

House of Lords' A Creative Future Inquiry-Submission by Creative Informatics and the Edinburgh Futures Institute, University of Edinburgh.

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Introduction

This response brings together reflections and learning drawn from a number of key organisations based at the University of Edinburgh:

- **Creative Informatics**, a 5.5 year programme (2018-2024) supporting data driven innovation in the creative industries in Edinburgh and South East Scotland through funding and support.
- **Edinburgh Futures Institute**, a new interdisciplinary hub at the University of Edinburgh, collaborating with industry, governments and communities to build a challenge-led data-rich portfolio of activity (including teaching, research and innovation) that has demonstrable ethical, social, cultural, economic and environmental impacts.
- **Data Driven Innovation initiative** of the Edinburgh and South East Scotland City Regional Deal – an innovation network helping organisations tackle challenges for industry and society by doing data right to support Edinburgh in its ambition to become the data capital of Europe.

We also draw upon the University of Edinburgh's world-leading Informatics, AI and machine learning research and rich range of academic and industry research in cultural heritage.

Summary of this response

In this response we address the seven questions posed by the Communications and Digital Committee drawing on the authors experience of supporting innovation, particularly innovation around data and data driven innovation and technologies, in the creative and cultural industries.

In response to Question 1, we briefly summarise key trends around both positive and negative disruption currently and over the next 5-10 years, and then discuss in more detail several key areas of disruption, notably AI, machine learning and shifts in the screen industries use of technology. We also discuss emergent changes to business models and towards the 'creator economy'.

In response to Questions 2 and 3, we discuss the skills needs of the creative sector, and the opportunities and barriers around these, particularly drawing on our work delivering the Creative Informatics programme and using research and development as a framework for skills development. Our observations cover both formal arts and creative education contexts and the role of continuous professional development – and the inaccessibility of the latter, particularly creatives in freelance and SME contexts. We particularly emphasise the need for enabling creatives to gain the critical skills and confidence to continuously upskill and work collaboratively, recognising the pace of technological change, rather than recommending specific technical or professional skills offers.

In response to Question 4, we elaborate on the skills discussion, exploring how industry might better support the talent pipeline through research and development projects, particularly those embracing collaboration and risk. We recommend ongoing engagement with academic research and knowledge transfer opportunities in this context – drawing on our own experience of working with the creative sector.

In response to Question 5, we talk in more depth about the Creative Informatics programme, our learning from it, and we include a wide range of testimonials from participation in funded creative data research and development projects and associated training. These testimonials speak to the lived experiences and positive impacts on participants' businesses, creative practice, entrepreneurial capacity, and the sustainability of their creative careers.

In response to Questions 5a and 6, we provide focused reflections and recommendations around the efficacy of government support for the sector, particularly focusing on the benefits of several landmark funding programmes to date but also reflecting on the risk of short/medium-term initiatives coming to an end. We discuss the network and capacity building in such initiatives, and the importance of continuity of funding and support to avoid cycles of repeated work and lost connections. We also highlight the current financial uncertainty facing the sector around government support, at a time when a number of these key successful initiatives are drawing to a close.

Finally, in response to question 7, we highlight exemplar initiatives from other countries. We highlight several large scale and long-term EU investments in the creative and cultural industries, which are providing a longer runway to sustainable communities around creative innovation. We also highlight some specific project examples that nurture rich collaboration across creative, scientific and technology areas, leading to innovative new work.

We close this submission with a list of additional resources, research publications and reports which we believe the Committee may find useful and relevant to this Inquiry. All of these are publicly accessible but we also to send copies of these under separate cover to the Committee for convenience of access.

Our Responses to the A Creative Future Inquiry Questions

1. Which areas of the creative industries face the greatest potential for disruption and change in the next 5–10 years, and what impact could this have?

All areas of the creative industries face disruption and change over the coming 5-10 years, however in some cases that disruption may be positive and productive, for others that disruption raises new questions and risks. There are some overarching trends we would note as important in understanding future disruption, notably:

- Wider shifts towards freelance as the model of employment – already common in the creative industries but also impacted by wider “gig economy” shifts.
- Funding for creative organisations and activities – which has direct impacts both on jobs and creative workers access to skills, training, career development opportunities.
- Increased demand for “creative tech”, “creative technologist” and similar blends of creative and technology skills across all sectors not just the creative industries, e.g., in healthcare. (*‘For every £1 of turnover directly generated by the arts and culture industry, an additional £1.23 worth of turnover is supported in the wider economy through indirect and induced effects’* - CEBR report for Arts Council England, 2020).
- Emergence of new business models – including models for artist support through subscribers and/or crowdfunding (creator economy); new business models built on new forms of digital distribution and exchange; business models arising from scaling creative practice through technology.
- Changes to workplaces and practices post-Covid, including shifts towards home and hybrid working which provide positive opportunities for creatives in a wider range of physical geographies (particularly beyond London).

- a. What changes are expected in the way creative/cultural content is produced; the way audiences are engaged (for example through digital or immersive experiences); and the way business models operate?

Specific technologies are impacting specific industries more profoundly.

AI has potential to significantly disrupt a number of content creation and audience engagement areas in the coming years – disruption which could be positive or deeply problematic in nature depending on the regulatory framework and cultural norms that emerge around it. Nesta has undertaken a number of reports on future skills needs which repeatedly find that creative skills remain extremely important in a workplace changed by AI, with AI much better suited to efficiencies in production and analysis, and much less well suited to the creation of original content.

Areas where automation and AI are already having an impact on creative production include the role of designers and graphic designers where a combination of automated solutions, self-service solutions, and ‘gig economy’ labour provide inexpensive alternatives to original

design work. However, increased needs for effective communication of data and data visualisations are creating opportunities for designers working in these areas.

Machine Learning is proving particularly beneficial in the production process of multimedia content requiring subtitles/speech to text solutions, something which has been a beneficial outcome of the Covid disruptions and move to streamed content. Otter AI is a company which has seen notable uptake and led to more frequent subtitling of video content than would be feasible through manual captioning (which is higher quality but infinitely less scalable and more costly). Similarly, HTR (Handwritten Text Recognition) is increasing the ease and accuracy of generating transcripts from images of text, via infrastructures such as Transkribus.

Significant change in creative content production is currently underway in live filming and the screen industries' use of green screen, VR and LED screen environments / 'virtual production' methods. These approaches potentially replace entirely the use of locations through live VR filming and continued enhancement in post-production through developments led by Unity and Unreal Engine. The use of AI techniques in animation production is also anticipated. These changes have the potential to improve the environmental impacts of productions (travel, materials, waste, etc.), but also require significant shifts in the types of skills and roles required on film and television sets, towards more technical and digital production skills. These changes also point to the increasing convergence of technologies and content production methodologies across screen industries and the games industry – and changing skills demands and transferability.

AI has significant further potential (and is already in some usage) in video editing, journalism, and in the wide range of creative contexts where large volumes of information must be understood and sifted quickly and effectively. Some of the most interesting work in this space is looking at the potential for tailoring content differently for different audiences – both for enabling audiences to choose their own creative or located route through material (variations on the “choose your own adventure” concept); and for tailoring content to specific audience interests and concerns. That tailoring is a natural extension of the algorithmic profiling seen in social media contexts and is accompanied by many of the same potential benefits (relevance, interest, better potential for monetisation/reaching the right audiences) and concerns (data profiling, fairness and equity, opaqueness over differentiated access to information, inequalities around differential pricing or access, etc.). These uses of AI in creative production contexts raise not only questions of practical skills but also a requirement for industry and society to be informed around the ethics and norms of these methods, supported by relevant guidance and regulatory contexts.

Audience engagement in live performances may be enhanced with the use of on-stage VR and AR environments, affects and characters to enhance the narrative and experience as well as harnessing VR, AR and mobile and 5G technology for audience interaction with live experiences. The impact of hybrid or purely digital broadcast' online of performance has yet to assert itself in this current transitional phase from the end of covid restrictions. There are a number of areas still to be developed in terms of audience expectation and readiness, and the capacities of cultural organisations and performance production companies.

During the 2020 and 2021 Covid restrictions there was a vast amount of initial experimentation with alternative delivery models for creative content, including genuinely innovative work (e.g., the RSC's Dreams), arising from the lack of access to in-person performance and audience spaces, and the attendant loss of revenue. Historically filming and/or digital distribution of creative work has been dominated by large national companies (e.g. The National Theatre, the National Gallery, etc.) who have had sufficient funding to explore or partner in large scale projects – often offering the resultant content for free or at subsidised rates.

The sector has seen the development of an emergent 'creator economy' that is defined by content creators, curators, and community builders working independently and using software and finance tools to help them with growth and monetisation. Platforms such as Twitch are redefining the value creation and entirely ignore the traditional value chains that previously underpinned the creative industries. Platforms can also control content distribution and impede creators' ability to capture value from their products or services. Amazon (Twitch, Kindle), Alphabet (YouTube, advertising), Tencent, Bytedance, and Spotify exercise considerable influence over the monetary split from creative content and what types of creative content are promoted by their algorithms.

The availability of free creative content during Covid restrictions proved particularly challenging for creative organisations without the existing equipment or skillsets to create new digital-first content or redistribute existing content freely. Filming of live content that is available live or later as a secondary viewing will require new skillsets that most venues do not yet possess, new equipment and a new IP model that agrees ownership between the creative partners – owners of the film, owners of the performance and the venue owners and how the revenue in the form of a ticket (streaming charge) is split and recorded.

New business models are an inherent part of new production, distribution and IP arrangements. International models already explored and established include The Sessions music livestreaming platform created by The Effenaar, Eindhoven, working with Dynamo, 1418 Allround Media and Copyright Delta to embed rights and technical innovation as part of online/hybrid livestreaming of performance.

2. What skills will be required to meet these emerging opportunities and challenges?

There are specific skillsets which are increasing demand, and look set to continue to be in demand in the short to long term future, including capacity to work with large data sets, undertake data analysis and/or manipulation, appropriate coding/software development or tailoring skills, tailoring of existing computational methods including AI and machine learning, although most often these skills will be required somewhat indirectly – through literacy and use of technology tools built on data, AI, etc. Additionally creative professionals need business skills, particularly around new business models and developing sustainable creative careers. They also need the skills, confidence and sufficient technical literacy to be able to communicate effectively with AI developers and system designers. Most of these are skillsets in high demand across all areas of the economy. There are very specific skillsets

associated with creative production including: virtual production; knowledge and use of gaming engines (both for gaming and broader screen industries); digital production across all creative areas; licensing and rights management through new platforms; etc.

Our experience from the Creative Informatics programme, running in Edinburgh and Southeast Scotland since 2018, is that for most creative careers it is challenging to identify one specific skill or technique that will future proof their practice. Instead, the need is for creatives to have access to funding, time and resources to regularly update and develop skills in reaction to the changing needs of the market. Crucially for digital creative practice and exploration of emerging technologies, this also requires a significant investment in creating 'scaffolding' mechanisms that support creatives to navigate the training and funding landscape and develop their confidence in working with more technical collaborators, and/or new approaches. That capacity to step away from day-to-day contracts and responsibilities and undertake continuous professional development (CPD) and/or research and development (R&D) or research and innovation (R&I) tasks is essential, however the financial realities for much of the creative sector mean this isn't possible without some form of support or subsidy. Without that development of skills, creatives are at risk from competitors, from automation and/or semi-automated services, etc.

Many larger cultural organisations are also not equipped in the main for this (1a) type of creation and delivery method and, in our experience, have the largest 'creativetech' skills gap in the areas of performance and data-driven platforms. They often have limited experience of filming and online streaming within their core team although will have worked with external service providers in the creative sector. Delivering innovation in venues or in collaboration with venue teams is challenging due to the gap in understanding between the innovator and the core teams. However, without obvious current audience demand and/or challenging expectations for online delivery (particularly post Covid when much content was made available for free) it is hard to make the case for these types of innovation, and the need to develop such skills remains moot. There is potential to increase remuneration for online performance - potentially for enhanced creative performances using technology – but these kinds of experiences and expectations are particularly challenging to deliver with existent skillsets and audience engagement practices.

Cultural organisations' data use within venues is proficient, and some have shared data across venues to create insights and many use The Audience Agency to support data analysis and insight at a larger scale. However, data use and innovation beyond this is limited, with some members of the community keener to seek data to defend traditional business models, rather than using it to innovate and future opportunities. Academic expertise can support decision making and provide research and skills input, whilst academic expertise with innovation funding can underwrite risks that would otherwise restrain organisations from taking steps to progress.

Across the creative industries we have observed that there are gaps in degrees associated with the cultural and creative industries, with many designers, artists, performers, etc. completing arts education without an understanding of the affordances of data and technology and particularly poorly equipped to think about innovation and innovative

business models around their practice – both skills areas that would enable them to practice more flexibly throughout their creative careers.

3. What actions are needed from the Government and local authorities to ensure there is an appropriate talent pipeline equipped with these skills?

We would advise that it is crucial for support to focus on the wide end of the funnel/early stages of the pipeline, ensuring that there is sufficient skilled capacity to take forward innovative ideas and businesses in the future.

Education

Data skills and creativetech as well as digital, design methodologies, business awareness or entrepreneurship skills should continue to be the focus for Local Authorities and Government educational departments to embed within secondary education with preparatory awareness in primary education. Many young gamers, Minecraft users and TikTok creators are well ahead of the creativetech expertise demonstrated by teachers and arts and cultural productions and GLAM venues. These kinds of experiences lead to development of skills that are useful in spatial awareness, architectural creation, creative problem solving and are applicable in careers in animation, VFX, games, VR and AR interaction design in museums and galleries to enhance learning, creating VR and AR training materials and experiences and in marketing, social media and advertising in creation agencies but also required skillsets in venues and cultural organisations and festival companies, to name a few.

As already noted above, FE and HE arts and creative programmes should also be supported to embed business, digital and data skills as a core part of the curriculum, to ensure all students are thinking about how they might develop their practice in an economically sustainable way moving forward.

Industry

We have commented (Q2) on the unrealised value in data in the creative industries – something also explored in more detail (in the context of the Edinburgh and South East Scotland region) in the 2020 Developing Data-Driven Innovation in Creative Industries: White Paper (Parkinson, Terras, Speed, Somerville). Across the UK, institutional funding to support data gathering and dissemination would help creative organisations to learn from others and to grow their enterprise.

Skills support for creatives already established in their practice remains important, especially if that support enables them to pivot their business to become more economically sustainable in the long term. In the Creative Informatics programme (in Edinburgh and South East Scotland) we have trialled a range of different interventions with creative industries companies – usually small and microenterprises – to develop skills through R&D funding and CPD programmes that work across academia and industry. A number of other clusters from the Creative Industries Clusters Programme (CICP) (funded by the Industrial Strategy, through the AHRC) have similarly trialled models of development and knowledge

exchange to enable creatives to work more closely with tech and data, form new collaborations, and in so doing develop significant new technical skills and explore new business models.

There is much to be learned from these experiences of collaborative creative industries and academic projects, including where some of the barriers and opportunities to development sit. For instance, several CICP clusters have put in place measures to make training and funding opportunities more open to a wider range of participants – recognising the burden of applying for funding (particularly for the many creatives who have never done so before), the opportunity cost of attending training or information sessions when you will not otherwise be being reimbursed for your time (as is the case for many if not all freelancers, who make up a large proportion of the sector). Training and developing creatives also requires consideration of neurodivergence (particularly support for those with dyslexia which is common in the general population, but particularly common in the creative sector), and other forms of scaffolding that enables them to take up opportunities.

- a. [How can this be sufficiently flexible to take account of the pace of change in the sector?](#)

Pace of change in the technology is often subsumed by those using creativetech as they add the skills and knowledge as they go, to adopt that approach in education would require a more practical experimentation approach, getting students used to creating outputs and encouraging adoption of new technologies and tools. If a previously written taught module becomes out-dated from one semester to the next a practical exercise can add skill, and when done in small groups peer learning and discovery can support learning reinforcement and builds collaboration and teamwork which are essential skills in creative and cultural careers and in application in roles in the wider creative economy (as defined by Nesta). The approach of equipping pupils and students with techniques in how to learn, un-learn and re-learn would facilitate their own pursuit of knowledge and skills acquisition.

A similar flexibility is required in CPD contexts for the creative industries – supporting creatives with the critical skills, opportunities, and resilience to adopt new tools, technologies and approaches. There are widespread resources for learning, particularly through online learning platforms including open resources including MOOCs and peer resources (e.g., on YouTube), but these are only useful when critically engaged with. Enabling creatives to think about their own goals for their practice, their business models, their audiences, their current resources and capacity and potential to grow or develop, and how to work with collaborators – particularly technical collaborators – enables them to learn and develop their practice over time. These kinds of empowering skills and expertise are far more valuable in the long run than courses that focus on a single technology or skillset – though there is also a place for focused technical offerings to help creatives take their work forwards in these new technologies and spaces.

4. What actions are needed from industry to support the talent pipeline development?

There are often two strands of response to addressing the recruiting challenges by industry. One is to say graduates do not have the skills they need and often cite soft skills – listening, responding with creative ideas, communication, possibly also pitching, negotiating, and business awareness; and the other, we can train them in our systems, processes, software and our style if they are not fully prepared so it is not considered an issue but an opportunity.

Our experience has been that research and development initiatives provide an excellent framework for professional development and cross pollination of ideas within the creative industries. Whilst the work we have undertaken through Creative Informatics has been primarily supported under our own funding (ultimately from UK and Scottish Government), many of the models we have used can be adopted by industry to support their own talent, and connect with external specialists. Nurturing talent in a fast-moving space requires an understanding of new technologies, forthcoming opportunities and needs, which in turn requires strong networks.

We have found that for larger creative organisations the pace of change can be slower and that it often benefits these organisations to connect with faster moving smaller scale innovative tech startups who are better positioned to take risks and explore new technologies – something our Challenge project funding strand was designed to nurture. In these projects a (typically) larger creative or cultural organisation (‘Challenge Holder’) sets a challenge – usually a true pain point for the organisation around data or which can be resolved through creative data driven work, this brief is then shared with local creativetech startups who propose solutions. The successful ‘Responder’ then undertakes R&D work (up to a max of £20k project) that results in a ‘minimum viable product’ (MVP) which is made available under a 3-year royalty-free license to the Challenge Holder, but which the Responder retains the IP for and is encouraged to commercialise. Both Challenge Holders and Responders are supported to develop their briefs and their work, often with academic advice as well as support and signposting to business opportunities and further funding.

We have found that these relatively small riskier exploratory projects which have a clear focus but not necessarily a fixed outcome (true R&D rather than commissioned outputs) leads to significant learning across digital literacies, technology, business models, and cross-sector collaboration for both the larger industry partner and the startup undertaking the work.

a. What actions are needed from organisations in the creative industries to prepare for and accommodate the requirements of the future workforce?

Industry could support soft skills development through visiting as a speaker, posing a live interactive scenario, setting a project and involving themselves in educational settings to allow for practice and development. They can also act as advisers on industry standard approaches, practices and software, help advise on curriculum content, and current and

foreseen job roles and what these entail. If absorbing a graduate into the workplace and training them in their own systems etc. this requires ‘training the trainer’ preparation and also a capacity of workload sharing to allow for training time to be devoted to preparing new recruits. Smaller organisations and cultural bodies in the sector may find this challenging. Apprenticeships are also a valuable industry-education partnership.

Organisations in the creative industries will also benefit from participating in knowledge transfer opportunities – liaising with research and researchers on education, training and higher education, as well as the creative industries and economists. This provides mutual benefits as it supports creative industries organisations understand future opportunities and developments to the industry emerging from cutting-edge research, but also helps maintain and extend the relationships between academia and industry, ensuring that formal education programmes equipping the next generation of creative professionals continue to be developed with future industry needs in mind.

5. What role do innovation and research & development play in addressing the future challenges facing the creative industries?

We see innovation and research and development (R&D) as playing a critical role in addressing the future challenges facing the creative industries. Innovation and R&D enable the creation of new products, services, and experiences which support the economic (and, in some cases, environmental) sustainability of the sector, but also the nurturing of new and emerging skillsets which enable creative people and companies to continue to be competitive in their region, the UK and internationally. Without investment in R&D and innovation the creative industries in the UK risk falling behind those in other locations. Innovation and R&D also enable creative organisations to develop new approaches that can lead to faster and more effective scaling up, efficiencies, and enhanced products.

For the last four years the Creative Informatics programme has been supporting creatives in and around Edinburgh and South East Scotland to undertake R&D projects and training supporting the development of new products, services and experiences around data and data driven innovation. The programme is a partnership of the University of Edinburgh, Edinburgh Napier University, Codebase, and Creative Edinburgh (a membership organisation bringing together the cities creatives, particularly freelancers). Creative Informatics has been funded by the Industrial Strategy through the AHRC, the Data Driven Innovation programme of the Edinburgh and South East Scotland City Region Deal, and by the Scottish Funding Council. The intention has been to increase the long-term resilience, sustainability and competitiveness of the creative industries in the region through investment in innovative new work and capacity building.

To give a sense of why this work is important, and how R&D can make a difference, we would like to share some key statistics emerging from the programme, which still has a further 18 months to run. To date, (Nov 2018-Aug 2022) Creative Informatics has led to:

- Creation or retention of 218 new jobs in Edinburgh and South East Scotland

- 30 new startups, spin outs, or significant business pivots
- £6.57m in further funding for companies we have supported (for every £1 we have invested, a further £1.74 has been attracted in grants or investment)
- 99 new products, services or experiences
- 136 new Minimum Viable Products

We have also provided training for 676 individuals through a range of CPD offerings, notably 200 participants in the Creative Bridge programme, a 10-week pre-accelerator aimed at creatives looking to create innovative new digital products. The programme focuses on three key areas: helping creatives turn a creative idea into a sustainable business; breaking down barriers to the startup world by demystifying the jargon around tech entrepreneurship; and sharing toolkits and processes to give creatives the power to respond to fast change and cultivate resilience in a turbulent world. The programme has been led by Codebase, one of the largest tech incubators in Europe and home of the new £42m Scottish Government Tech Scalar initiative – which builds on their Creative Bridge work.

The evidence we have seen from this programme – and others in the wider Creative Industries Clusters Programme – is that R&D investment in the creative industries has a significant impact on the success, resilience and competitiveness not only on individual creative organisations, but also on clusters of businesses and the wider region. Feedback we have received on the impact of these kinds of interventions from participants – mainly drawn from creative startups and SMEs - include:

“The Resident Entrepreneur programme [a funding strand of Creative Informatics] allowed my co-founder and I time to begin technical development, engage further with our target sector and to develop our strategic partnership with [a major national arts organisation]. This funding unlocked further support from Creative Scotland.”

“Creative informatics support helped demonstrate confidence in myself and [my business] which has in turn enabled us to unlock further funding to grow our team from 2 unpaid PT [Part Time] to 4 paid PT.”

“...without it [CI support] I wouldn't have brought my ideas any further than thoughts/ideas - I never thought I could be the person to make them happen I didn't have the confidence or belief in myself”

“This has been a transformative experience, as I've been able to commission an app and learn technical skills I've struggled to access before. Doors have been opened that were previously closed and I have a route towards a sustainable creative livelihood now. It has also given me connections to technical expertise for future. My mentor was brilliant and so generous with time and support - I've learned an enormous amount in terms of technical and business knowledge”

“Being part of the Creative Informatics network has been transformative to my own creative practice. It has enabled me to 'level up' in terms of accessing people, opportunities and funding. My understanding of different organisations and how

they function has increased considerably and so has my confidence to reach out to them.”

“Having this network helps me find people who can help and advise on the project. The budget has helped me take more time to work on the project, and to work on it within a cohort of similar minded people, removing isolation of being an entrepreneur.”

“Creative Bridge and attending the short course 'Developing a Data Driven Company' contributed significantly to my learning, particularly when thinking strategically about how we use data and the ethics around this.”

“I have found the CI team to be extremely supportive and encouraging throughout the CI programme. We won [a Challenge project] and we received further funding as [a member of the CI team] signposted us to a relevant Innovate UK Grant.”

“The impact has been significant and produced valuable new data which would not otherwise exist. This has enabled me to make informed decisions and access other funding to start transforming my sector.”

“The programme has enabled me to prioritise my career development and focus into this new area of data and technology for the arts. I am currently planning to move from a mix of freelance theatre projects running alongside [my startup], to working full-time with the business from October 2022. This is planned to coincide with the [startup] platform generating revenue.”

“It’s been very impactful - I’ve gone from thinking I’ll develop something as part of my practice as a sole trader to setting up a limited company to own my IP and I’ve reached the semi-final of Converge [Scottish spin outs competitive awards and associated support programme] where I’m trying to raise more money to further develop my app. CI has massively increased my confidence and ambition to do this!”

“It has helped me merge my creative ventures with my established technical services, allowing me to marry the two in an innovative and sustainable practice”

“The impact on my decisions to focus on the market for interactive stories. I had several projects running and I have decided to focus on the one project. Since then, my creative practice has flourished in terms of contracts and cash into the business.”

“I’ve made a big breakthrough with a business idea I’ve been pursuing for several years without the technical knowhow (in NLP) to get there. As a result, I’ve commissioned an app and left my job to focus on this opportunity. It has given me a USP that no one else in my field has so far.”

“Through participation in the CI programme I have gained access to opportunities and had time to invest in investigating potential pathways for myself and other creatives interested in producing data driven work. I have grown from being a

creative practitioner producing my own work, to being engaged with and supporting to larger creative community.”

“Participating in CI Programme has had a huge positive impact on my business. We were looking to pivot in 2020 and start an immersive design studio and that is when we won a Challenge Project with [a major cultural organisation]. This project has received further funding of £50k from Innovate UK and [the cultural organisation] and allowed us to position the outcome of the challenge as a product. We have now applied for further EIT Funding to support us in the commercialisation of the product and scale it in the EU Markets.”

“The Challenge project significantly enhanced the potential of our creative technology and digital practices in the organisation, giving us the opportunity to dedicate more time and resources to realise a public commission, and a project with real longevity and further opportunities to develop. The programme also connected us with creative technology specialists for example 3D printing, who were not only helpful in their support of the original project but have also continued to support us with other projects going forward.”

“The CI programme has significantly reduced the precarity of my practice which allows me to produce work with greater confidence, to innovate and take creative risks.”

“It has given me a new focus on building a games ecosystem wide cluster in order to build a more consistently successful games ecosystem. This is after a decade of disaffection with the sector, as isolated, insular and insufficiently ambitious.”

“...Creative Informatics has been a game changer for us. The programme has been very empowering, as a fledgling business straddling a chasm between art and technology. Creative Informatics filled a funding gap between art and technology that was sorely missing here in Scotland we believe. This support has allowed us to explore our ideas in a way that other funding bodies or commercial entities wouldn't or couldn't. The programme has connected us with a myriad of like-minded practitioners to learn from and has teamed us up with exciting partners on projects through which we are honing our skills. CI has also been helping us by encouraging and allowing room for new ways of thinking in regards to what a creative tech business can be.”

- a. What actions are needed from the Government, funding bodies and sector organisations to support innovation, and research & development?

Building on the achievements of the past decade of strategic support would enable gains to be consolidated and secure progression. The Industrial Strategy was developed in response to the gap in skills and innovation progress due to the financial crisis in 2008 and its subsequent three years of recovery, to bring the UK in line or ahead of international

competitors. Any gap from now as these programmes of scale come to an end risks losing the cohesion of networks and receding in the advances made. In our experience this was evident in the gap between Creative Clusters round 1, which ended mid-2015, and round 2 which started in late 2018. Infrastructure, teams, networks and regional intensity dissipated, and the legacy of methodologies and innovations were at risk with academic partners holding the output and needing to find ways to build upon it within their own efforts. Initiatives can end, but they can also anticipate as Sigmoid curves and transmogrify before such losses occur and the 'dying off' creates a resignation and a sense in the sector of no longer being valued, considered and invested in. Post Covid a gap in visionary support strategies for the sector could not only risk a receding of progress and diminishing of gains, it could also see the closure of creative and cultural entities who are currently working hard to recover, with no signs of innovation-led recovery funding on the horizon.

6. How effective are the Government's existing strategies at supporting the creative industries to meet the challenges and opportunities ahead?

The UK Government defined the creative industries in 1998 and has built various support programmes on this foundation with quantitative economic figures produced each year. The contribution of the sector to the UK treasury is clear and noted in the opening introduction of this House of Lords inquiry.

The support provided by the UK Government over the past ten years has developed the creative and cultural industries' research and innovation capacity in tandem with academia and resulted in a well-established infrastructure, deepened networks and collaboration which has led to research innovation and new businesses, services, products and audience experiences. Strategies such as the Industrial Strategy and its Challenge Fund, Audiences of the Future, the Creative Clusters programmes (round 1 and 2) and the principle of 'design first' within the KTN support and Innovate UK funding has supported design but also helped embed design methodology and its value in non-creative businesses and illuminated its essential role in supporting improved innovation processes and solutions development.

The addition of the Policy and Evidence Centre (led by Nesta) for the Creative Clusters programme has provided a wealth of data on the quantitative and qualitative outputs of each of the Clusters, their combined impact across the UK, and their regional impact as well as highlighting individual case studies demonstrating the effectiveness of their approaches and the innovations created. This is a very valuable resource for policy makers, academia and the creative and cultural sector itself and a Centre that should continue and draw upon more widely.

Although not primarily targeted at the creative industries, we have also benefitted from the UK Government's City Deal programme. In Edinburgh and the South-East City Region the University has worked in partnership with the City of Edinburgh Council and Scottish Government. The University identified the potential of data to transform in ten sectors and established a capital strategy to develop hubs for data-driven innovation and added a Skills Gateway to prepare a talent pool for those sectors through education (secondary and tertiary), skills provision and career re-training in data roles. The DDI Hubs' overall mission is

to drive data-driven innovation across these ten sectors which include the creative and cultural sector, alongside festivals and tourism. This has led to new Masters Programmes (www.efi.ed.ac.uk) and new teams dedicated to supporting the adoption of data within creative and cultural businesses and to stimulate data-driven innovation collaboration across the disciplines of the creative and cultural sector in partnership with academia. The DDI programme is also supported the development of computing infrastructure which will support cross sector innovation with large scale data – including the creative industries.

The AHRC Creative Clusters Programme allowed us to propose within this overall strategy a deeper engagement and tailor-made provision for creative practitioners, creative companies and cultural organisations (including the Edinburgh festivals) to develop data-driven innovation and entrepreneurship with skills and mentoring support over the past 4.5 years through Creative Informatics. This has proven transformative and an initiative we wish to continue, however funding ends in March 2024. In anticipation of this we have developed a vehicle to continue engagement with the sector entitled CreativeTech Scotland Gathering. This will allow the convening of the community to share innovation, showcase new ‘creativetech’ applications through demonstrations and skills sharing. However, no funding has yet been identified to continue to award to creative and cultural entrepreneurs to develop their innovative ideas into start-up businesses, which is essential to bring ideas to prototype to showcase viability and attract further investment.

There has been significant investment in exploring creative industries futures and changes through research and development activities in recent years, under the Industrial Strategy Challenge Fund (ISCF) supported Creative Industries Clusters Programme (through which we are funded). The government has also supported the Audience of the Future programme (funding which ends after 2023) and Strength in Places, which has supported several large-scale creative industries projects (notably MediaCymru in Cardiff, and MyWorld in Bristol). Additionally, it has funded Unboxed 2022 (a single one-off investment in new innovative creative public work) and specialist skills support through organisations such as The Space, Backstage Academy, etc.

At present the creative industries are facing a far less certain future over support for meeting the challenges and opportunities ahead. There is a new DCMS Creative Sector Vision 2030 (due imminently), which the sector (including ourselves) has been consulting on, but it is not clear how funding may follow this.

Both industry and academia have lost significant access to funding and collaboration around innovation, R&D and skills post Brexit. Industry investment in R&D is limited by the challenges of recognising creative industries development work as R&D, and therefore limiting access to R&D tax credits and other interventions which could encourage more innovation and development across the sector – something which could be addressed through revised definitions and a better understanding of innovation in the sector. This kind of intervention feels particularly important at this time since furloughing in the creative and cultural industries during Covid has (in our experience) particularly impacted R&D activities. Whilst many felt to compelled to innovate and explore, many of those organisations who usually have an ongoing strand of R&D and innovation paused this work, or focused only on

immediate revenue generating work, which may have as-yet-unknown impacts on future competitiveness.

Moving forwards, we would like to see both the continuation of support for innovation in the creative industries, and a strategic move towards providing better continuity of support for the sector. Developing networks and communities of practice takes time, however many funding initiatives from Government address time periods which, at best, support the building of new networks and communities, only to finish once a system/area/community is performing well. Sometimes this activity can become self-sustaining but we have witnessed multiple initiatives come in, do good work, be discontinued, and gradually that community and capacity dies back until the next initiative emerges (see Q5). We would like to see a much smarter approach to timelines, extension funding, and the embedding of innovation in many skills, training and professional contexts.

7. What lessons can the UK's creative industries learn from other countries, and other sectors?

There are a number of exemplar activities and initiatives taking place in other countries, particularly in mainland Europe. We will talk about some of these but also generally note that the advances in EU investment in creative and cultural sectors, which includes acknowledging the impact of creative and cultural sectors' innovation within their own and other sectors, is something we should be mindful of and work with.

An initiative which we have been involved in (though the Una Europa alliance and the winning ICE consortium), and very much welcome, is the EIT Cultural and Creative industries (EIT CCI). This is a 15 year and €150m programme to develop cross-continent networks, innovation and skills opportunities. The intention that through large-scale (50+ partners) collaborations, the initiative will build on established communities of practice, connect existing and future programmes, and significantly develop capacity and economic benefits for the sector. We would particularly point to the long-term nature of this initiative, enabling a significant period for set up, delivery, and the opportunity to turn the EIT CCI into a self-sustaining model and network.

We would also point to the New European Bauhaus initiative which connects the European Green Deal to living spaces and experiences through creative and interdisciplinary work. The focus on sustainable and inclusive futures is both timely and critical given the current climate crisis. The initiative also reflects the fact that moves towards environmental sustainability are relevant across the whole economy, not only in those areas of heavy engineering directly concerned with sustainable technologies. Creative industries not only have many opportunities to improve the sustainability of their practices, but they are also uniquely placed to help society imagine alternative futures and be inspired and persuaded to make long term changes.

The New European Bauhaus is also concerned with inclusive growth, something we welcome as the creative industries are especially challenged by socio-economic inequalities which are often aggravated by not only socio-economic but also geographical inequality of access to opportunities within the sector – the UK experience of this is compellingly

documented in Orian Brook, Dave O'Brien, and Mark Taylor's 'Culture is Bad for You' (Manchester University Press, 2020). In our own work we have made significant efforts to consider issues of equality, diversity and inclusion (EDI), including providing governance structures that give our regional community a voice and strong feedback mechanisms, and openly sharing our performance against EDI measures.

We increasingly see the creative industries, particularly its intersection with technology, in the context of STEM (Science, Technology, Engineering, Mathematics) and/or STEAM (Science, Technology, the Arts, Engineering, Mathematics). One European initiative which has been driving interdisciplinary innovation in the STEAM space is S+T+ARTS (or STARTS), which explicitly supports work "at the nexus of science, technology and the arts". Activities across the programme have included residencies – co-creation projects between artists and technologists; prizes; 'lighthouses' – thematic pilots addressing major challenges for industry and society; academies – playful digital skills training for children and young people; and regional centres – providing a focus for critiquing the status quo and reimagining the future through local lens'.

We would also recommend looking at the work and support given to specific centres and organisation making a difference. We see a lot of cutting-edge work around design, creativity and technology emerging from the Netherlands and would particularly note Waag, designated as a 'Future Lab for design and technology' by the Dutch ministry for Education, Culture and Science who also provide core funding for their work to create an open, fair and inclusive society through design, creativity and (critical use of) new technology.

Additional Resources

In addition to the response above we would like to provide the Communications and Digital Committee with a number of reports and documents which we think will be helpful and relevant to this inquiry.

Chan, Kam, Panneels, Inge, Warren, Katherine, Upton, Liam, & Orme, Anna. (2022). Creative Informatics - a toolkit for digital events. Zenodo. <https://doi.org/10.5281/zenodo.6012621>

Elsden, C., Chan, K., Erskine, P., Helgason, I., Lechelt, S., Osborne, N., Panneels, I., Smyth, M., Warren, K., Terras, M., & Speed, C. (2020). Creative Informatics Guide for Online Events (1.0). Zenodo. <https://doi.org/10.5281/zenodo.3980961>

Elsden, C., Lechelt, S., Jenkins, A., Helgason, I., Panneels, I., Thornton, P., Orme, A., Osborne, N., Chan, K., Turner, M., Upton, L., Rovatsos, M., Jones, C., Schafer, B., Smyth, M., Speed, C., & Terras, M.. (2021). Cataloguing Creative Informatics Projects: First Report (2018 - 2020) (1.0). Zenodo. <https://doi.org/10.5281/zenodo.4704712>

Elsden, C., Piccio, B., Helgason, I., Yu, D., & Terras, M. (2021). Learning from the 2020 Edinburgh Festival Fringe: Recommendations for Festivals and Performing Arts in Navigating Covid-19 and New Digital Contexts. Zenodo. <https://doi.org/10.5281/zenodo.4775363>

Jones, Vikki, & Cunningham, Morvern. (2022). Future Culture Edinburgh report (1.1). Zenodo. <https://doi.org/10.5281/zenodo.6037499>

Jones, V., Elsdon, C., Helgason, I., AndThen, Piccio, B., Holland, K., Chan, K., Upton, L. 2022. FestForward. Digital edition available from: <https://www.festforward.org/>

Lechelt, Z., Elsdon, C., Speed, C., Helgason, I., Paneels, I., Smyth, M., & Terras, M. (2019). How can we balance research, participation and innovation as HCI researchers? In Proceedings of the Halfway to the Future Symposium 2019 ACM. <https://doi.org/10.1145/3363384.3363394>

McGillivray, Barbara et al. (2020). The challenges and prospects of the intersection of humanities and data science: A White Paper from The Alan Turing Institute. Figshare. <https://dx.doi.org/10.6084/m9.figshare.12732164>

Osborne, N. With Lugar, E., Vines, J., Schafer, B., Hemment, D., Speed, C., Vallor, S., Terras, M., Rovatsos, M., Parkinson, C. 2021. Getting Creative: Can a UK Centre for Creative AI Catalyse a Reimagining of AI's Possibilities? Essay commissioned for CRAIC: The Creative Research And Innovation Centre (Institute for Media and Creative Industries at Loughborough London) [website], 31st May 2021. <https://craic.lboro.ac.uk/essays/getting-creative-can-a-uk-centre-for-creative-ai-catalyse-a-reimagining-of-ais-possibilities/>

Osborne, N., Orme, A., Chan, K., Speed, C., Terras, M., Coleman, S., Gormezano Marks, A., Smyth, M., Somerville, R., Parkinson, C., & Turner, M. (2021). Creative Informatics Equality, Diversity, and Inclusion Policy & Action Plan 2021-23 (1.1). Zenodo. <https://doi.org/10.5281/zenodo.5227270>

Osborne, N., Schafer, B., & Terras, M. (2020). Creative Informatics Ethics Statement (1.3). Zenodo. <https://doi.org/10.5281/zenodo.3610105>

Panneels, I., Terras, M., Jones, C., Helgason, I., Komorowski, M. Plugging the Data Gap: Freelance Workers in the Creative Industries. Creative Industries Policy & Evidence Centre blog, 24th May 2021. <https://pec.ac.uk/blog/plugging-the-data-gap-freelance-and-self-employed-workers-in-the-creative-industries>

Parkinson, C., Prof Speed, C., Prof Terras, M. and Somerville, R. (2020). Developing Data-Driven Innovation in Creative Industries: White Paper <http://dx.doi.org/10.7488/era/507>

Speed, C., & Disley, M. (2021). Intra-actions in data-driven systems: A case study in creative praxis. In N. Lushetich, & I. Campbell (Eds.), Distributed Perception: Resonances and Axiologies (1 ed.). (Routledge Studies in Science, Technology and Society). Routledge. <https://doi.org/10.4324/9781003157021-14>

Terras, M., Coleman, S., Drost, S., Elsdon, C., Helgason, I., Lechelt, S., Osborne, N., Panneels, I., Pegado, B., Schafer, B., Smyth, M., Thornton, P., & Speed, C. (2021). The value of mass-digitised cultural heritage content in creative contexts. Big Data & Society. <https://doi.org/10.1177/20539517211006165>

Upton, L., Speed, C., Osborne, N., & Schmeisser, S. (2021). Creative Informatics Annual Report 2021 (1.3 (digital) and final print version). Zenodo.
<https://doi.org/10.5281/zenodo.5211661>

Upton, L., Terras, M. Osborne, N., Orme, A., Speed, C., Oliver, R., Chan, K., Talley, A., Bates, C. & Lunn Creative. (2022). Creative Informatics Annual Report 2022 (1.0). Zenodo.
<https://doi.org/10.5281/zenodo.7040658>

Valeonti F, Bikakis A, Terras M, Speed C, Hudson-Smith A, Chalkias K. Crypto Collectibles, Museum Funding and OpenGLAM: Challenges, Opportunities and the Potential of Non-Fungible Tokens (NFTs). Applied Sciences. 2021; 11(21):9931.
<https://doi.org/10.3390/app11219931>