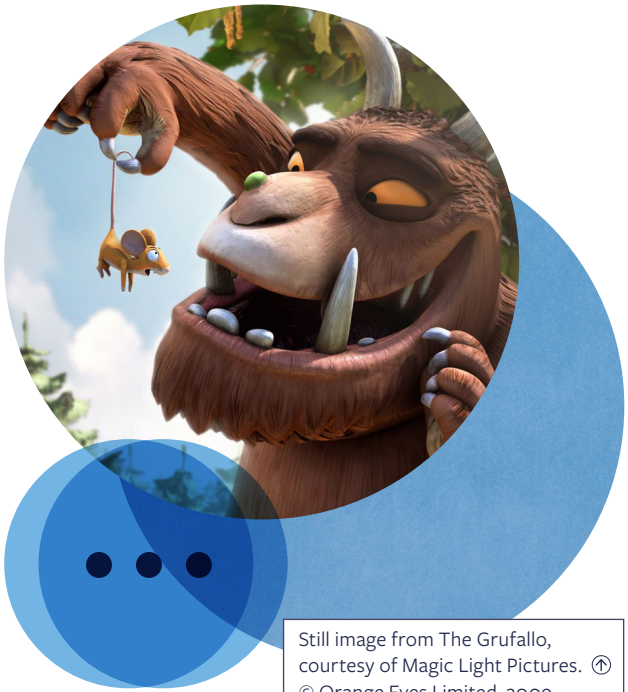
The second event provided an opportunity to consider some of the issues raised in more detail. In the first of a series of breakout sessions, participants established parameters for 'good' growth in CreaTech, in the context of:

- Economic growth;
- Future workforce;
- Sustainability;
- Wellbeing and health;
- Soft power and internationalisation.

Building on this discussion, the second breakout session focussed on how their institutions, the wider tertiary sector, and, ultimately, the UK government, can support CreaTech. Finally, in a third breakout session, participants considered the future of CreaTech growth and explored potential applications of CreaTech in other sectors

beyond the Creative Industries. In addition, selected participants took part in a number of smaller **thematic working group** meetings which explored a series of key issues in further depth, including a specific discussion of the role of further education institutions.

To further supplement the above, a series of in-depth qualitative semi-structured interviews were undertaken with **eight research institutions specialising in CreaTech innovation**. Institutions were selected on the basis of having received significant UKRI funding for CreaTech-related research and innovation programmes and/or being home to research centres engaging in CreaTech research and innovation, and included institutions from across England, Scotland and Wales. Interviewees provided details on their programmes of research and innovation, and were encouraged to reflect upon the successes of these programmes — in particular with regard to engagement with industry, difficulties and challenges faced during the course of these programmes and lessons learned, and future research and innovation opportunities. The data obtained through these interviews contained valuable insights for those institutions wishing to undertake similar programmes of research and innovation.



Still image from The Grufallo, courtesy of Magic Light Pictures. © Orange Eyes Limited. 2009.

Throughout the course of the project, a series of regular focus group meetings were undertaken with a **project working group consisting of 22 representatives from a range of relevant organisations** including further and higher education representative organisations; specialist research centres; and Creative Industries funding, support and advocacy bodies. Meetings explored a wide range of issues including:

- CreaTech opportunities and barriers for the tertiary education sector;
- The adequacy of existing mechanisms for funding CreaTech research and innovation across the tertiary education sector, and what future support might be needed;
- The efficacy of the term 'CreaTech' to capture the wide range of innovative activity being undertaken around creative technologies, and to drive forward sectoral investment and growth initiatives.

In a series of focus group meetings, representatives from the Prize-winning institutions and working group members were provided with the opportunity to give feedback on the key findings and recommendations provided in this report.

Finally, a high level advisory board of experts in CreaTech met three times over the project duration and gave the research team comments on project design, emerging evidence and areas for potential policy recommendations.

Photo Credit: Liminal Stage Productions

CreaTech Skills

What is a CreaTech skill?

CreaTech skills are those that blend creativity with digital technology expertise.[30]

Research conducted by the Creative Industries Policy and Evidence Centre (Creative PEC) in 2019 used a data-driven analysis of millions of job adverts to identify 54 of these CreaTech skills. These ranged from **graphic design**, to **animation**, to **video editing**, to **type setting**, and all had a strong association with creativity (creativity was likely to be mentioned in job adverts which asked for those skills), alongside an implied requirement for technical expertise.[31]

This research then looked at which jobs were commonly asking for these CreaTech skills, finding that they were particularly prominent in job adverts for a number of roles including **Graphic Designers**, **Product Designers**, and **Animators**, reflecting the demand for professionals who can combine technical acumen with creative vision. The research also found that many roles classified under broader occupational labels, such as **Artists** or **Photographers**, required skills that rely heavily on knowledge of digital tools and platforms, like motion graphics or 3D animation. This analysis confirmed what many had guessed — that some of the most seemingly 'traditional' creative roles had become CreaTech jobs.

Building upon this PEC work, new research conducted by Erskine Analysis for this paper has found evidence of **350,000 people currently employed in CreaTech roles in the UK** (i.e. in roles that ask for high levels of CreaTech skills), and **20,000 current job vacancies for CreaTech-intensive roles** across the country. We anticipate that many more than this will be using CreaTech skills outside of these roles, and studies on the future of work suggest that we can expect the number in both categories to increase over the next decade.[32] This may also mean seeing CreaTech skills increasingly required outside of creative fields like advertising and media, and in areas like e-commerce and healthcare, where visualisation and interface design are becoming critical.

As is the case in the wider Creative Industries, we found that salaries within CreaTech roles are varied, reflecting the diversity of positions, and levels of expertise. The salary spectrum ranges from a minimum of £10k to a median of £35k, with the highest earners making up to £492k. This wide range underscores the broad scope of CreaTech positions, encompassing entry-level roles to highly specialised and senior positions.

"So many of the jobs now in the screen industries are CreaTech jobs [with] the rise of virtual production technologies... There's hardly anybody in the screen industry who doesn't have to interface with technology at some point".

Co-Director, Screen Industries Growth Network, University of York

Diversity and inclusion in CreaTech

Whilst CreaTech skills and jobs seem set to become increasingly important, both in the Creative Industries and across the wider economy, there remains worries about who has access to them. Queen's Anniversary Prize-winners and CreaTech experts strongly emphasised to the research team their concerns about the lack of diversity in those who are able to build successful careers in areas related to CreaTech. They made clear that diversity and inclusion considerations should underpin all efforts to create a CreaTech skills pipeline. This is not only a question of moral justice but will also ensure that industry is able to access the broadest range of talent, bringing the diversity of experiences and ideas that evidence has suggested is linked to better workplace decision making.[33]

New research by Erskine Analysis provides evidence to support these concerns, finding a mixed picture in terms of the diversity of those in CreaTech jobs. On the one hand, gender distribution within CreaTech roles reveals a notable deviation from the broader tech industry: while only 25.5% of employees in the general tech sector are female, **CreaTech boasts a more balanced gender representation with 45% of its professionals being female** and 55% male. This is more representative of the broader population in the UK, where 51% are female, and 49% male.

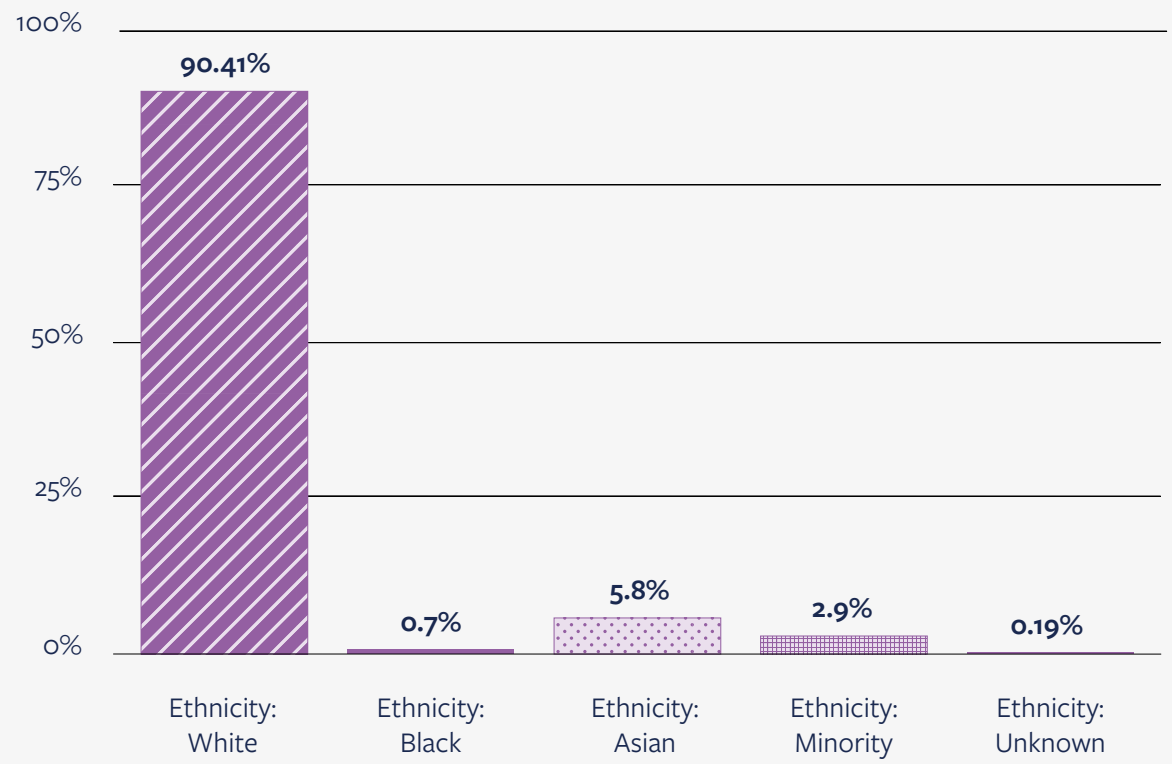
On the other hand, ethnic diversity remains below representative levels compared to the working population in the UK, and significantly worse than either the tech sector or the creative sector as a whole. As shown in **Figure 1**, our analysis found that it is likely that **90% of those working in CreaTech are ethnically white**, while only 6% are Asian, and less than 1% black.[34] These figures are particularly striking given the density of CreaTech roles found in London, which is the most ethnically diverse region of the UK, with 46.2% of residents identifying in the last census as Asian, black, mixed or 'other' ethnic groups, and a further 17.0% with white ethnic minorities.[35]

Whilst we don't have data on all employee characteristics relating to CreaTech roles, research looking at the Creative Industries workforce as a whole suggests that social class is also likely to be a determining factor in who has access to these jobs. A disproportionately high number of people working in the Creative Industries come from privileged backgrounds and attended private schools, and this is particularly the case in some areas where we find a higher concentration of CreaTech roles, like advertising and marketing.[36]

As in other parts of the Creative Industries, there is therefore urgent work to be done with regards to creating educational opportunities for students from all backgrounds, as well as from across the country, that can allow for equal participation in emerging CreaTech careers.

> "CreaTech boasts a more balanced gender representation with 45% of its professionals being female."

Figure 1 Ethnicity of people working in CreaTech roles



"A disproportionately high number of people working in the Creative Industries come from privileged backgrounds and attended private schools."

"90% of those working in CreaTech are ethnically white, while only 6% are Asian, and less than 1% black."

Developing a CreaTech skills pipeline

Photo Credit: Sheffield Hallam University

As both traditional creative disciplines, and new areas of the economy, integrate digital and tech elements with creative practice it is clear that fresh educational and training pathways will be needed. Over the last year, we have heard evidence from colleges and universities who are leading the way in supporting the development of CreaTech skills, but we have also heard from those same institutions that singular interventions will never be enough — **in order to develop a workforce with the requisite technical expertise and creative ability, it is crucial to consider skills and training using a holistic lens, which must include school education, further and higher education, and lifelong learning opportunities.**

Discussions with our university and college representatives reflected the importance of well known systemic issues facing schools, colleges, universities and skills providers across the UK. These include the impact of falling numbers of international students and a long period of frozen tuition fees for higher education organisations; underfunding leading to growing deficits in further education; and challenges around finances and availability of teachers in schools.[37] Whilst these structural issues are not the main focus of this paper, it is important to recognise that without action to address them, it will be difficult to realise the full potential of CreaTech.

In addition to the systemic issues facing our education systems, we heard evidence of a number of specific issues which are having an acute impact on institutions and courses aiming to develop CreaTech skills. The findings of our research emphasise the need to develop an educational pipeline that delivers the required skills, beginning with school education and feeding through to further and higher education.

Developing a CreaTech skills pipeline: *school education*

Our interviews with further and higher education leaders confirmed that the development of CreaTech skills cannot begin at college or university, but must start with a broad and balanced school education which recognises the importance of creative subjects and builds confidence with changing technologies.

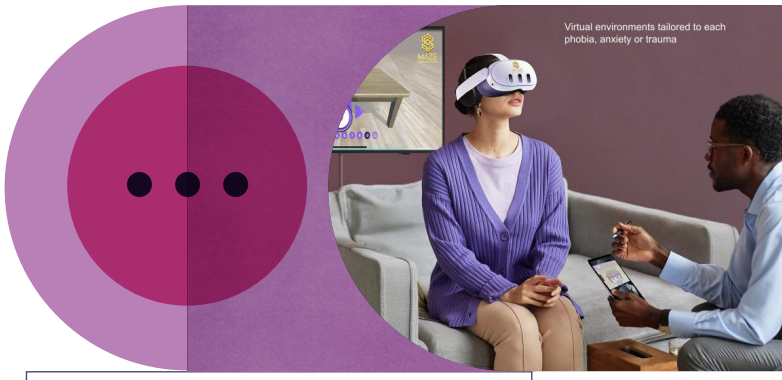
Creative subjects are an important foundation to CreaTech skills, both because they develop specific relevant capabilities (e.g. design skills), and because they build creative confidence, requiring students to come up with new ideas and interpretations, rather than asking them to reach a specific answer or to get as close as possible to a pre-approved set of criteria.[38] CreaTech leaders and education providers across all four nations recognise this and recommend a strong creative education infrastructure is fundamental to building CreaTech skills. English providers interviewed were particularly concerned about the impact of what they perceive to be the de-prioritisation of creative subjects in English schools (there has been a 23% decline in the number of hours spent teaching the most commonly taught creative subjects in English state-funded secondary schools between 2011 and 2024).[39]

Tertiary education leaders and CreaTech experts also suggested that a balanced school curriculum should seek to provide a range of technical and digital skills that can underpin both the employability of school leavers and their transition into further education (including in areas like web design and programming).

Those teaching students in CreaTech subjects in further and higher education were clear that students' increasing levels of interaction with CreaTech activities — e.g. computer games, photo editing software — is driving interest in the subject area but can not yet replace the fundamental skills taught through either technical or creative subjects at school.

In addition, education leaders from across the UK highlighted that they were concerned about the lack of awareness from both students and parents regarding the capabilities and potential of CreaTech technologies and — perhaps more importantly — the types of careers which might use these technologies in the future. Participants in the Coronation Challenge advocated for a 'careers not courses' approach whereby careers pathways in this space are made more explicit to school students in advance of consideration of their tertiary education choices.

Tertiary education and industry leaders also suggested that there may be unexplored opportunities to combine creative and technical subjects within schools. They recommended that this could be done by promoting subjects which use both creative and tech skills (for example, through digital arts subjects, like film), by imbuing the technical rigour of Computer Science with the innovative spirit of creative subjects within existing course provision, or through the development of new courses such as a Digital Creativity GCSE, which has been recommended by UKIE (the trade body for the UK games and interactive entertainment industry).[40]



Interactive Psychotherapy — Maze Reality
[See page 70 for more.]

Developing a CreaTech skills pipeline: *further education (FE)*

Further education institutions can have a particularly important role to play in the development of a CreaTech skills pipeline, whether that is through preparing students for higher education or by providing forms of vocational training which ready students for the world of work and which can be tailored to upskill those returning to work or existing employees developing their careers. Yet their ability to deliver technologically focussed creative courses is undermined by a number of issues.

First, the ability of further education institutions to embed training in CreaTech technologies into existing programmes, or indeed to develop new digital-creative programmes, is limited by the pre-specified educational frameworks within which they work (i.e. those designated by awarding organisations). FE leaders feel that creative (including CreaTech) subjects are poorly understood by awarding organisations and that this is limiting provision. Policymakers have also been very involved in setting qualifications (apprenticeship standards and T Levels in England, for instance) and the experience of those working in FE is that they have often taken a narrow approach to this task, failing to recognise where employers are looking for people with creative as well as technical skills. This may be one of the reasons that the decline in FE enrolments in creative subjects over the past decade has been even more severe than that of FE enrolments across the board.[41]

FE leaders we interviewed spoke in particular of the challenge of facing an accountability system which does not reward a 'creativity first' approach — whereby the focus is on the development of creative ideas which can then be enabled by technologies — or provide enough time and space for teachers and students to be more creative within the existing curriculum.

Second, FE institutions told the research team that they were struggling to hire the staff and to develop the capabilities or connections to adequately teach CreaTech skills. Educational leaders outlined the challenge of staff recruitment, which is generic across the FE sector (and exacerbated by the fact that pay is not always competitive with schools or industry as funding rates have lagged behind labour costs), but highlighted that it may be particularly acute in areas like CreaTech where there is rapid technological development. Given time pressures on staff, it became clear that current upskilling tends to be done by staff in their own time. Although we heard evidence of informal training networks being developed across institutions in particular places, time constraints limited the effectiveness of these networks.

FE leaders explained that these fundamental issues were being exacerbated by more practical challenges for their institutions in gaining access to state of the art technologies. Whilst an institution might make a one-off investment in a new piece of technology (e.g. a 3D printer) or piece of software, they would be unlikely to be able to update this piece of technology every year. This issue is more specifically addressed in the chapter on CreaTech Innovation.

Given the long-term nature of these challenges, FE leaders suggested that a renewed commitment to building stronger links between their institutions, universities and industry is urgently needed to support the upskilling of staff and to increase students' exposure to the emergent technologies and skills that CreaTech companies are using.

There are many good examples of where further education institutions have built strong links with other industries that a new approach to FE-industry relations focussed on the creative sector could build upon.[42] However, FE leaders familiar with CreaTech companies were clear that they recognise that there are additional challenges inherent to building long-term relationships in a fast moving field that is dominated by small businesses.

Developing a CreaTech skills pipeline: *higher education (HE)*

The Creative Industries remain an overwhelmingly graduate destination (57% of those employed in the sector from April 2023 to March 2024 had a degree or equivalent).[43] Evidence suggests that half of these graduates are likely to have studied Creative Industries related subjects, which include explicitly CreaTech subjects like computer games.[44] Therefore it is important in developing a CreaTech skills pipeline that we foster a political environment which recognises and rewards strong provision in degree programmes within higher education.

HE institutions are typically enabled to innovate and be flexible with their curricula in terms of content, delivery and assessment (with the exception of those subjects with specific professional standards or accreditation). As a result, HE leaders feel more able to respond to technological and industrial deployments in the CreaTech field than FE institutions. HE institutions' ability to share examples of where CreaTech is already adding "value" to arts and other creative programmes is testament to this. Examples include embedding new forms of technical skills and creative practice, and bringing the arts into a more productive dialogue with STEM subjects (including through the new generation of digital arts schools now emerging in UK universities, like SODA, the School of Digital Arts, at Manchester Metropolitan University).[45]

Beyond this distinction, however, higher education institutions share many of the same challenges as their FE counterparts.

Involving industry in decisions around education is vital to ensuring curricula align with the immediate needs of employers, particularly in dynamic sectors like CreaTech, where creativity and technology converge. Industry insights help address contemporary skills gaps and vacancies, ensuring graduates are equipped to enter the workforce. However, industry engagement often focusses narrowly on current challenges, leaving less attention to foresighting — understandably so, given the complexity and uncertainty of predicting future trends. For more accurate foresighting, it is essential to bring together a diverse coalition of experts, including employers, emerging technologists, and specialists in innovation and future work dynamics. This collaborative approach enables education systems to anticipate and prepare for emerging skills demands, fostering a pipeline of talent that not only meets present needs but also drives the evolution of the CreaTech sector.

Those teaching Creative and CreaTech subjects told the research team that they also experience significant time pressures which limit their ability to add space for experimentation and 'play' into the degree curricula. Whilst learning the technical parts of CreaTech skills is obviously important to future job prospects, they suggested that in many CreaTech fields it is an experimental approach that will reap the greatest rewards — and so finding time for students to innovate is important.

As with further education institutions, there are also budgetary and technical support restrictions which limit the acquisition of the new technologies for teaching. While research and innovation funding can help an institution acquire new technologies, this is neither regular nor certain. Recruitment of appropriately skilled staff (both academic and technical) is also a significant issue for many institutions.

Staff in higher education typically reported that they had more time for upskilling than their further education counterparts, although this was still largely felt to be insufficient given the fast-changing pace of technologies. They also suggested that this was more likely to be part of their research and innovation activity (e.g. conferences, research projects with industrial partners). As such, HE leaders told us that it is not necessarily easy to translate this awareness

into the classroom in such a way as to innovate in teaching. It was also noted that close links to industry resulted in significant benefits in terms of exposure to information about the changing uses of technologies and creative practices.

Coronation Challenge participants also identified that enabling interdisciplinary and cross-faculty working can be particularly challenging in the university sector, even more so than for those in further education who we interviewed. This is due to a series of institutional issues around matters such as uneven allocation of staff resources and wider competition for budgets between departments and faculties, which often work counter to attempts to teach and research in an interdisciplinary manner. Furthermore, references were consistently made to the problem of breaking down disciplinary 'silos', especially between STEM subjects and the arts, in part due to the nature of existing research funding mechanisms. Where we did find examples of successful interdisciplinary working, these tended to be in research and innovation projects where interdisciplinarity was a core part of the request for funding.

Finally, many of those leading higher education institutions feel strongly that recent rhetoric around 'low value' arts courses has been damaging for recruitment of students, sharing the concern of their FE counterparts that there is a poor understanding of career pathways in the Creative Industries in general, and CreaTech roles in particular.

Developing a CreaTech skills pipeline: *lifelong learning*

In providing a holistic view of education and skills training towards developing an effective and inclusive CreaTech skills pipeline it is also crucial to consider mechanisms for lifelong learning and continued professional development (CPD) that enable individuals to learn, upskill and re-train throughout their entire lives, and which create opportunities for both young people and adults to develop the skills needed to pursue a career in increasingly technologically-focussed Creative Industries. Lifelong learning is particularly crucial for the UK Creative Industries, both in terms of attracting new talent and diversifying the workforce, and with regards to individuals presently working in the Creative Industries — in particular at mid-career stage — trying to upskill in order to adapt to the changing nature of work, creative practice and innovation.

From January 2027, the UK government's Lifelong Learning Entitlement (LLE)[46] will transform the post-18 student finance system in England[47] by creating a single funding system for higher education. The LLE will enable individuals to develop new skills and gain new qualifications at any point throughout their working lives, by providing funding for full courses at level 4 to level 6 (including degrees, higher technical qualifications, and designated distance-learning and online courses), as well as individual modules of high-value technical courses at level 4 to 5. The LLE is aimed at supporting the government's skills agenda, with the intention to work together with Skills England to align with the government's skills priorities. This alignment, together with adding CreaTech skills to the government's list of skills priorities, will be crucial in ensuring lifelong learning opportunities that benefit individuals looking to (re-) train or upskill to work in the UK Creative Industries, and provide the necessary skilled workforce for these sectors.

We recommend: Develop a CreaTech skills pipeline

Note: the research team took evidence from across the UK, and believe that all four nations of the United Kingdom would benefit from developing a holistic approach to CreaTech skills development. However, as this paper is being published by the Department for Culture, Media and Sport, we have not provided explicit recommendations on skills for the devolved nations.

School Education

For the Creative Industries to thrive, nations across the UK need a strong CreaTech skills base fuelled by broad and balanced curricula and accountability systems which recognise the importance of creative subjects and increasing confidence in using technology.

In England, policies must address the decline in provision of creative subjects, including by:

- Maintaining the Labour Party commitment to have a creative subject in Progress 8 accountability measures;
- Moving towards a minimum four-hour Arts entitlement within the school week to the end of Key Stage 3, and provision at Key Stages 4 and 5 outside of exam syllabuses;[48]
- Ensuring that Labour's commitment to a Teacher Training Entitlement includes high quality, industry-informed professional development opportunities for those teaching creative subjects, and is supplemented by bursaries for teachers for relevant subjects.

The one year UK-wide expansion of the Creative Careers Programme must include information about CreaTech roles and careers. Our evidence would also support a need for careers advice in this area beyond this expansion year.

Policymakers should create opportunities to embed technological experimentation into creative subjects at school, and creative experimentation into technical subjects. In England, consideration of such an approach should form part of the curriculum and assessment review and should drive the expansion of the definition of expressive arts subjects to include digital arts subjects, like film. Scotland is moving to adopt this approach with the pilot development of "Film & Screen" as an expressive arts subject for ages 3 to 18 as part of the Scottish Curriculum.

In the long term, consideration should be given to the development of new courses focussed on the opportunity at the nexus of creative subjects and digital technologies — e.g. a Digital Creativity GCSE.

Further and Higher Education

Sector leaders and governments at national and regional levels must support ambitious new approaches to ensure that FE and HE institutions can bring in those working in industry. The Further Education Lecturer Reservists (FELR) initiative offers a potential model for the wider Creative Industries to adopt, developing a cohort of 'lecturer reservists', who teach part-time while continuing their industry roles.[49] In England, this should be done in partnership with the newly-developed Skills England.

Consideration should be also given to how HE and FE can work more closely together on the subject of CreaTech. One particular opportunity is for the higher education institutions involved in the recently announced AHRC-funded Creative Clusters to collaborate directly with local further education institutions.

Photographer: Chris Scott

Further Education only

There must be a greater policy commitment to strengthen further education, and in particular industry-facing technical education, for the Creative Industries across all four nations.[50] This must fully recognise the unique potential of CreaTech skills and subjects to drive innovation and growth.

In England, it is essential that the curriculum and assessment review and the post-16 education and skills strategy seek to understand and therefore better address the skills needs of the creative sector. To do so they will need to work hand-in-hand with employers, emerging technologists, and specialists in innovation and future work dynamics to understand its changing needs. To ensure longevity this cannot be a one-off exercise.

Higher Education only

The Government must ensure they foster a political environment which recognises, amplifies and rewards strong CreaTech provision in HE.

Lifelong Learning

The Lifelong Learning Entitlement (LLE) must support the development of CreaTech skills — by offering creatives the opportunity to learn how to make use of emerging technologies and by ensuring there are adequate opportunities to develop CreaTech skills in areas like graphic design, animation and video editing.

CreaTech Innovation

What is CreaTech Innovation?

New technologies undoubtedly offer challenges to businesses across the Creative Industries, including to livelihoods and to the regulatory framework that underpins the sector.[51] However, CreaTech innovation — which we define **as the innovative use of emerging technologies in creative processes** — is also having positive social and economic impacts.

Artificial intelligence (AI) is fuelling innovation across the Creative Industries. For example, in gaming, it is being used to develop more intelligent and diverse virtual characters;[52] advertising agencies are using AI-generated content in campaigns;[53] and in fashion AI is being used to convert sketches, mood boards, and even descriptions into high-fidelity designs.[54]

Robotics, too, is part of a CreaTech innovation boom, for example, the 3D printing of materials is being explored by the designers and architects as a potential way to reduce waste, inside and outside the creative sector.[55]

Other technologies like Virtual and Augmented Reality and blockchain are also opening up new possibilities for creative expression and business growth. **The annex to this paper provides case studies to give a sense of the breadth of CreaTech innovation projects taking place in universities and colleges across the UK with subjects ranging from metaverse museums, to augmented reality environments in healthcare, to textile-printing robots.**

Put simply, as in other areas of the economy, **technological development is likely to be one of the key drivers of long-term productivity growth in the Creative Industries**, and its impact extends far beyond the small number of CreaTech companies listed above, across the Creative Industries and to the entire economy.[56]

In theory, the market should provide access to finance for individual creatives, businesses and academics seeking to experiment with these sorts of technologies. However, across the economy, imperfect information surrounding the potential value of investment in R&D means that private companies and investors tend to focus on less risky, closer-to-market projects.[57] As a result, the Government has put into place a number of interventions to encourage research and development spend, which include funding through UK Research and Innovation (UKRI) and tax incentives to support companies that work on innovative projects in science and technology.

As a global leader in both technological innovation and the Creative Industries, the UK has a clear advantage in CreaTech. However, analysis of the data and qualitative interviews for this research suggest that these interventions may not be wholly suited to creative businesses pursuing CreaTech Innovation.

In this chapter we explore why this may be the case, and what changes may be required.

Encouraging CreaTech innovation through UKRI

UK Research and Innovation (UKRI) is a non-departmental public body sponsored by the Department for Science, Innovation and Technology which invests in research and innovation to enrich lives, drive economic growth, and create jobs and high-quality public services across the UK.[58] It does this by investing in key drivers of innovation — including individual researchers, universities, businesses and NGOS.[59]

As highlighted in our chapter on the History of CreaTech, UKRI has in recent years facilitated a number of successful investments at the intersection of emerging technologies and the Creative Industries, with examples ranging from Innovate UK programmes including Bridge AI and Creative Catalyst, to research into circular fashion led by the Natural Environment Research Council (NERC), Innovate UK and Arts and Humanities Research Council (AHRC), to AHRC's ongoing investment in creative clusters.[60]

These UKRI investments have supported universities and businesses to unlock growth and leverage in private investment — for example, the Creative Industries Cluster Programme leveraged in **£277m** pounds of public-and-private co-investment, and supported 466 spin-outs, start-ups and scale ups.[61]

"The overarching objective [of StoryFutures] was about unlocking university research for the Creative Industries. Underneath that what comes is another emphasis on structured R&D. That's one of the main things that we were trying to drive within the creative industry. In depth and structured R&D is crucial for the creative tech sector. It drives innovation and it also allows them to create experimental and new products, services and experiences that they might not have been able to do otherwise. SMEs are quite reluctant to engage in that sort of R&D because it is quite resource intensive; it takes up a lot of time and takes up a lot of money. So where we come in as an organisation is that we lay out a very clear pathway from idea to prototype to market, which in essence aims to de-risk that R&D process for the SME. This enables them to harness their creative potential a bit more effectively."

Monitoring & Evaluation Officer, StoryFutures, Royal Holloway, University of London

However, there remains a question about whether the overall level of public investment in R&D through UKRI is appropriate given the size of the opportunity.

The previous government acknowledged that public investment in research and development in the Creative Industries should reflect the size, economic contribution, and future growth potential of the sector.[62] This was also a sentiment that our research found is common amongst creative businesses, tertiary education institutions and investors interested in the CreaTech space.

However, estimates from CRAIC at Loughborough University suggest that less than 1% of UK Research and Innovation's spending between 2016 and 2021 was invested in the Creative Industries.[63] This analysis looked at all sub-sectors of the Creative Industries, including the IT, software and computer services sector.

The Creative Industries sector has rightly been recognised as a growth opportunity by the new Government and is central to their developing industrial strategy. This will set out an ambitious plan to 'deliver the certainty and stability businesses need to invest in the high growth sectors that will drive our growth mission', and UKRI funding into innovation happening in these sectors is an important lever to achieving this. Therefore, right now is an appropriate time for policymakers to work with UKRI colleagues to consider how they might be able to stimulate new co-investment and drive economic growth in the Creative Industries through a cross-UKRI ambition to increase the share of its investment in technological innovation that supports and is supported by the sector.

The nature of CreaTech is that it is grounded in creativity and culture but at the same time rooted in R&D cultures from science, innovation and technology. To maximise its potential, education leaders, including CreaTech specialists and Coronation Challenge winners, made clear that an increased spend on Creative Industries will need to be accompanied by work to address the inherent challenges of working between disciplinary silos including by:

- providing clarity over interdisciplinary funding opportunities;
- giving access to funding and programmes with less restrictive 'impact' and 'purpose' requirements, to support more experimental projects with emerging technology;
- seeking to manage conflicts over intellectual property;
- managing uneven institutional resource allocation (e.g. staffing) and infrastructure investment (e.g. spend on software, hardware and technology labs) across STEM subjects and the arts;
- and by changing the perception around the value of the arts and humanities in relation to STEM subjects.

Made in Code: Reimagining the Experience of Fashion
[See page 72 for more.]

We recommend: Increase public investment in Creative Industries R&D

Note: Further research is imminent from the Creative Industries Policy and Evidence Centre to uncover more about the ways in which UKRI currently supports the sector,[64] and the Creative Industries Council is working to draw out linkages between public investment and the growth of the sector. Both of these pieces of work should help to guide this intervention.

The proportion of R&D investment spent on the Creative Industries, including CreaTech, should increase as a new industrial strategy seeks to find ways that additional public spend can unlock private investment in fast growth areas, including this sector.

A five year plan, driven by UKRI and industry, should look at the ways in which additional funds could multiply the impact of existing investments, and detail new areas of opportunity.

The case studies in Annex 1 of this paper show the potential that CreaTech has to support:

» Economic development;

» Climate and environmental sustainability;

» Health and wellbeing.

These may be three areas which UKRI could focus any additional investment on, given their close links to three of the UK Government's missions, which are to: Kickstart economic growth; Make Britain a clean energy superpower; and Build an NHS fit for the future.[65]

This paper does not prejudge everything that additional UKRI spend might seek to achieve. However, throughout the research project we found significant enthusiasm amongst our research participants for the establishment of a physical hub or hubs, beyond existing investments, that could support CreaTech activity across the UK.

It was perceived that this could help to solve a number of challenges faced by CreaTech businesses and higher and further education institutions including that:

» Creative businesses and tertiary education institutions lack access to state of the art technologies, and are hampered by the cost and inherent risk of investing in these new technologies (e.g. investing regularly in state of the art 3D printers);

» There are challenges related to knowledge transfer in the area of CreaTech, particularly outside of the screen sectors;

» Creative businesses and tertiary education institutions seek opportunities to experiment with emerging technologies;

» Tertiary education institutions seek advice and guidance about how they can best work with creative companies and foster creative entrepreneurship;

» Those involved in CreaTech innovation can struggle to find space to demonstrate, and sell, their work.

We recommend: Establish a CreaTech Catapult

Catapults are not-for-profit, independent technology and innovation centres which connect businesses with the UK's research and academic communities. Businesses and educational institutions can use them to access technical facilities and expertise.

They address a number of the critical market failures faced by the creative industries — specifically:

- the inherent inefficiency of many organisations acquiring specialised, expensive equipment needed for specific innovation projects (and the challenge for smaller companies of getting access to this equipment);
- the imperfect information surrounding the potential value of investment in R&D (particularly for companies and for investors in a fast moving area like CreaTech).

We suggest a new catapult should be funded through InnovateUK, with a cost of £50-70m over five years, and with an ambition to leverage at least £10m from industry.

"To be successful a Catapult would need to build on these existing strengths by providing an unprecedented national scale capability responsive to — and focussed on — emerging technologies and their application in creative jobs, skills and innovation."

It would be critical for such an intervention to build on the nascent R&D infrastructure for the creative sector that has been developing over the last decade. Important projects already underway include:

» the **Digital Catapult**, which focusses on significant challenges and opportunities facing the UK's economy and society, where technology can play a major role in providing solutions. This Catapult has supported the Creative Industries through a number of programmes, including through work on AI and on advanced media, although the sector will never be its sole focus as it is technology driven, rather than sector driven;

» the **AHRC Creative Industries Clusters programme**, which seeks to address a distinct and measurable challenge for the Creative Industries within a specific geography or region. It focusses on the creation of products, services, and experiences and significant potential commercial impact;

» the **AHRC CoSTAR programme**, which is a £75.6 million national research and development network of laboratories that are developing new technology to maintain the UK's world-leading position in gaming, TV, film, performance, and digital entertainment sectors;

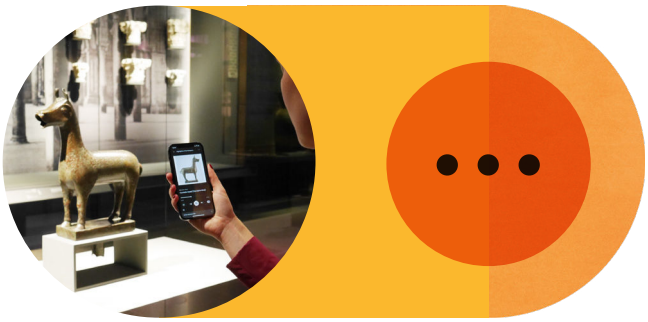
» the **Future Observatory**, which is the Design Museum's national research programme for the green transition and a developing network of individuals, organisations and initiatives, created in partnership with the AHRC;

» and Innovate UK's **Creative Catalyst programme**, which provides innovation support for high potential businesses in the creative sector in the UK.

The first round of the Creative Industries Clusters Programme, in particular, has developed a number of mature clusters, many of whom are already focussed on emerging technologies. For example, on the back of the XR Stories Creative Industries Cluster, York University has played a significant role in establishing an innovation hub in York city centre, which is owned by the city but managed by the university. Media Cymru operate a more mobile and itinerant form of hub called 'Innovation Spaces', which travels around South Wales, taking in both urban and rural areas, and attempts to connect creative businesses and communities.

Two new clusters with a CreaTech focus were recently announced as part of the next round of funding, with £13.5 million awarded to boost Merseyside's thriving live music sector by harnessing new technologies and to help creative firms in the West Midlands revolutionise live performance with VR and immersive technology.[66]

To be successful a Catapult would need to build on these existing strengths by providing an unprecedented national scale capability responsive to — and focussed on — emerging technologies and their application in creative jobs, skills and innovation. It would offer the opportunity to put in place an established model alongside the novel forms of infrastructure being pioneered by AHRC, and could become the 'front door' for those interested in investing in, or interacting with, all types of CreaTech across the creative sub-sectors.



Encouraging CreaTech innovation through tax reliefs

Private investment has a clear part to play in achieving the multifaceted benefits of investment in CreaTech innovations. Alongside investment through UKRI, Research and Development (R&D) tax credits have emerged as one of the most important policy levers to encourage private companies to invest more in innovation, helping them to accelerate their R&D, hire new staff and ultimately grow.[67]

However, there has for some time been questions about whether the existing tax incentives work for all creative sub-sectors, with both researchers and sector leaders arguing the definition of R&D that the HMRC uses might disadvantage this part of the economy.[68] More broadly, there remains confusion throughout the sector about who can apply for the existing tax credits, for what reasons, and the rationale behind which applications are turned down and which are accepted. Over the past year, HMRC has stepped-up their scrutiny of applications following a paper from the National Audit Office which suggested high levels of fraud and error.[69] This makes it all the more important that creative companies have clarity about the ways in which this critical tax mechanism can and should be used.

We recommend: Leverage new private investment in CreaTech by supporting access to R&D tax reliefs

As part of a government-funded action research pilot, legal advice should be provided to Creative Industries businesses who have not commonly applied for R&D tax reliefs and who are unsure whether they might be eligible. A six-month pilot would build a repertoire of case studies which could support a better understanding of how creative companies engage with the R&D tax system, to encourage more organisations to apply for the tax credits where they are eligible, thus leveraging greater levels of R&D investment across the creative sector.

As an outcome, a document co-authored with the HMRC would be published including anonymised case studies, and headline guidance for different sizes and types of creative companies across sub-sectors. This would give companies greater insight into how the current tax system can and should be used, as well as providing evidence which would support future conversations with HMRC about changes to the tax mechanism.

We suggest this initiative would cost £100-200k, which would cover the costs of the legal and tax experts who would work with the companies during the initial six month period, and then the costs of a small team of researchers who would support these experts and the HMRC with the writing up of insights gained, including case studies and best practice. We believe this exercise would support HMRC's new theme of 'helping businesses get things right' in regards to the R&D tax reliefs.[70]

Photographer: Chris Scott

CreaTech Companies

What is a CreaTech company?

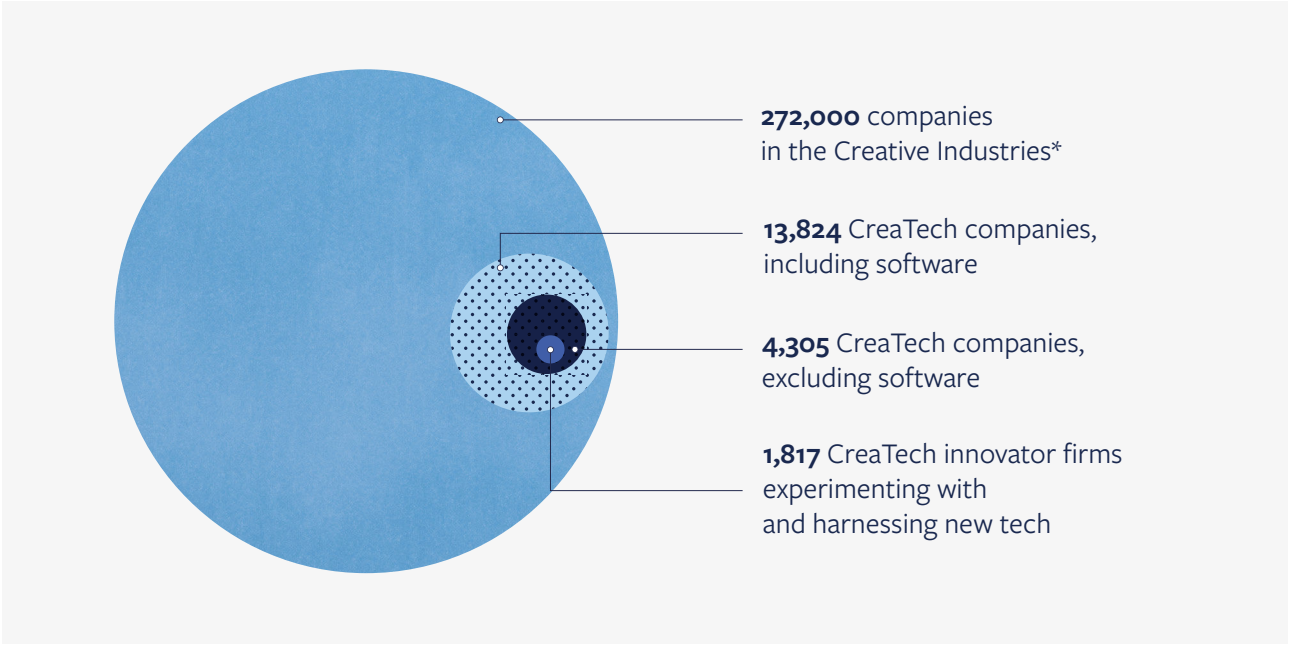
While all creative businesses should have the opportunity to engage with emerging technologies — it is CreaTech companies, whose core value proposition sits at the intersection of emerging technology and the Creative Industries, which represent some of the UK's most dynamic and innovative economic drivers. These are businesses blending creative practice with technological advancement, bringing transformative solutions to industries as diverse as music, games, advertising, architecture, and beyond. In this chapter, CreaTech companies' characteristics, economic impact, and growing relevance in the UK economy are explored.

In order to understand the challenges faced by CreaTech companies, it is important first to define them. However, this is not a simple task.

Our approach has been to use data from private sector data platform, Beauhurst, to identify 'layers' of CreaTech companies (Figure 2), allowing us to get a better understanding of businesses who are interacting with emerging technologies in different ways.

We start by looking at all companies in the Creative Industries, using the definition adopted by the Department of Culture, Media and Sport which includes the following sub-sectors: advertising and marketing; architecture; crafts; design and designer fashion; film, TV, video, radio and photography; information technology, software and computer services; publishing; museums, galleries and libraries, and music, performing and visual arts. DCMS sector estimates identify 272,000 of these companies in the UK.[71]

Figure 2 Creative Industries, and CreaTech companies in the UK



(Source: Erskine Analysis, DCMS, Beauhurst, 2024)

We then identify those companies within this definition who are adopters of emerging technologies, using tags created by Beauhurst which consider a company's description, geographical location, funding, financial performance and stage of growth, technology stack, and sector.[72] Unsurprisingly, we find that many companies using emerging technologies in the Creative Industries are software businesses. One example is Cogna[73], who are applying and developing AI to solve workforce productivity challenges in traditional businesses, like utilities companies. Overall this approach identifies **13,824 active CreaTech companies, supporting over 506,000 jobs**. We believe this group of businesses are likely to play a pivotal role in growing national employment, increasing international competitiveness, and pushing forward technological progress.

Brooching the Subject
[See page 67 for more.]

The next layer removes software businesses so that we can better understand the innovation landscape in other parts of the Creative Industries. At this layer we identify **4,305 companies in sub-sectors like Advertising, Games, Architecture, Music, and Film who are applying emerging technology to drive business value**. An example of a business in this category is Imaginarium Studios, who are applying motion capture technologies for creative outputs in films, AAA Video Games, TV shows and Music videos.[74]

Our final layer looks at a smaller group of what we call 'CreaTech innovators'. These are non-software companies that Beauhurst data does not only suggest are using emerging technologies to grow their businesses but ones which are building new technologies for use in the Creative Industries. We are able to identify those companies generating new technologies using the aforementioned tagging system, and by interrogating company descriptions, patents, and other IP indicators. We find **1,817 of these companies**, with an example of a business at this layer being virtual world technology builder, Improbable.[75]

This approach provides us with a surface level understanding of the impact of the CreaTech landscape — and by looking more closely at specific examples we can see the way in which these companies are transcending the boundaries of a single industry, permeating a wide range of sectors where they innovate at the crossroads of technology and creativity.

We can see the impact of CreaTech companies in sectors including:

Design

Where major firms like Adobe Systems provide essential tools for graphic design, digital art, and multimedia. These tools are integral to the creative economy, empowering millions of professionals worldwide to produce cutting-edge digital content and engage new audiences.

Fashion

Where CreaTech companies are radically transforming fashion through virtual shows, 3D garment design, and AI-powered personalisation, enhancing customer engagement and operational efficiency. Virtual fashion showcases and custom-fit clothing are becoming accessible to designers of all scales, including smaller brands with limited resources.

This variety in application demonstrates that CreaTech is far more than a niche segment; it is a key driver of innovation and economic growth, creating jobs and fuelling new markets. Another way of demonstrating the far-reaching applications of CreaTech companies is to look at the level of investment going into companies making use of technologies which are particularly linked to CreaTech skills (in that, to make use of the technology you need a combination of creative and tech skills).

This is further explored in Annex 2.

Education

Where CreaTech's role in education technology (EdTech) has introduced a suite of digital tools that make learning interactive, customisable, and widely accessible. The integration of digital media and creative technology into curricula has enhanced engagement across diverse learning environments.

Advertising

Where the advertising industry benefits significantly from CreaTech company-led innovation, such as data-driven personalisation and VR/AR campaigns, allowing brands to craft immersive experiences that resonate with consumers in novel ways. Companies like Meta have been instrumental in developing and deploying AR/VR advertising platforms that reimagine consumer engagement.

Entertainment

Where pioneers like Epic Games and Unity Technologies are redefining gaming and film, using advanced 3D rendering, virtual production, and other immersive tools that enable high-quality, real-time storytelling experiences.

Art and Culture

Where digital artists leverage new platforms to create, distribute, and monetise their work, reaching global audiences. The adoption of non-fungible tokens (NFTs) has opened up unique avenues for artists to monetise their digital creations, further embedding CreaTech within the fabric of the cultural economy.

CreaTech growth and economic contribution

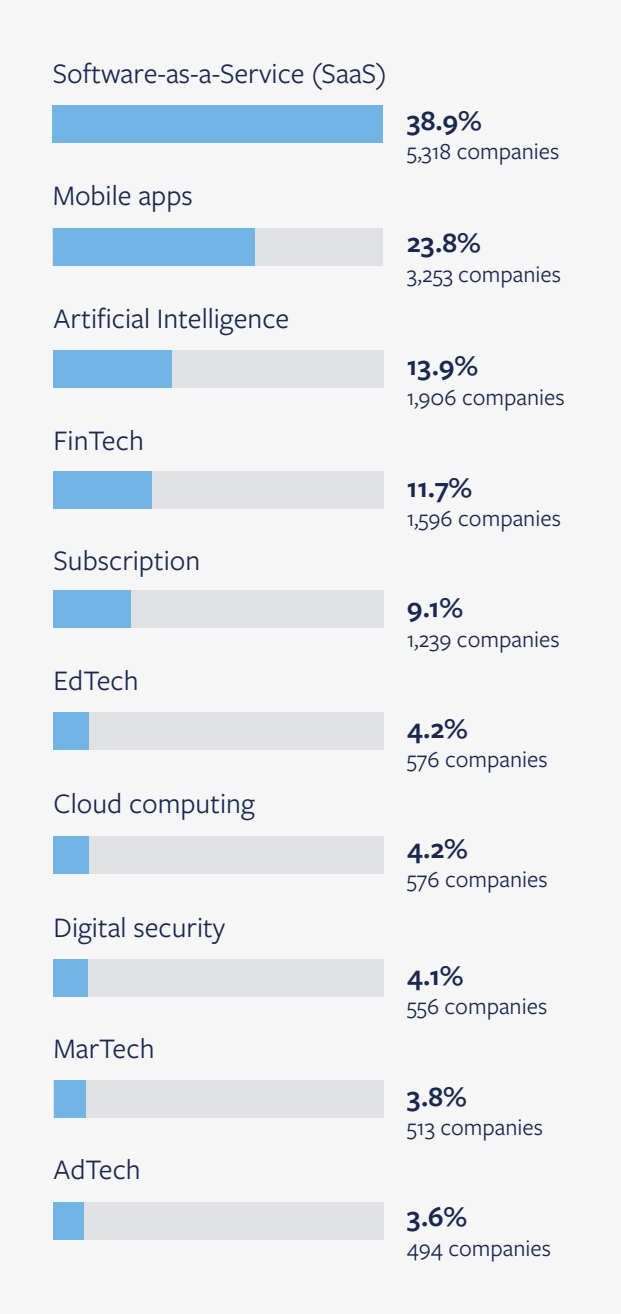
In recent years, CreaTech companies have achieved remarkable successes, from rapid advancements in AR/VR and 3D printing to breakthroughs in gaming technology. These technologies are reshaping both creative and traditional industries, driving consumer engagement, enhancing productivity, and contributing significantly to economic growth. Our analysis shows that during 2021 and early 2022, CreaTech companies (including software companies) **attracted record levels of investment**, a testament to CreaTech's potential and the strong confidence investors place in its future. **With turnover reaching £65.6 billion in the latest financial year, CreaTech companies have demonstrated an ability to make substantial contributions to GDP** while also fostering innovation that benefits a wide range of industries.

We also find that they are operating in a wide range of economic areas, and adopting diverse business models (Figure 3) and on a global scale, with significant engagement across North America, Europe, and Asia. This international footprint reinforces potential to attract foreign investment, diversify revenue streams, and drive UK exports, all of which support broader economic resilience and growth. To maintain this trajectory, the UK must cultivate a supportive environment for CreaTech growth through targeted policies and investment strategies.

However, our data also highlights a challenge which could be limiting the growth of CreaTech firms.

Creative Industries expert bodies have for some time pointed to access to finance as a problem for many creative companies, whether or not they are engaging with emerging technologies. **In 2018 the Creative Industries Council produced research which suggested that 72% of creative businesses report not having enough finance and that 62% believe their growth is restricted by lack of funding.**[76]

Figure 3 Areas of activity operated in by CreaTech companies (using Beauhurst Buzzwords)



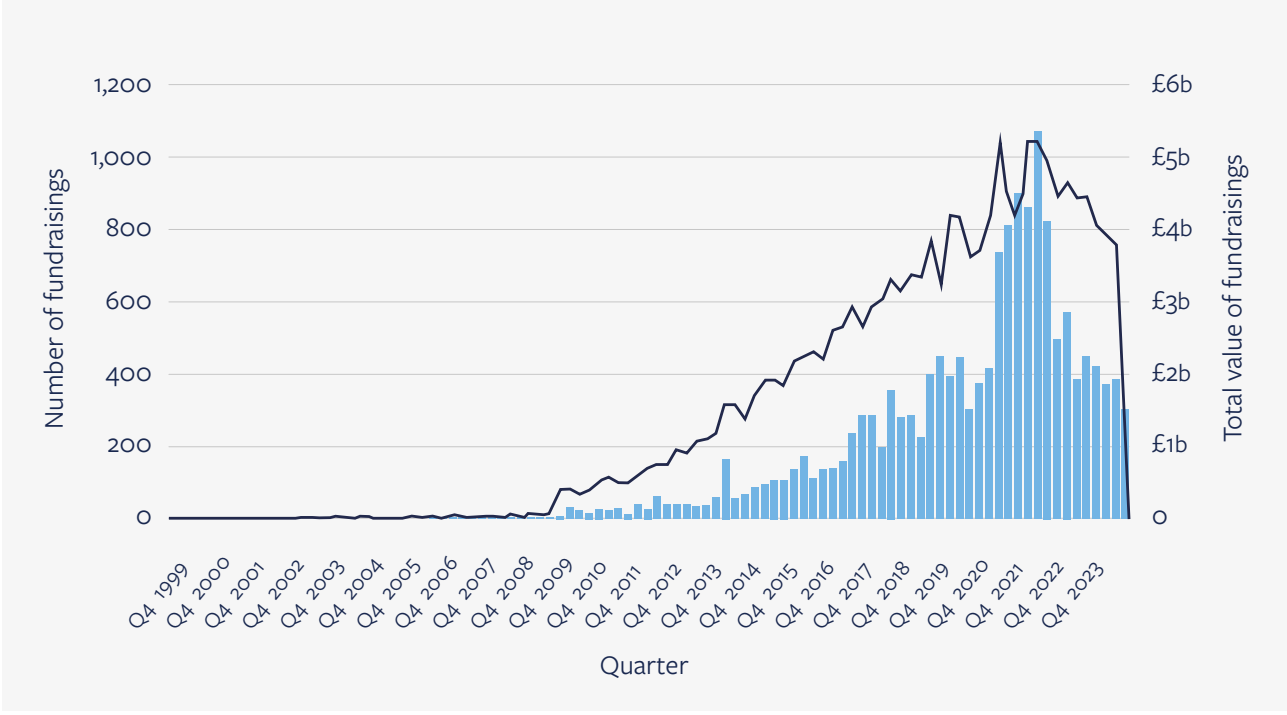
(Source: Erskine Analysis, Beauhurst, 2024)

New research from the Creative PEC suggests that there is limited venture capital investment in the Creative Industries outside IT, software and computer services, and that what little is available is overwhelmingly going to creative businesses in London and the South East.[77] Now, research is underway from Creative UK in partnership with the PEC and BVA BDRC, seeking to capture experiences and perspectives as to how creative businesses and organisations use finance and funding as they grow, with a particular focus on SMEs.[78] The hope is that this **new evidence (to be published in early 2025) will lead to a much better holistic understanding of the problems facing creative companies in accessing finance, and support the development of policies that can help creative companies on a journey from startup to IPO.**[79]

Our research has only focussed on CreaTech companies, which make up a relatively small number of overall creative firms. In this segment of the Creative Industries, we have found that a particular gap may exist for these companies in that equity investment into CreaTech companies has tended to fall short of what is needed to develop a late stage ecosystem of scaling companies.

Focusing on those companies at our CreaTech Innovator Firms, we use the Beauhurst dataset to find 565 organisations in the UK that have raised a seed round.[80] We find that 27% of those companies went on to secure Series A funding, with a sharp drop-off thereafter — just 1.8% of the seed-funded companies advanced to a Series B round. By comparison, of the 13,553 seed-funded tech companies in the UK overall, a lower proportion, 20%, secured Series A funding, and 7.4% of this cohort ultimately raised a Series B round. This discrepancy underscores a challenge in securing follow-on funding for CreaTech firms, despite their innovative potential and economic contributions. Addressing this funding gap represents a significant opportunity to help CreaTech companies scale, enabling them to contribute more robustly to the UK's economy and solidifying the UK's position as a leader in creative technological innovation.

Figure 4 Fundraising by UK based CreaTech companies



(Source: Beauhurst, 2024. Note: investment refers to equity investment raised by 13,824 CreaTech companies)

We recommend: Create new funding mechanisms for scaling CreaTech companies

CreaTech, where cutting-edge technology meets Creative Industries to generate innovative IP and products, is evolving rapidly but faces significant funding challenges at the Series B+ stage. Currently, the gap is often filled by international investors, primarily from the US, creating risks of IP and talent migration out of the UK. Establishing a Fund of Funds would enable CreaTech companies to access the necessary late-stage capital domestically, fostering the retention of talent and IP within the UK.

The Fund of Funds would combine public and private capital, sourced from the British Business Bank, Creative UK, and UK pension funds, among others. There is an opportunity here to also link to the likes of Innovate UK's Investor Partnership Fund, which provides matched funding between R&D grants and VC, bridging to larger scale capital investors like the British Business Bank. This pooled approach would address the Series B+ funding gap by creating a substantial resource dedicated to CreaTech scale-up needs. It would attract private investment through government-backed incentives, including tax benefits and capital matching, and provide both high-risk and high-return potential. The Fund would necessarily have to allocate a proportion of the total fund to CreaTech companies, rather than being absolutely dedicated to these companies alone, to enable appropriate diversification.

The Fund would support multiple specialised investment streams: Growth Equity funds for companies ready for large-scale expansion, Impact funds for ventures aligned with social and environmental goals, IP-Backed funds to support R&D-heavy CreaTech companies, Regional funds to stimulate innovation outside London, and Special Situations funds for companies facing unique challenges. This approach promotes regional economic development, job creation, and ecosystem resilience. Ultimately, this Fund of Funds is designed to enhance domestic investment, keep talent and IP within the UK, and cement the UK's leadership in CreaTech innovation.

This fund would aim to answer one of the many challenges creative businesses have in accessing appropriate finance, and should sit alongside other recommendations being developed at national and regional levels.

Photographer: Kat Gollock

Conclusions

Conclusions

The convergence of the Creative Industries and emerging technology, in the form of CreaTech, has emerged as a compelling and necessary force for economic, cultural, and social growth in the UK. CreaTech businesses — spanning sectors from gaming and design to fashion and education — are at the forefront of innovation, demonstrating the potential of Creative Industries to drive economic productivity and create new, highly skilled jobs. At the same time, these businesses and the broader sector face significant barriers, including an insufficient flow of capital for growth, limited access to emerging technologies in educational institutions, and skills shortages across various creative and technical disciplines. This report has highlighted the critical role of CreaTech in shaping the UK's future economy, while setting out a path for policymakers to ensure that the sector thrives.

The first theme emerging from this research is the economic impact and strategic potential of CreaTech. As in other areas of the economy, technological development is likely to be one of the key drivers of long-term productivity growth in the Creative Industries. However, realising the potential of CreaTech depends on creating a more favourable environment for innovation and growth. This requires improved access to R&D funding and incentives, expansion of public and private investment, and strengthened partnerships across the private sector, academia, and government. By addressing these needs, the UK can secure a robust CreaTech sector that contributes to the broader economy and serves as a foundation for a sustainable, technology-enabled future.

A second theme concerns the pressing need to cultivate a pipeline of diverse, skilled workers equipped with both creative and technological capabilities. The evidence reveals a need to address skills gaps across educational stages, from primary through to tertiary and beyond to include lifelong learning. This report advocates for comprehensive educational reform to ensure that students in the UK are exposed to both creative subjects and technological skills early on, progressing to advanced, interdisciplinary training in further and higher education. Only by developing a workforce proficient in these multifaceted skill sets can the UK maintain its competitive CreaTech edge.

Finally, this report underscores the importance of building a strong, well-supported ecosystem for CreaTech innovation. As a nation, the UK is well-positioned to lead CreaTech on the global stage, but achieving this ambition will require targeted infrastructure and policy support. Through investments in resources such as a dedicated CreaTech Catapult and clearer pathways to R&D tax relief, the UK can facilitate the kind of interdisciplinary collaboration and technological experimentation that drives CreaTech forward.

By fostering a conducive environment for CreaTech to flourish, the UK has an opportunity to lead in a sector that is reshaping economies worldwide. CreaTech's role is more than simply adding value to existing Creative Industries; it represents a transformation in how creativity is expressed, how technology is used, and how society benefits from innovation. The findings and recommendations in this report provide a strategic framework to ensure that the UK remains at the forefront of this dynamic sector, enabling economic growth, nurturing talent, and advancing cultural influence on a global scale. Collaboration among industry, education, and government will be vital to the future success of CreaTech companies, and innovators alike, and the UK must act decisively to secure its position as a CreaTech leader for the benefit of generations ahead.

Policy recommendations in full

[1.] We recommend: Develop a CreaTech skills pipeline

Note: the research team took evidence from across the UK, and believe that all four nations of the United Kingdom would benefit from developing a holistic approach to CreaTech skills development. However, as this paper is being published by the Department for Culture, Media and Sport, we have not provided explicit recommendations on skills for the devolved nations.

School Education

For the Creative Industries to thrive, nations across the UK need a strong CreaTech skills base fuelled by broad and balanced curricula and accountability systems which recognise the importance of creative subjects and increasing confidence in using technology.

In England, policies must address the decline in provision of creative subjects, including by:

- Maintaining the Labour Party commitment to have a creative subject included in Progress 8 accountability measures;
- Moving towards a minimum four-hour Arts entitlement within the school week to the end of Key Stage 3, and provision at Key Stages 4 and 5 outside of exam syllabuses;[81]
- Ensuring that Labour's commitment to a Teacher Training Entitlement includes high quality, industry-informed professional development opportunities for those teaching creative subjects, and is supplemented by bursaries for teachers for relevant subjects.

The one year UK-wide expansion of the Creative Careers Programme must include information about CreaTech roles and careers. Our evidence would also support a need for careers advice in this area beyond this expansion year.

Policymakers should create opportunities to embed technological experimentation into creative subjects at school, and creative experimentation into technical subjects. In England, consideration of such an approach should form part of the curriculum and assessment review and should drive the expansion of the definition of expressive arts subjects to include digital arts subjects, like film. Scotland has already adopted this approach with the development of "Film & Screen" as an expressive arts subject for ages 3 to 18 as part of the Scottish Curriculum.

In the long term, consideration should be given to the development of new courses focussed on the opportunity at the nexus of creative subjects and digital technologies — e.g. a Digital Creativity GCSE.

Further and Higher Education

Sector leaders and governments at national and regional levels must support ambitious new approaches to ensure that FE and HE institutions can bring in those working in industry. The Further Education Lecturer Reservists (FELR) initiative offers a potential model for the wider Creative Industries to adopt, developing a cohort of 'lecturer reservists', who teach part-time while continuing their industry roles.[82] In England, this should be done in partnership with the newly-developed Skills England.

Consideration should be also given to how HE and FE can work more closely together on the subject of CreaTech. One particular opportunity is for the higher education institutions involved in the recently announced AHRC-funded Creative Clusters to collaborate directly with local further education institutions.

Photographer: Chris Scott

Further Education only

There must be a greater policy commitment to strengthen further education, and in particular industry-facing technical education, for the Creative Industries across all four nations.[83] This must fully recognise the unique potential of CreaTech skills and subjects to drive innovation and growth.

In England, it is essential that the curriculum and assessment review and the post-16 education and skills strategy seek to understand and therefore better address the skills needs of the creative sector. To do so they will need to work hand-in-hand with employers, emerging technologists, and specialists in innovation and future work dynamics to understand its changing needs. To ensure longevity this cannot be a one-off exercise.

Higher Education only

The Government must ensure they foster a political environment which recognises, amplifies and rewards strong CreaTech provision in HE.

Lifelong Learning

The Lifelong Learning Entitlement (LLE) must support the development of CreaTech skills — by offering creatives the opportunity to learn how to make use of emerging technologies and by ensuring there are adequate opportunities to develop CreaTech skills in areas like graphic design, animation and video editing.

[2.] We recommend: Increase public investment in Creative Industries R&D

Note: Further research is imminent from the Creative Industries Policy and Evidence Centre to uncover more about the ways in which UKRI currently supports the sector,[84] and the Creative Industries Council is working to draw out linkages between public investment and the growth of the sector. Both of these pieces of work should help to guide this intervention.

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CreaTech, where cutting-edge technology meets Creative Industries to generate innovative IP and products, is evolving rapidly but faces significant funding challenges at the Series B+ stage. Currently, the gap is often filled by international investors, primarily from the US, creating risks of IP and talent migration out of the UK. Establishing a Fund of Funds would enable CreaTech companies to access the necessary late-stage capital domestically, fostering the retention of talent and IP within the UK.

The Fund of Funds would combine public and private capital, sourced from the British Business Bank, Creative UK, and UK pension funds, among others. There is an opportunity here to also link to the likes of Innovate UK's Investor Partnership Fund, which provides matched funding between R&D grants and VC, bridging to larger scale capital investors like the British Business Bank. This pooled approach would address the Series B+ funding gap by creating a substantial resource dedicated to CreaTech scale-up needs. It would attract private investment through government-backed incentives, including tax benefits and capital matching, and provide both high-risk and high-return potential. The Fund would necessarily have to allocate a proportion of the total fund to CreaTech companies, rather than being absolutely dedicated to these companies alone, to enable appropriate diversification.

The Fund would support multiple specialised investment streams: Growth Equity funds for companies ready for large-scale expansion, Impact funds for ventures aligned with social and environmental goals, IP-Backed funds to support R&D-heavy CreaTech companies, Regional funds to stimulate innovation outside London, and Special Situations funds for companies facing unique challenges. This approach promotes regional economic development, job creation, and ecosystem resilience. Ultimately, this Fund of Funds is designed to enhance domestic investment, keep talent and IP within the UK, and cement the UK's leadership in CreaTech innovation.

This fund would aim to answer one of the many challenges creative businesses have in accessing appropriate finance, and should sit alongside other recommendations being developed at national and regional levels.

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Photographer: Martin Shields

Annex 1: Examples of CreaTech innovation in Tertiary Education

Annex 1: Examples of CreaTech innovation in Tertiary Education

This Annex is formed of case studies submitted by the Coronation Challenge participants and by other leading higher and further education institutions in the CreaTech space. Organisations were asked to submit case studies which demonstrated different approaches to CreaTech innovation.

Taken together, they demonstrate some of the breadth and diversity of CreaTech innovation being undertaken in tertiary education institutions, showcasing the great variety of approaches taken to various areas of creative practice, emerging technologies and industry relationships.

This Annex should not be read as a comprehensive summary of the CreaTech projects that have been undertaken in tertiary education institutions across the country, but rather offers selected insights into this emerging area of activity.

AR-assisted design and robotic fabrication framework for parametric masonry structures

University of Liverpool

2024

Credits	Yang Song, Prof Richard Koeck, Asterios Agkathidis — The University of Liverpool.
Emerging technologies involved	Robotics, Augmented Reality (AR)
Creative practice involved	Architectural Design, Digital Fabrication, Immersive Experience, Architectural Education, Human-robot Collaboration, Creative Thinking.
Sector(s)	Architecture, Design, Engineering, Robotics, Architectural Education, Computer Science
Region and Nation	Liverpool, England

This project, completed as part of a PhD study at the Centre of Architecture and Visual Art (CAVA), University of Liverpool in 2024, explored the integration of augmented reality (AR) and robotics into architectural design and fabrication. It aimed to create a seamless "design-to-fabrication" framework that could bridge digital design and practical production challenges. The research focussed on developing an immersive, interactive AR environment for architectural design that could enhance parametric thinking, design feedback, and human-robot collaboration, thus improving current design and construction methodologies.

AR technology enables users to engage in a 3D-4D intuitive design experience beyond the computer screen, allowing for on-site previews of mechanical and sustainable performance, and comprehensive design optimisation before physical construction. Furthermore, AR's real-time interactivity allows users, regardless of their digital construction or computer science background, to efficiently and accurately manipulate robotic arms and achieve human-robot collaboration for digital construction.

The potential of this framework to transform architectural design and construction was validated through experimental research, focusing on parametric masonry structures from digital design to fabrication phases. While initially validated with masonry structures, this framework holds promise for development and application across various architectural materials and proposals, bridging practical constraints in a novel way.

This AR design and fabrication project significantly advanced knowledge in AR, parametric design, robotic fabrication, and their intersections within architecture. The research demonstrated how innovative technologies, such as AR and robotics, can create a "design-to-fabrication" framework that enriches current methods in line with the digitalisation trends in architecture. Moreover, this project underscored the importance of educating creative thinkers who can transcend disciplinary boundaries and employ advanced digital tools and creative design methods to address future challenges.

Outcomes

Innovative synergy:
Demonstrated how AR can interact with robotic fabrication, enhancing the conventional architectural design process by making it more immersive and intuitive.

Human-robot collaboration:
Enabled non-technical users to manipulate robotic systems with real-time feedback, increasing efficiency and precision in construction tasks.

Practical validation:
Successfully validated the framework with parametric masonry structures, showing potential for broader application across various materials and architectural projects.

Knowledge advancement:
Advanced the field by integrating AR, parametric design, and robotics, highlighting how digital tools can transform architectural practice.

Future-oriented skill development:
Emphasised the need to educate cross-disciplinary creative professionals who can leverage advanced technologies to address the evolving challenges of architectural design and construction.

Brooching the Subject — COP26

City of Glasgow College

2020-2021

Credits	Aileen Dickie-Adams, Lisa McGovern — City of Glasgow College
Emerging technologies involved	CAD, Rapid Prototyping, 3D Printing
Creative practice involved	Jewellery, Craft
Sector(s)	Creative Industries
Region and Nation	Glasgow, Scotland

'Brooching the Subject' was the title of a competition initiated and project led by Curriculum Head of Craft and design, Lisa McGovern and executed by the Jewellery Department of City of Glasgow College. Students were to design a brooch for the First Minister to wear at the 26th UN Climate Change Conference of the Parties, held in Glasgow, October 2021. The brief asked students to design a piece that would highlight the issue of rising sea levels due to climate change, and its effects on communities and villages around Scotland or Globally. The theme also coincided with Scotland's Years of Coasts and Waters (20/21).

The winning brooch was a silver and gold brooch, designed by Aileen Dickie-Adams as part of her requirements for the Higher National Diploma in Jewellery at City of Glasgow College, and was made in conjunction with City of Glasgow College and project partners Vipa Design Ltd.

The brooch was cast in recycled silver and finished with Fairtrade gold, and in its creation the artist made use of both ancient techniques and emerging technologies; the brooch was cast using the ancient "lost wax" method and the gold was inlaid using the ancient Japanese technique of Keum Boo, whilst early prototypes were 3D printed using plant-based resin and the design was developed using Computer Assisted Design software.

The brooch's aesthetic was inspired by the 'beautiful and dangerous' waters of the Corryvreckan Whirlpool.

The artist prioritised sustainability and ethical practice in the design and production of the brooch. The material for the winning design was supplied by various project partners: for example, the recycled silver inlaid Fairtrade gold came from Vipa Designs Ltd, and was funded by the Scottish Fair Trade Forum, together with Cooperative Education Trust Scotland and City of Glasgow College.

Acquired by the National Museum of Scotland in January 2024, for its permanent collections, it represents the Scottish government's participation in COP26, and the environmental targets agreed to, as well as acting as a representation of Nicola Sturgeon, who wore the brooch to COP26 when serving as Scotland's first female First Minister for Scotland. More broadly, its place in the collection demonstrates the ways in which CreaTech innovation is already transforming the craft sector.

Outcomes

Cultural and environmental awareness:
The brooch serves as a creative representation of Scotland's response to climate change, reflecting the government's environmental commitments made at COP26.

Preservation and legacy:
Acquired by the National Museum of Scotland in 2024, it symbolises the power of CreaTech innovation in the craft sector, as well as Scotland's role in international climate policy and 21st-century politics.

Innovation in craft:
Combined ancient and modern techniques, showcasing Scotland's heritage in silversmithing while integrating cutting-edge technologies like 3D printing.

Gaming the Past — Valletta: Streets of History and The Remnants

University of Lincoln — 2022-Present

Credits	Dr Renata Ntelia — University of Lincoln
Emerging technologies involved	AR and GeoLocation, Machine Learning, Procedural Content Generation, and Computer Vision
Creative practice involved	Game Design and Archival Research
Sector(s)	Cultural Heritage, Education, Games, Computer Science, Tourism
Region and Nation	Malta, UK, rest of Europe

Gaming the Past denotes a series of research and creative initiatives focused on employing game design as a means to explore history and cultural heritage. There are two separate projects described below.

Valletta: Streets of History (VSH) is a game about Maltese history and culture. The project received funding from Malta Arts Council. It was undertaken from 2022 to 2023 by a team of alumni and researchers of University of Malta and was directed by Renata Ntelia of University of Lincoln. The game blends archival research with AR and geolocation technologies to create a treasure-hunt-style experience in Valletta, capital city of Malta. The player assumes the role of a detective-historian and is invited to piece together information of personal narratives from certain moments of Malta's past by visiting locations, solving riddles, and completing mini games.

The Remnants (R) is a work-in-progress educational game. Renata Ntelia of University of Lincoln received internal funding in 2022 to design a proof-of-concept prototype. The game concerns the traumatic experience of WW2 concentration camps. The game will use a database of already existing archives but will also enrich the archives by means of digitisation employing computer vision. Via machine learning and procedural content generation, players will engage with accounts and testimonies of WW2 camp inmates to learn about their personal narratives and circumstances. Through this, the game will enable a more immediate understanding of this inhumane experience in the context of historical trauma.

Outcomes

Personal engagement with history and culture:
VSH engaged users with Maltese history and culture through an interactive, location-based gaming experience. Remnants (R) will encourage a personal understanding of history by focusing on microhistories, making the traumatic experiences more relatable and impactful.

Technological innovation and integration:
VSH combined AR and geolocation with archival content, offering a playful approach to cultural storytelling. R will utilise machine learning and procedural content generation to create personalised, dynamic interactions with historical archives.

Historical education and archival innovation:
R will incorporate computer vision to digitise and enhance access to existing archives of concentration camp testimonies. There will be further potential for the game to be used as supplementary course material in history classes.

Public accessibility:
VSH is freely available on Google Play, ensuring widespread access and participation: download it from Google. Once completed, R will be freely accessible online and in memory institutions throughout Europe, promoting wide educational use.

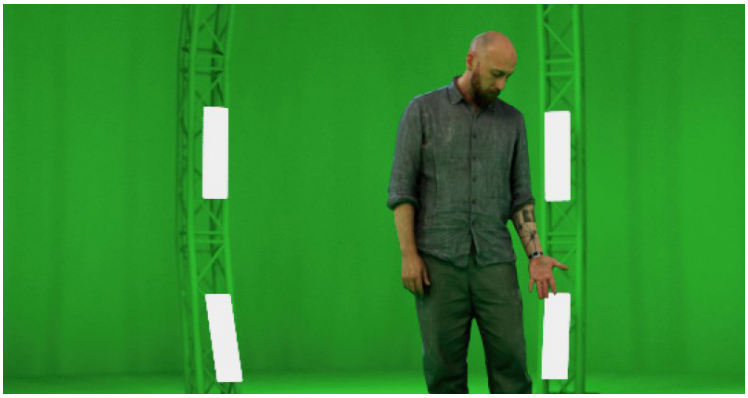
Transferability and commercialisation:
VSH possesses high potential for adaptation to other cultural heritage sites and contexts globally. It additionally offers the opportunity for local businesses to advertise within the game's map, integrating commercialisation with cultural tourism.

Gate Ways: Immersive Technologies for Heritage Archives

Falmouth University

2023

Credits	Lee Miller — Falmouth University
Emerging technologies involved	Immersive technologies (Volumetric Capture, LiDAR, 3D scanning)
Creative practice involved	XR, volumetric capture, performance and live art
Sector(s)	Theatres, galleries, libraries, archives, museums and the wider cultural sector
Region and Nation	South West, England



Outcomes

Innovative archival protocols: Established cutting-edge methods for converting traditional archives into XR formats, increasing accessibility.

Volumetric capture: Pioneered documentation techniques for live performances, creating a rich, reusable digital asset library.

Cross-sector collaboration: Engaged cultural and technology partners to foster interdisciplinary innovations.

Regional impact: Strengthened ties with local institutions, supporting Cornwall's creative and digital economies.

In 2022, Falmouth University was awarded £850,000 by the Arts and Humanities Research Council's Creative Research Capability (CResCa) fund to establish GWITHA, a project dedicated to immersive archival practices in performance. The project focuses on converting existing archival materials into Extended Reality (XR) formats and collaborating with performance companies to document live practices through volumetric capture.

This initiative operates within the broader £7 million funding from Research England's Expanding Excellence in England (E3) scheme, which underpins the Centre for Blended Realities. The Centre fosters a wide variety of live projects, extending GWITHA's activity and creating opportunities for potential partnerships across creative industries, cultural institutions, and research networks. These projects aim to advance the application of digital and immersive technologies, enhancing both regional and national capacity for innovation in the creative sector.

Interactive Psychotherapy — Maze Reality

The Open University

2022-Present

Credits	Lisa Bowers, OU, Dr Rachel Happer — Clinical Psychologist at University of Edinburgh, DHVL at University of Glasgow.
Emerging technologies involved	Mixed Reality, 3D modelling, AI adaptive therapy
Creative practice involved	Mixed Reality, Design
Sector(s)	Design, Mixed Reality, Healthcare
Region and Nation	Edinburgh, Scotland

Outcomes

Enhanced patient care: More efficient and personalised interventions, leading to quicker therapeutic solutions.

Increased accessibility: Reduced waiting times and broader access to remote and in-person care.

Data-driven outcomes: Improved patient tracking through data collection and treatment evaluation.

Scalable solutions: Created modular platform supports to help healthcare professional training and development while improving service delivery.

Improved patient outcomes: Empowering patients with tools for ongoing therapy, reducing relapse, and improving long-term mental health management.

Interactive Psychotherapy — Maze Reality is a project aiming to revolutionise trauma, anxiety, and phobia treatment through a comprehensive blend of remote and in-person therapeutic care. By integrating modular virtual environments, augmented reality (AR) avatars, and adaptive AI-driven therapy, the initiative's ambition is to enhance patient engagement, intervention effectiveness, and therapeutic outcomes.

Developed in collaboration with leading clinical psychologists and academic experts, the team is developing a product which can provide a seamless bridge between inpatient and outpatient care, leveraging mixed reality to offer tailored exposure therapy, mindfulness, and behavioural interventions.

The project's ambition is to enhance therapeutic care within trauma, anxiety, and phobias by providing:

» Enhanced remote and in person care;

» Better engagement;

» Better intervention and avoidance;

» Quicker solutions;

» Reduced waiting times;

» Training and education opportunities;

» Support for recruitment and staff development;

» Improved data collection and treatment evaluation;

» Better patient outcomes.

To support in-patient care the project is creating modular-based virtual environments which are tailored to specific areas of trauma, anxiety, or phobia treatment. These are being developed with healthcare specialists who control sessions through a central platform device.

For outpatient care, the project is developing a companion app with AR avatars and adaptive therapy to support ongoing self-reflection, practise, and discussion of anxieties to increase confidence.

The user interface (UI) is designed to be intuitive, employing an approachable avatar to deliver empathetic responses for mental health support. Avatars will prioritize inclusivity and diversity, providing options for a variety of appearances, multilingual speech-to-text capabilities, and visual alternatives where feasible. Augmented reality has been incorporated to enhance user engagement through immersive experiences.

The overall ambition is to create subscription models, based on bespoke modular components, which will allow healthcare therapists to access pre-built mixed reality environments to enhance the existing services they offer.

Lindsey the Tour Guide Robot

University of Lincoln

Lincolnshire County Council, Lincoln Museum and Usher Gallery, Threshold Studios

2018-2023

Credits	Prof Marc Hanheide, Dr Francesco Del Duchetto, Dr Paul Baxter — Lincoln Centre for Autonomous Systems (L-CAS), University of Lincoln
Emerging technologies involved	Robotics, Machine Learning and AI
Creative practice involved	Museum and gallery curation, design
Sector(s)	Education and cultural heritage
Region and Nation	Lincolnshire, England

Outcomes

Enhanced visitor engagement: Provided with over 15,000 interactions.

Personalised tours: Based on visitor behaviour, improving the visitor experience.

Supported digitalisation in heritage sectors: By bridging physical and digital content.

Improved accessibility: Especially for individuals with learning disabilities and autism.

Empowered museum staff and festival participants: To customise robotic tour content, fostering innovation within non-technical communities.

"Lindsey the Tour Guide Robot" is a human-sized autonomous mobile robot deployed as a cultural assistant in the archaeological gallery of Lincoln Museum (previously known as the Collection Museum) in Lincoln, UK. During its deployment, from 2018 to 2023, the robot provided visitors with information about local archaeological exhibits through short educational presentations and full thematic guided tours around the gallery. More than 15,000 interactions with the museum's visitors were provided in this way. Over this period, the project team continuously developed the functions of the robot (improved tour experiences, improved robot behaviours, etc) in collaboration with the museum and visitors through a number of projects.

These projects included: automated characterisation of the engagement of visitors and personalisation of the robot tour based on visitor behaviour, providing non-roboticists with the tools to develop and implement specific robot tours themselves, and improving the accessibility of museum content through the robot for people with learning disabilities and autism, funded through a TAS Pump Priming project.

The project was part of a more general theme being explored by the researchers which considers how the digitalisation of heritage and arts content can be extended using the latest technologies. Findings suggest that robots can act as a 'bridge' back to the physical world, allowing interaction between physical and digital content. For an individual museum, library or gallery the use of robots could also facilitate an increase in interactivity between a collection and its visitors, and improve accessibility.

Made in Code: Reimagining the Experience of Fashion

University of the Arts, London

Victoria & Albert Museum, and University College London

2021-2023

Outcomes

Technological Innovation: Demonstrated near real-time digital cloth simulation and representation, expanding the potential for experiences across fashion, cultural heritage, film, games, live and online performance.

Cross-disciplinary Collaboration: The partnership involved experts in textiles, fashion, computer science, anthropology, and cultural studies and institutions, highlighting the potential of interdisciplinary R&D in creative industries.

Skills Development: The project emphasised the need for hybrid material-digital skill sets, crucial for the future of fashion and technology.

Sustainability: The project explored novel types of fashion experience, underscoring sustainable design through digital methods that optimise a creative led technology approach, contributing to a potentially more eco-friendly fashion industry and consumer.

Cultural Dialogue: The symposium at the V&A revealed the potential impact on performance, adjacent digital material industries, and ecosystems including film, gaming, and extended reality (XR) with discussions around future applications, experiences, and industry benefits.

Follow on funding: The project was a successful proof of concept helping UAL to win additional funding through AHRC's Creative Research Capability award, to create the first research facility for XR Textiles and Dress, driving skills development and creating new markets for creative and cultural sectors in this space.

The "Made in Code: Reimagining the Experience of Fashion" project, led by Jane Harris, Professor of Digital Design and Innovation, the University of the Arts London (UAL) in collaboration with a range of industry and academic partners, explored the intersection of digital fashion, performance, user experience design and computing technology. Launched as a prototype installation at the Victoria & Albert Museum (V&A), the project showcased cutting-edge digital fashion experiences. It used state-of-the-art marker-less motion capture, garment simulation, software physics, and high level rendering technology to create custom digital garments and avatars. Over 3 days, the prototype installation experience engaged over 500 visitors, including creative industry leaders. The project required interdisciplinary collaboration from partners including: the Victoria and Albert Museum, Maria Grachvoge (fashion designer), Holition (user experience design), Happy Finish (digital visualisation), MoveAI (motion capture), Numerion (software physics for textiles and dress), and University College London (anthropology).

Visitors to the V&A were invited to have their body motion captured using a marker-less motion-capture capability provided by MoveAI. Each individual's movement data was then translated into a costume-based avatar, dressed in fluid digital representations of garments by British fashion designer Maria Grachvogel, a pioneer in luxury fashion, a digital artist and an expert in drape and form. Production company Happy Finish developed the technical elements of the user experience, and Holition created the interface that facilitated audience engagement.

This project combined technical and creative expertise. Developed by software physics specialists Numerion, digital cloth simulation is notoriously complex, the realisation of which in close to real-time was core to the R&D scope of the project. Numerion provided a unified physics framework supporting the simulation of soft and rigid bodies with collision detection and motion constraints in a single pass, allowing full action, and reaction between all digitally modelled components. The Anthropology department at University College London was also a partner in this R&D activity, documenting the experience of participants.

A key part of the installation was creating the opportunity to document the experience of participants in using this emerging technology.

Credits: Prof Jane Harris — Fashion, Textiles and Technology Institute, UAL, Happy Finish, Holition, Maria Grachvogel, MoveAI, Numerion Software, University College London, Victoria and Albert Museum

Emerging technologies involved: Computer science

Creative practice involved: Design, Textiles

Sectors: Design, STEM, Anthropology

Region and Nation: London, England

Mapping the Soul VR

Aberystwyth University

2020 - Present

Credits	Eddie Ladd, Bella Merlin, Jorge Moreno, Jams Thomas, Oliver Turner, Lucy Gough, Piotr Woycicki — Aberystwyth University
Emerging technologies involved	VR
Creative practice involved	Opera, Theatre
Sector(s)	Opera, Broadcast
Region and Nation	Aberystwyth, Wales. International

Mapping the Soul VR was an innovative practice-as-research project designed to transform Lucy Gough's 2001 radio play Mapping the Soul into an interactive virtual reality (VR) operatic experience. The project explored the dramaturgical and interactive potential of VR, integrating insights from theatre, game theory, and neuroscience to reimagine the play's philosophical exploration of the human soul.

Through a multi-layered narrative, which combined a 17th-century brain dissection with a protagonist's subconscious journey, the Mapping the Soul VR project engaged participants in a deeply immersive and interactive narrative environment.

The play's main subject matter is the search for the existence of the human soul. It is a multi-layered narrative structured around a 17th century brain dissection, and the protagonist's journey through his subconscious in search of his soul. The project 'remediated' the play by interactively engaging the participants with its story world and with the philosophical and scientific discourses surrounding it.

The project aimed to better understand how the VR medium might become of increasing importance in the writing and performing of theatre, including by driving new narratives and offering new dramatic possibilities. In addition, it looked to give greater insight into the relationship between the virtual self and corporeal reality from a cultural, philosophical, neuroscientific and cognitive perspective.

Outcomes

Innovative medium: By remediating a radio play into VR, the project investigates the unique capabilities of VR, such as virtual embodiment and sensory illusions, to enhance storytelling and audience engagement.

Cross-disciplinary insights: Merging discourses from theatre, neuroscience, and game theory, the project offered new perspectives on how VR can be used to structure and enhance interactive theatrical experiences.

Cognitive and philosophical exploration: The project contributed to our understanding of the relationship between the virtual self and corporeal reality, offering valuable insights into the intersections of cognitive science, philosophy, and cultural studies.

Future applications: The findings from the project could have significant implications for the use of VR in other narrative-driven formats, expanding the potential of immersive media in the creative industries.

Museum in the Metaverse

University of Glasgow

2023

Credits	Prof Neil McDonnell (PI), Dr Pauline Mackay, Prof Maria Economou and Prof Murray Pittock (Co-Is) — University of Glasgow
Emerging technologies involved	XR (Extended Reality), Immersive Technologies
Creative practice involved	Virtual Reality
Sector(s)	Cultural Heritage, Higher Education
Region and Nation	Glasgow, Scotland

The Museum in the Metaverse (MiM) project is aiming to develop a ground-breaking two-sided Extended Reality (XR) Culture and Heritage platform. The platform's ambition is to empower online visitors to explore diverse cultural assets in engaging new ways, enable curators to create new content and tell new stories with heritage collections and explore models of use to support sustainable economic and cultural growth. The project is led by Professor Neil McDonnell (PI) working with Dr Pauline Mackay, Professor Maria Economou and Professor Murray Pittock (Co-Is) at the University of Glasgow.

MiM harnesses Glasgow's reputation for research in digital cultural heritage and XR, together with key cultural heritage and immersive technology partners (Edify, Historic Environment Scotland, National Museums Scotland and The Hunterian) to develop an innovative solution to two issues that collections face: first, that they are often only able to physically exhibit a small proportion of objects held in collections (many can exhibit less that 10%), and second, that audiences are limited in their ability to access collections by cost, distance, and accessibility constraints.

One side of the proposed platform is intended for visitors to gain access to a rich array of museums, sites, objects, and novel and dynamic experiences. The other side is for virtual curators, where experts and lay creators alike can build enriching and entertaining narratives using objects and virtual environments that have never been placed together in the real world.

The project is funded by Levelling Up Innovation Accelerator funding via Innovate UK, a pilot initiative intended to spread the benefits of increased investment in research and innovation across the UK and support the national levelling-up ambition.

Outcomes

Advanced content creation techniques and workflows for 3D digitisation of heritage collections: Using cutting-edge hardware and software, MiM will develop novel 3D digitisation techniques which will contribute to the development of workflows that aim to raise the quality and cut the cost of at-scale capture of heritage collections. These will be published for the benefit of the wider sector.

Ground-breaking XR self-curation and publishing platform for Cultural Heritage experiences: MiM will democratise access to and storytelling with our shared Cultural Heritage through a 'build your own' platform. This will be built on XR technology and accessible from anywhere in the world on mobile devices and XR headsets, allowing visitors to virtually handle museum objects.

Three state-of-the-art metaverse museums showcasing the potential of immersive technologies: The MiM project will produce three examples of curated experiences using the new immersive platform. This will allow otherwise impossible compositions of disparate objects, objects currently in storage and objects that cannot be displayed (e.g. due to conservation considerations).

Up-to-date audience insight research: Through wide-reaching audience surveys, large-scale practical demonstrations, and concentrated focus groups, MiM will generate significant new knowledge. The insights from this will inform audience engagement and commercialisation strategies for the sector.

New economic model for the Cultural Heritage sector: The development of a safe loaning mechanism for 2D and 3D digital assets will be the means by which MiM will create a new economic model for collection holders. This will unlock the potential of a global audience, whether collections are seeking a route to open access or a rich new revenue stream.

Rethinking Material Resources: using regenerative, casein-based materials to disrupt the concept of mass-produced fashion through transdisciplinary practice

University of the Arts, London

2019-2024

Sector(s)	Design, STEM, Anthropology
Region and Nation	London, England

Outcomes

Transdisciplinary collaboration: Developed a methodological framework for knowledge exchange between academia (Design, STEM, Anthropology) and industry.

Textile innovation: Aligned raw bio-materials, green / circular chemistry, cultural studies and product design, and environmental science with market needs, resulting in novel approaches to casein-based materials.

Technological advancement: Designed novel biodegradable fibres, and materials. Designed a lab-scale wet spinning rig for rapid prototyping sustainable materials, advancing the technological readiness of RPFs.

Sustainable processing: Developed a green / circular chemistry process for colouring casein-based materials using anthocyanins from food waste, reducing reliance on harmful chemical dyes.

Scholarly contributions: Published two peer-reviewed, open-access journal articles on the circular economy potential of RPFs and their application in fast fashion.

Prototyping success: Tested and developed various bio-materials for multiple manufacturing applications, working closely with green chemists and bio-material engineers to ensure functionality and sustainability.

The "Rethinking Material Resources" project addresses two significant environmental challenges: the waste generated by the fashion, and wider apparel industry (including across sports, workwear, footwear, and accessories) and the food sector. Using design led, green/circular chemistry (an emerging technical field) and bio-engineering methods, it focuses on the development of Regenerated Protein Fibres (RPFs) derived from waste dairy products, specifically milk, as an alternative to petrochemical-based textiles — essentially to achieve a biodegradable fibre for material processing. This initiative aims to create more sustainable textile production methods, while minimising the use of harmful chemicals in their production. The research draws on a transdisciplinary approach, combining textile design, green or circular chemistry, bio-engineering, anthropology, and environmental science to explore emergent practices that faltered with the invention of petrochemicals, and the production of synthetic materials. The project reimagines the role of RPFs and the potential for new materials within modern, fast-fashion and wider apparel markets.

Industrialization is exhausting the planet's natural reserves leaving a shortage of land and natural resources. An average of 1.7kg of apparel / textile waste is landfilled per person each year, the majority of which, in terms of textiles and materials in general, is petrochemically derived and non-biodegradable, containing harmful chemicals from textile processing, dyeing and other finishing treatments. In addition to textile waste, food waste of all kinds is also prolific — in the Western world in particular. The UK food and drink manufacturing industry alone produces almost 2 million tonnes of waste per year, with the dairy industry being the largest generator of waste.

Rethinking material resources prototype R&D work brings together these two issues, by evaluating and improving the properties of design led bio-engineered textile materials that may be produced using Regenerated Protein Fibres (RPFs), derived from waste dairy products, chiefly milk, whilst reducing the use of toxic chemicals used during their manufacture.

The research is conducted through the close collaboration between researchers specialising in textile design (focussing on the design and processing of casein-based fashion /wider apparel, and related textiles and materials), green or circular chemistry, bio-engineering (focussing on the technological development and production of casein fibres in a viable form) anthropology and cultural studies (focussing on archive data, and emergent textile design practices pre the era of oil), and importantly environmental science (the study of fibre pollution in the world's water and air).

Credits: Dr Marie Stenton, Dr Joe Houghton, Professor Veronika Kapsali — UAL, Hannah Auerbach George — Victoria and Albert Museum, Professor Susanne Kuechler - University College London, UAL Business of Fashion, Textiles and Technology Creative R&D Partnership, Arts and Humanities Research Council Creative Industries Cluster Programme

Emerging technologies involved: Material Science, Green/Circular Chemistry

Creative practice: Design, Textiles

Royal College of Music Performance Laboratory

Royal College of Music

2022-2023

Credits	Aaron Williamon — Royal College of Music
Emerging technologies involved	Audiovisual Technologies, Music and Acoustic Technology
Creative practice involved	Musical Performance
Sector(s)	Cultural Sector, Music
Region and Nation	London, England

Outcomes

Expanded performance capabilities:
Established a dual-strand performance lab, enhancing the scope of the Performance Simulator.

Increased accessibility:
Created a 110-capacity, fully accessible studio, promoting inclusivity in performance training and research.

Technology upgrades:
Installed cutting-edge simulation and performance capture systems, enhancing research and practical applications.

Staff development:
Trained staff members in the latest simulation technologies, strengthening internal expertise.

Additional funding:
Secured £46k in leveraged funding, demonstrating the project's potential to attract further investment.

In 2022, The Royal College of Music received £1.9m through AHRC's Creative Research Capability (CResCa) programme, to upgrade and expand their pioneering Performance Simulator facility into a dual-strand performance laboratory.

Investment supported the creation of a 110-capacity, fully accessible studio, upgrades to the existing Performance Simulator space, and new simulation and performance capture systems in both spaces. This also enabled training for four members of staff, generated £46k leveraged funding, and has increased public engagement, with the facility featuring on the BBC television programme Click.

They are partnered by Studio Jouan.

Shaun the Sheep: Immersive Experience

University of Liverpool

2020-2023

Credits	Prof Richard Koeck — CAVA, Centre of Architecture and the Visual Arts, The University of Liverpool
Emerging technologies involved	Games engine technology, leading-edge 3D visualisation, sensors, machine learning, WebAR
Creative practice involved	Animation, Creative Storytelling, Storyboarding, Architectural and Immersive Design, Human-Computer Interaction (HCI)
Sector(s)	Film, Animation, Architectural Design, Game Design, Spatial Sound Design
Region and Nation	Liverpool, Bristol and London, England. Shanghai, China

The Shaun the Sheep: Immersive Experience was one of eight UK-China Creative Partnerships launched in February 2020, concluding in 2023. This project sought to integrate advanced immersive technologies into the stop-motion animation industry, traditionally reliant on manual craftsmanship. Collaborating with renowned Bristol-based animation studio Aardman, the project aimed to develop new value propositions for existing IP through innovative, technology-driven experiences. The multidisciplinary partnership also involved the University of Liverpool, Goldsmiths University of London, FeedAR, and the Shanghai Theatre Academy.

Led by Professor Koeck from CAVA, Centre of Architecture and the Visual Arts at the University of Liverpool, this multidisciplinary team brought together experts in animation, architectural and immersive design, virtual reality, real-time technologies, machine learning, spatial sound, WebAR, and commercialization. The project aimed to blend creative technologies and processes, including gaming technology and machine learning, within a real-world commercial framework.

The primary goal of this ambitious R&D project was to innovate in research, technology, and creative application by developing a prototype for an entirely new kind of Shaun the Sheep visitor experience. This prototype aimed to offer a non-linear, real-time, responsive, spatially immersive family experience in Shanghai. Designed to be enjoyed by families of all ages, the experience created through this project allows direct interaction with a Shaun the Sheep story in real-time, in a bespoke-designed space with multiple LED screens and projection, without the need for headsets, gloves, or personal devices. Aardman used this opportunity to develop a new story set in China that remains true to Shaun the Sheep's adventures while acknowledging China's cultural context and values.

The project's outcome is a prototype that merges the scalability of film and animation with the intimacy and responsiveness of immersive experiences, redefining the term "mixed reality". This innovative approach, devoid of headsets, gloves, and mobile phones, presents a scalable concept with the potential for significant impact within and beyond the creative industry sector. This new methodology is seen as a pioneering form of "responsive cinema", which we might see realised in the future.

Outcomes

Prototype Innovation:
Developed a prototype for a Shaun the Sheep visitor experience, offering real-time, non-linear, and spatially immersive storytelling without headsets or personal devices, setting a new standard for mixed reality.

Cultural Integration:
Created a Shaun the Sheep narrative tailored to a Chinese audience, balancing cultural authenticity with the core brand identity.

Technological Breakthrough:
Pioneered "responsive cinema," blending animation scalability with immersive responsiveness, setting a precedent for future creative industry applications.

Commercial Potential:
Presented a scalable model for immersive experiences with significant potential across global entertainment sectors.

The Robotics Living Lab (RoLL) at Manchester Fashion Institute

Manchester Fashion Institute, Manchester Metropolitan University

2023-2024

Credits	Prof Susan Postlethwaite — Manchester Fashion Institute, Manchester Metropolitan University
Emerging technologies involved	Robotics
Creative practice involved	Fashion
Sector(s)	Fashion, Manufacturing
Region and Nation	Manchester, England

The Robotics Living Lab (RoLL) led by Susan Postlethwaite, Professor of Fashion Technologies and director of RoLL, Manchester Fashion Institute, Manchester Metropolitan University, is a new fashion research facility created to help support fashion businesses to develop high value, low volume garment production using agile collaborative robotic technologies for more sustainable production.

RoLL was created in recognition of the need to modernise the fashion sector in the UK, to increase its sustainability through creative automation, and aims to develop easy to use, novel, collaborative robotic tooling, and agile systems, enabling designers to offer world-class fashion design products that are locally manufactured and so part of a reshoring or near-shoring agenda. It was awarded £3.8m by the Arts and Humanities Research Council (AHRC) to build and equip the new facility as part of the Creative Research Capability (CResCa) World Class Lab series. This funding enabled new research into highly responsive, sustainable approaches for garment manufacturers.

The lab is both academic and industry facing. Explicit priorities, therefore, include seeking industry partners and gaining access to sites of manufacture to carry out research into processes that could be automated in the creation of garments, shoes and accessories, and those that need to remain human skills.

In addition, the Lab is directly supporting designers including by: engaging a younger generation in fashion fabrication using digital tools, collaborative robotics, agile tooling, and AI; helping designers to take a more systemic approach in their use of agile tooling; and by running a 'Co-Design Residency Programme (CDRP) workshop series and focus groups which will be offered to support designer/manufacturer businesses speculate on, propose, design, and iterate the kind of robotics or agile tooling that could support developments in their business.

RoLL have already developed a cutting tool end effector for a collaborative robot arm with POMO Robotics and support from the Cotton Textiles Research Trust as the first of a series of tools for micro fashion businesses. Other tools which the Lab hopes to provide in the future include robotic tabletop/desktop solutions, build-your-own modular and soft robotic systems and multi-use collaborative and swarm robotics.

Outcomes

Sustainability and Innovation: Drives innovation in garment production, offering eco-friendly, digitised solutions that modernise traditional fashion manufacturing processes.

Industry Collaboration: Engages micro and SME fashion businesses, focusing on automation and the upskilling of the workforce through collaborative robotic systems.

Reshoring potential: Aims to shorten supply chains and localising production, positioning the UK as a leader in sustainable fashion manufacturing.

Skill development: Is addressing a skills gap by supporting the integration of digital tools and robotics in fashion, re-engaging the younger generation with modern production techniques.

Tool development: Created a collaborative robotic cutting tool, with plans to expand into additional tooling solutions for micro fashion businesses.

Volumetric assets and immersive environments depicting future impacts of rising sea levels on the Broads and East Anglia coastline

Norwich University of the Arts

2023

Credits	Louis Nixon — Norwich University of the Arts
Emerging technologies involved	Immersive technologies
Creative practice involved	Volumetric Capture, VP, Visual Arts
Sector(s)	Cultural Sector
Region and Nation	East Anglia, England

In 2022, Norwich University of the Arts were awarded a £780,000 AHRC Creative Research Capability (CResCa) grant, to establish an Immersive Visualisation Lab. This transformative investment purchased a volumetric capture system, virtual production technologies and a 360-degree LED screen to create the first facility of its kind in the UK.

This funding facilitated a project to explore the impact of rising sea levels on communities in the Broads and East Anglian coastal region, and has helped to strengthen partnerships with researchers, industry specialists and international partners, by offering a one-stop-shop for different creative technologies.

Partners included the Broads Authority and We Are Immersive Ltd.

Outcomes

Technological innovation:
Established the UK's first immersive visualisation facility, advancing the creative use of volumetric capture and virtual production.

Environmental engagement:
Facilitated research on the effects of rising sea levels on vulnerable communities in the Broads and East Anglia, raising awareness through cutting-edge technology.

Strengthened partnerships:
Enhanced collaboration with the Broads Authority, We Are Immersive Ltd, and other international partners by providing a comprehensive hub for creative technologies.

Cross-disciplinary impact:
Supported research and industry projects across multiple sectors, fostering innovation in both academic and commercial contexts.

Regional influence:
Positioned Norwich University of the Arts as a leader in immersive technology within the East Anglian region.

Annex 2: Levels of investment in CreaTech technologies

In this paper we define CreaTech businesses as those companies who are in the Creative Industries and are blending creative practice with technological advancement. However, another way of thinking about CreaTech businesses might be to consider any companies using technologies which are particularly linked to CreaTech skills (in that, to make use of the technology you need a combination of creative and tech skills).

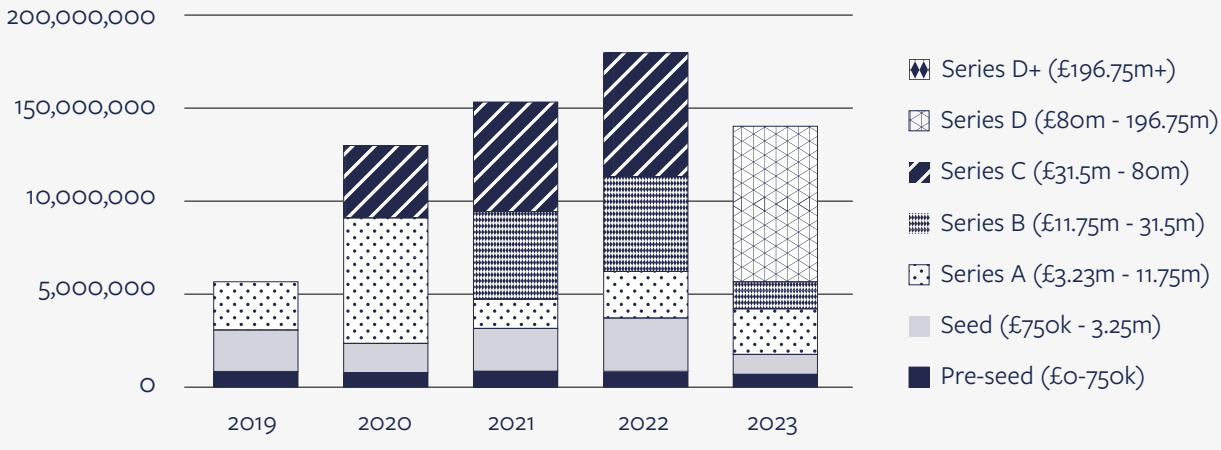
Three prominent examples of these technologies are **AR/VR & Haptics, 3D printing, and gaming technologies (GamingTech)**. By looking at levels of pan-economy investment in these technologies (using data from Beauhurst), we can gain a better understanding of investor sentiment towards these technologies in particular, and CreaTech more generally.

To do so, we approached identification of companies using Beauhurst's 'buzzword', and sector tagging taxonomy, which enables all funding for companies in those sectors to be aggregated, and reported on.

AR, VR & Haptics

We found that investment in UK companies developing AR, VR, and haptic technologies has shown steady growth over the past five years, peaking at £180.1 million in 2022. Despite a 22% dip in 2023, investment remains high compared to other tech subsectors. AR and VR, especially, are redefining storytelling, marketing, and user engagement across sectors. VR immerses users in new worlds, while AR enhances real environments with digital overlays, offering real-time interactivity. These applications have extended into fields as diverse as gaming, healthcare, and defence, suggesting strong demand for continued investment.

Figure A Investment in UK AR, VR & Haptics companies, 2019-2023

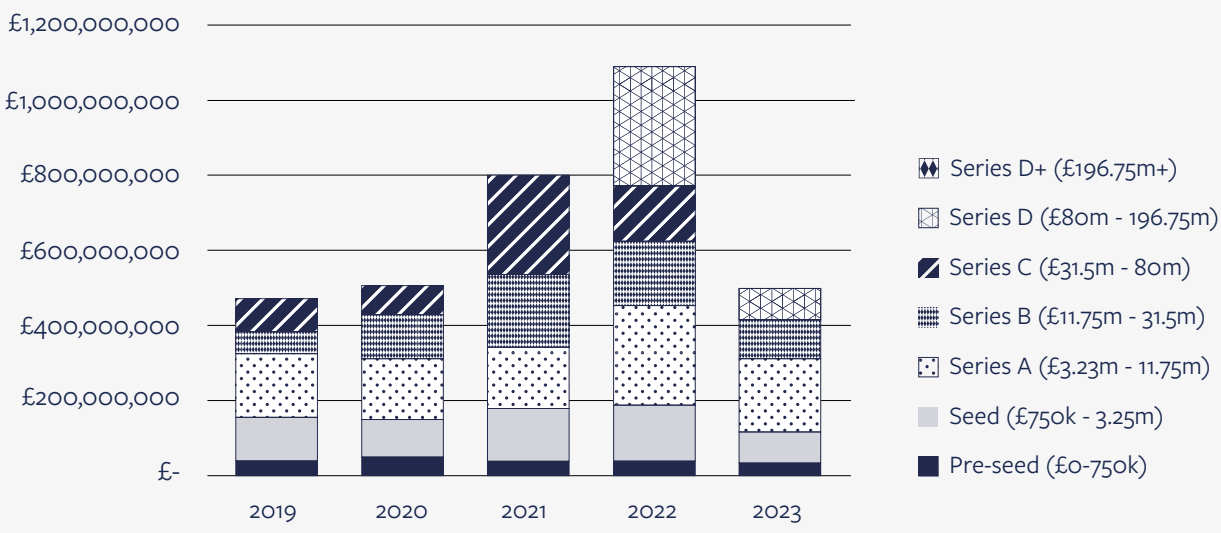


(Source: Erskine Analysis, Beauhurst, 2024)

3D printing

A breakthrough in 2021 saw VC investment in UK based 3D printing reach unprecedented levels, ranging between £44 million and £52 million annually over the last three years. 3D printing has revolutionised the creative process by allowing for rapid prototyping, material customisation, and intricate design. Architects, product designers, and creatives benefit from 3D printing's ability to turn conceptual designs into physical models, facilitating faster iteration and innovation. In turn, this technology has expanded creative possibilities across industries by enabling unique, highly tailored outputs at scale.

Figure B Investment in UK 3D printing companies, 2019-2023

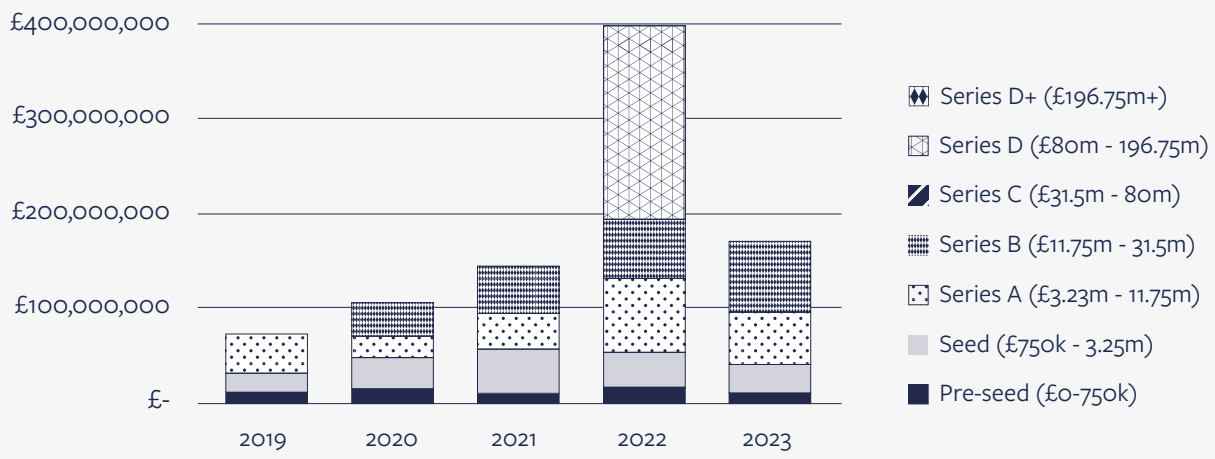


(Source: Erskine Analysis, Beauhurst, 2024)

Gaming technologies

In the UK, Gaming technologies experienced a notable investment surge in 2020, achieving 47.7% year-on-year growth. The gaming industry continues to sit at the frontier of digital innovation, with technologies such as the metaverse, AI, and blockchain creating unprecedented avenues for user engagement and revenue generation.

Figure C Investment in Gaming tech, 2019-2023



(Source: Erskine Analysis, Beauhurst, 2024)

A landmark investment of £203 million into UK unicorn Improbable underscores GamingTech's substantial appeal. Improbable's work in developing virtual worlds for industries ranging from entertainment to defence highlights the broad utility and high growth potential within this space. Improbable have received both private and public funding, including from Innovate UK, to lead them to unicorn valuations.

The Royal Anniversary Trust

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