StoryFutures

CREATIVE INDUSTRIES CLUSTERS

FINAL REPORT 2024

StoryFutures

ROYAL HOLLOWAY UNIVERSITY OF LONDON

Creative Clusters

UKRI Arts and Humanities Research Council

INDUSTRIAL STRATEGY

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DIRECTOR'S STATEMENT

StoryFutures: a portmanteau of 'Story' and 'Futures'.

StoryFutures was designed to evoke an idea that the stories of tomorrow may be told in new ways, through novel technologies and techniques, and yet, will remain 'stories' – ultimately judged by whether they reach and engage an audience. In looking ahead to tomorrow, therefore, there was plenty to learn from thousands of years of practice – practice that had, for the UK, underpinned one of the most successful business models and sectors in our economy – creative IP.

As we set out in the report that follows, we hope that we have made an important impact on the future of storytelling and the economies that are built around it.

A fabulous team of incredibly hard-working staff at StoryFutures has helped write our chapter in this story – a massive thank you to all of you, particularly the leadership team who took on the challenge of forging a truly interdisciplinary environment that relentlessly looked outwards to industry engagement and doing things differently to business as usual.

But StoryFutures would not have been possible without the support from our creative industries partners and the AHRC – to whom we owe a huge thank you for the risks you took and endeavours you shared. That alchemy of fabulous core staff and amazing partners is a crucial ingredient for the success of any project which, like StoryFutures, sets out to tackle a 'never been done before' challenge – embarking on a story without a table of contents to guide us.

This final report from the StoryFutures Clusters project is therefore our contribution to the future of innovative storytelling: a guide for those who might follow. Over the past 5 years we have created nearly 150 projects that explore the story forms, business models, workflows and audience experiences of 'next-generation storytelling' – and yet, as we see the rise of generative AI, the future of stories remains as compelling an area for R&D and innovation as when we began.

What follows shares the lessons we have learnt in the spirit of enabling future clusters or collaborative R&D projects to borrow what is useful from our experience, discard what is not and hopefully even tear up and challenge what has come before.

The future of stories is, after all, unwritten.

Professor James Bennett
Co-Director, StoryFutures

EXECUTIVE SUMMARY

> "This Committee undertook a visit to StoryFutures, one of the clusters in the Creative Industries Clusters programme, to inform this report. Businesses stated that having the support of universities provided a degree of reassurance to investors that made them a stronger proposition for investment. Academics noted that the Clusters programme created new incentives for applied research relevant to commercial applications that did not otherwise exist. The Committee heard that the level of private co-investment had significantly exceeded the programme's original targets."
>
> House of Lords Communications and Digital Committee, 2nd Report of Session 2022-23, *At Risk: Our Creative Future,* 17 Jan 2023, p. 66

StoryFutures was part of the Arts & Humanities Research Council's (AHRC) Creative Industries Clusters Programme. It was led by Royal Holloway, University of London and fundamentally designed to help creative industries in the region develop next-generation storytelling experiences. Through an overarching aim to broker and structure collaborative R&D projects between industry and research, StoryFutures promised to enable screen and CreaTech companies to develop new products and services as well as workflows and business models that can engage audiences in novel and commercially viable experiences. Four objectives defined this mission:

1. Drive Innovation: Enable cluster companies to undertake risky, cross-sector innovative product and service development;
2. Fuel Economic Growth and Jobs: Grow IP and jobs by brokering collaborative partnerships, supporting prototypes and pilots to reach audiences and enable companies to access further sources of funding and finance;
3. Network Cluster Connectivity: Strengthen collaboration and networking amongst Gateway Cluster screen and CreaTech industries and work to overcome geographic dispersal;
4. Grow Next Generation Talent: Support next-generation of diverse innovators in story and technological form, particularly at PhD and Early Career Researcher stage.

To deliver this, StoryFutures brought together the region's Higher Education Institutes (HEIs), namely the National Film and Television School, UCA and Brunel University, as well as world-class creative partners (Pinewood and Sky VR) and games studios, such as N:Dreams; cross-sector major regional economic players, such as Heathrow and our Local Economic Partners; and, finally, national trade body support from Pact, Ukie and British Screen Forum. StoryFutures was organised around four R&D themes: Story; Business; Data and Audiences – working across the creative production pipeline to help companies explore new technologies from conception to fruition. This approach helped us work with companies to consider not just what new and novel storytelling experiences could be created, but also where audience value lies and how could business models be developed to exploit this.

As part of the Creative Industries Clusters Programme, StoryFutures was conceived within the framework of the Government's Industrial Strategy Challenge fund, itself stimulated by the 2017 Bazalgette review of the Creative Industries. As UKRI explain, the Bazalgette Report identified two key innovation challenges facing the sector (see here) - https://assets.publishing.service.gov.uk/media/5a8219cfe5274a2e8ab577f4/Independent_Review_of_the_Creative_Industries.pdf

> Firstly, it lacked access to the high-quality research and innovation to drive growth through the development of new technology-enabled products, services and experiences; and secondly, immersive technologies (virtual, augmented and mixed Reality, virtual production technologies and haptics) offered both, significant opportunities for the UK creative industries as well as a potentially disruptive wave of innovation that could threaten the competitiveness of the UK's world-class screen and performance sectors (Smith, Chitty & Meller, 2021 p.45)[1].

Underpinning the Creative Industries Clusters Programme was a simple, yet compelling hypothesis 'that investing in applied research and innovation in established creative clusters can achieve a measurable increase in economic growth through increased participation in R&D by Creative Companies' (Smith, Chitty, Meller, 2021).

[1]A Deep Dive into the Creative Industries: UKRI, 2024 [Internal Use Only]

As the House of Lords Committee recognised, the StoryFutures test of this hypothesis proved positive: engaging over 1,000 companies and creating 142 R&D projects, StoryFutures created or saved over 350 jobs and leveraged over £16million in co-investment in creative industries R&D. Perhaps most significantly, as we explain below, this investment came almost equally from industry, research funders and higher education institutes. At the start of the clusters programme, such a co-investment profile would have been unheard of – particularly for a project focused on the future of stories.

If the creative sector is often referred to as a 'relationship business', then perhaps the most impactful work of StoryFutures has been to help reconfigure that relationship amongst universities, research funders and creative industries. Through the programme, universities acted as an anchor and catalyst for the development of the creative industries in the cluster to provide a network of access to R&D across the region and a variety of entry points to StoryFutures programmes. In so doing, our partner companies told us that it was not only through structured and funded R&D programmes that StoryFutures created value – it was as crucial for the 'value of the relationships they foster and innovation they unlock'. StoryFutures enhanced and facilitated the exchange of skills, knowledge and expertise required for SMEs to develop innovative products and services. The programme contributed to developing long-term strategic partnerships and improved cluster connectivity by fostering cross-sector and regional networking.

As StoryFutures Creative Industries Clusters Programme ends, this report sets out the impact, achievements and lessons of the funding programme (2018-2024). StoryFutures will continue to operate as a Strategic Business Unit at Royal Holloway, University of London, continuing to build collaborative R&D projects and programmes, but our role will no longer be charged with the specific creative clusters remit outlined above. As such, we hope this report can inform the development of future clusters – whether in the same subsectors and region, or beyond. The report is structured around lessons relating to benefits that the Clusters programme was designed to achieve with a short guide at the back of the report to the huge variety of learnings we have taken forward to the future of our R&D delivery for, and with, the creative industries.

HIGHLIGHTS

Over 5.5 years, StoryFutures managed to significantly over-achieve on nearly all KPIs. At the outset of an unprecedented investment in creative industries R&D collaboration, it was, however, difficult to predict the appropriate size and scale of KPIs. Thus, we were unable to meet the targets associated with the total number of companies engaged and researchers placed in industry. We discuss the reasons for this in Chapters 3 and 4 and hope that the lessons there ensure that future Clusters set targets that are informed by the challenges we experienced in meeting these.

Overall, however, we enabled nearly 100 companies to take part in R&D programmes, enabling one third of these to develop new export opportunities. In so doing, we created or saved over 350 jobs – more than 640% of our target; and leveraged over £14m in co-investment – more than 200% of our target.

KPI	TARGET	TOTAL	ACHIEVED
SMEs Participating in R&D supporting Story Futures - doing things with them	84	98	
R&D projects between HEI, CI Micros, SMEs & Large Businesses - where companies come in with a specific challenge looking for R&D collaboration	155	142	
Companies' engagement with Cluster[2]	1450	1060	
HEI industry placements for PhDs & ECRs in CI companies[3]	26	13	
Early career researchers involved in R&D activities	10	16	
New & saved jobs	56	374	
New products, services, experiences or IP	40	64	
SMEs reporting new export opportunities	21	30	
Leveraged co-investment	**£7,063,019**	**£14,239,235**	

[2]We discuss Cluster engagement, the shape and size of the cluster in Chapter 4.
[4]We discuss placements in Chapter 3.

Work supported by StoryFutures has been selected for international awards and festivals, including:

- EXIT Suit: EXIT Suit - Best in Show 'Awesome' Award' (Silicon Valley Awe Awards 2023).
- Hatsumi: Connect XR – Special Jury Prize in the XR Experience (SXSW 2024).
- Keeper of Paintings: Nominated for Best Experiential Design Metaverse, Immersive & Virtual (The Webby Awards 2023).
- Figment: Current Rising – Out-of-Home VR Entertainment of the Year (XR Awards 2021).

StoryFutures collaborated with StoryFutures Academy to create StoryTrails: The People's Metaverse, as part of UNBOXED 2022. StoryTrails became the UK's largest immersive storytelling project to date, reaching over 100,000 live audiences, and has been recognised at a number of prestigious awards. Crucial to the success of this project was the StoryFutures partnership with the BFI, researching long-term engagement, habits and preferences of users with virtual reality.

- Winner: Best Use of Digital - UK (Museums + Heritage Awards 2023).
- Honoree: Metaverse, Immersive & Virtual - Diversity, Equity & Inclusion (Webby Awards 2023).
- Nominee: Best Immersive (SXSW Innovation Awards 2023).
- Finalist: Times Higher Education Research Project of the Year (Arts, Humanities and Social Sciences, 2023).
- Winner: Use of Archive (FOCAL Awards 2023).

"Access to blue chip clients is really key because as a start-up, we wouldn't normally be able to reach them. StoryFutures was able to marry up our skillsets with industry partners. Plus, we benefited from the networking – we built a relationship with other firms who we had been pitching against... with complementary skills like AI and mobile AR. We've brought them into our work and vice versa."
Mark Cundle, Austella - Digital Content Development Studio

"StoryFutures is a good platform to connect with heritage and commercial companies. The approaches to immersive storytelling pave the way for innovation."
Hannah Platts - Ancient Historian and Archaeologist, Royal Holloway, University of London

"StoryFutures really know their business and offer advice. That's extraordinarily helpful for a start-up or someone trying to launch a project in this field. There are so many out there claiming they know how to change the world in the tech sphere, but [StoryFutures] actually know their stuff. I had a fairly good idea of how it would work, but what they helped with was detail on what needed to happen to get the project going. On fundraising and to get a demonstrator. They understood what that meant and the language needed to make everyone understand the vision."
Louisa Grasso - Music Archive Gallery

"I have nothing but glowing praise and recommendation for StoryFutures. They have all that experience and understanding around technology, around narrative and storytelling, but then also around audience and audience psychology as well [...] it's a really well-rounded organisation."
Mimi Harmer - Factory 42

"It was super valuable for us to be able to have that support around us, [StoryFutures] have been really wonderful supporters of our work."
Olivia Hinkin - Arcade

"StoryFutures is a flagship for interdisciplinary collaboration, connecting academia, SMEs and cultural organisations."
Professor Niki Panteli - Royal Holloway, University of London

Finance

One of the primary aims of StoryFutures was to develop an R&D programme that was co-financed through research funding, university funding and industry funding. The initial Creative Industries Clusters Programme award to establish StoryFutures was £6.4m, which catalysed a further £16,549,646 of co-investment in creative industries R&D. Our approach was to utilise research and university funding to de-risk investment from industry – often acting as the first 'money down' to facilitate the top of the 'innovation funnel' to kick start an R&D journey. The result was that the overall co-investment was shared roughly equally between three sources of funding: Higher Education Institutes [37%], Research Funding [29%] and Industry Funding [34%].

This funding took two forms:

(1) R&D co-investment: Co-investment came in two forms, cash and in-kind, and predominantly from two different kinds of organisations, large organisations and SMEs. Cash investments were largely made by large organisations acting as 'Challenge Setters' in StoryLab, or Fellowship R&D programmes discussed in Chapter 1. These cash investments enabled large organisations to play a stimulating role in R&D for creative SMEs who would own the IP in the results but provide a licence for use to the Challenge Setter. In-kind investments from SMEs enabled them to make substantive commitments to R&D without cash expenditure – for example, in the form of foregone overheads and profit margins, discounted day rates or free use of facilities/ services/licences as part of the collaboration.

(2) Follow-on funding: Follow-on funding helped develop innovation prototypes through to products, markets and commercialisation. Significant successes in this regard included:

- Early-stage paper prototyping with Figment Productions led to *Current Rising* – the UK's first immersive opera made in collaboration with The Royal Opera House. Figment received nearly £1m investment from Innovate UK's Production Innovation for Immersive Content competition.
- Smartify received £1m capital investment from Pembroke VC to expand into the US market, supported through business modelling research and iterative R&D development of their app.
- Following on from the Immersive Fellowship Programme, Valkyrie Industries have since secured additional investment of nearly £400,000 through crowdfunding on CrowdCube and an XR4ALL grant.

Benefits

The Benefits Map (Figure A) was developed with the AHRC to guide the Creative Clusters Industries Programme's monitoring, reporting and evaluation. It provides a clear guide for targeting and measuring impact.

To help both, map our impact and act as a guide to lessons learnt for future Clusters' programmes, we have structured this report to reflect the 5 benefits:

1. **Creation of an environment for new & experimental creative content, products, services & experiences**
2. **Generation of long-term strategic applied research partnerships**
3. **Access to Knowledge, Expertise & Skills**
4. **Key Place-based/Sector issues are addressed**
5. **Economic & Social benefits are addressed**

In addition, we will also be discussing themes of sustainability/green innovation and Equality, Diversity & Inclusion (EDI) in Chapters 6 & 7.

CHAPTER 1
LESSONS IN R&D ECOSYSTEMS

KPI	TARGET	TOTAL	ACHIEVED
SMEs Participating in R&D supporting Story Futures - doing things with them	84	98	
R&D projects between HEI, CI Micros, SMEs & Large Businesses - where companies come in with a specific challenge looking for R&D collaboration	155	142	
Companies' engagement with Cluster	1450	1060	

Benefit 1: Creation of an environment for new & experimental creative content, products, services & experiences

If R&D is the 'engine room' of innovation, many SMEs struggle to engage effectively with it – lack of time and money to do so being key barriers. For many, R&D happens on the fly, funded from and within client projects and, consequently, the learnings from that R&D are lost and/or not capitalised on. Further, and unsurprisingly in the context of poor business model understanding, SMEs do not employ systematic practices for making the most of what results from their R&D efforts – readily acknowledging that they do not have the expertise or infrastructure to capitalise on R&D. This results in an inability for SMEs to be as creative as they want: that is, if innovation is the successful implementation of creative ideas, then the R&D initiatives that are seen all the way through to implementation are few and far between.

One of the most significant interventions of the Creative Industries Clusters Programme more widely, and StoryFutures in particular, has been the implementation of structured programmes of R&D that provide creative ideas with a funnel, or pipeline, to better navigate the route from idea to market. In this chapter, we set out some of the approaches taken to create an environment where SMEs felt able to experiment with new creative content, products and services. Our programmatic initiatives included:

StoryLab: A challenge-led model designed to build networks, foster collaboration and work in structures familiar to SMEs, such as commissioning and pitching.

Fellowships: Longer-term projects that are 'bottom-up', rooted in SMEs' ideas, giving them space and support to flourish.

R&D on Demand: Facilitating SMEs 'access to research expertise for quick turnaround projects that often stimulate longer-term collaboration.

StoryLab

StoryLab served as an open innovation architecture designed to address specific challenges that are barriers to growth across the creative sector – rather than specific R&D problems of an individual organisation. StoryFutures' focus on next-generation storytelling technologies and experiences ensured that StoryLab was primarily focused on barriers to adoption in immersive technologies for audience-facing experiences: what were the *scalable* unique selling points of immersive storytelling that SMEs and large organisations could leverage? In this regard, StoryLab was focused on technologies that were near to market – virtual and augmented reality – which were in need of a 'killer app' to cut through a variety of audience 'frictions'.[4]

As a methodology for enabling innovation and building R&D ecosystems, StoryLab's purpose has been to facilitate collaboration between researchers, SMEs and large organisations, known as the 'Challenge Setter' (such as Heathrow, The National Gallery and Discovery).

StoryLab is a two-stage commissioning process:

1. An open call leading to a pitching and commissioning event that allows shortlisted SMEs to pitch their proposals and early concepts, working with stakeholders and researchers to discover more about the R&D challenges, and to define and assess initial responses.
2. One of these SMEs is selected and contracted to develop and deliver a prototype to meet the brief. This is funded by production budgets from the Challenge Setter, StoryFutures and the winning company's in-kind contribution.

StoryLab therefore represents the entry point to an innovation funnel that ultimately ends with one prototype being released into a real-world setting, tested and validated through audience insight research. By offering significant networking and client-relationship building events, as well as a paid development opportunity in both stages, StoryLab provides familiar frameworks to SMEs to undertake the less familiar programme of structured R&D.

This commissioning process is then followed by two further stages of production and evaluation:

3. The R&D prototype production itself, which follows a double diamond methodology, moving through the discover, define, develop and deliver phases (British Design Council, 2016).
4. Evaluation, a process subsequently carried out by the StoryFutures Audience Insight Team who, crucially, take part in the stage 1 process of forging a collaborative R&D production: from the outset, all parties agree on the goals they are aiming at and how success can be measured.

Beyond providing funding to SMEs, StoryLab acts as a catalyst for attracting relevant financial support – at the outset, leveraging co-investment from the Challenge-Setter to fund prototype production, supported through further in-kind guidance throughout production and a clear route to market. The initiative has excelled as a dynamic model, with each instance of StoryLab exploring how open innovation can efficiently mobilise resources to address the given challenge.

StoryLab has been StoryFutures' most pre-eminent example of how the Creative Industries Clusters Programme provides a structured R&D framework to enable not just one company to grow, but also develop an ecosystem in which large and small players mix, network and engage with R&D. Partnering with 'blue chip' Challenge-Setters helps to create a beacon that attracts SMEs to R&D opportunities. The programmatic approach to R&D serves as a guiding force for SMEs when partnering with these large challenge-setters and helps to drive the development of new, commercially viable, immersive products and services.

CASE STUDY | STORYLAB'S ECOSYSTEM IMPACT

The impact of the creation of value networks was exemplified when a global brand Costa Coffee delivered on their aims to incorporate recycling into their takeaway services, by collaborating with Heathrow as challenge-setters in one of our initial StoryLab Challenges in 2019. The task involved creating an immersive experience aimed at boosting recycling practices of the public at a Costa Coffee outlet situated in a Heathrow Airport terminal. Austella was one of the companies introduced to global brand Costa Coffee during an StoryFutures-run StoryLab. Though they did not win the original commission, 2 years later, as a direct result of having met during the programme, Austella was commissioned by Costa to develop a 1st stage prototype using blockchain technology (BURT: Borrow, Use, Reuse and Take back) as the basis of a coffee cup recycling initiative. The growth of the company through BURT led to Austella being acquired by the US digital firm SmartMedia Technologies as part of a wider 8-figure investment portfolio in Autumn of 2022. This substantial investment highlights the impact of the value networks created within StoryFutures programmes, whilst underscoring the effectiveness of StoryFutures programmes in empowering SMEs to engage with larger partners to develop successful products and services, ultimately leading to additional investments and global prospects for the SME.

In-Depth: The Keeper of Paintings

The Keeper of Paintings and Keeper Council experiences are notable due to the additional advantage of cultivating such an environment within an international context. These R&D innovations were made possible through StoryFutures' Creative Cluster grant, providing a foundation for a new AHRC project grant – 'StoryFutures China' led by Brunel University – alongside leverage funding from The National Gallery and in-kind contributions from the challenge winners Arcade.[5]

Our StoryLab established a challenge for SMEs to create an immersive prototype to be integrated into the permanent collection and provide a model on how to elevate visitor experiences in museums and cultural institutions. Additionally, the project aimed to foster the creation of novel business models, tap into export markets and strengthen cross-border cultural exchange between the United Kingdom and China. Building a wider partnership outside the UK that involved Shanghai's Tongji University and Foremost, a Chinese digital production studio, StoryFutures China united two globally renowned cultural institutions—The National Gallery in the UK and Shanghai Science and Technology Museum in China.

The 4 key challenges of the StoryLab brief for companies to respond to were indicative of wider barriers to growth in the emerging immersive content creation sector – including the need to develop international markets and companies' own IP:

- Delivery of a child-led learning experience that could demonstrably show the value of immersive experiences through family visitor metrics at The National Gallery;
- Devising a technological approach to working with The Gallery's permanent collection to ensure coherent and consistent experiences on-site;
- Creating an approach to work on and off-site (in the context of the pandemic);
- Developing a technology and creative approach that was suitable for international export and/or co-production for the Chinese market.

The winning SME, Arcade, were supported to develop two linked outputs co-created with children and their families;

1. An immersive AR experience for on-site use (The Keeper of Paintings).
2. A remote component created within and accessible via the Roblox game (The Keeper Council).

The first output involved creation of a game-styled augmented reality app (The Keeper of Paintings). This is an immersive adventure that provides children with additional layers of informational depth and emotional engagement with items in The National Gallery by revealing the stories behind them. This highlighted the immense value of such cultural institutions to new audiences, enabling institutions to increase visitor enjoyment and engagement with the institution's purpose: for example, the project showed significant educational benefits outlined by positive changes in children's attitudes around learning about art, as well as an estimated increase in knowledge about art.

The second prototype (The Keeper Council) was designed to test how cultural institutions engaged with users remotely, during and after the Covid-19 pandemic. Insights for shaping these experiences were derived from creation sessions and targeted discussion groups in both regions.

Co-design as a catalyst for experimental innovation

Co-design, a subset of participatory design, is a diverse family of methodologies that promote productive, reciprocal and collaborative relationships between different communities of use and design researchers, engaging end-users in core design processes (Druin, 2002; Van Mechelen, 2016). The methodology adopted was to develop a Children's Advisory Group (CAG), placing children's opinions and perspectives at the centre of design research, on par with opinions and perspectives of adults (Allison & Prout, 1997; Qvortrup, 2009). Various studies suggest that cultural institutions that invite children to co-determine the design of spaces, exhibitions and technologies are able to better attract young visitors (Birch 2018; Hackett et al. 2014; Hall and Bannon 2005). It is, however, rare for cultural institutions to work with children as design partners.

[5]The Keeper of Paintings was commissioned by the National Gallery, London and StoryFutures, Royal Holloway, University of London as part of StoryFutures China, a research and development project funded by the Arts and Humanities Research Council (AHRC). StoryFutures China was led by Brunel Design School, Brunel University London.

The CAG in the UK consisted of 16 children aged 7-11, participating in regular online workshops, recruited through StoryFutures' outreach. Additionally, over 500 children and parents provided feedback through UX testing. The same method was used in China, where 15 children aged 7-11 from different parts of the country participated in three online workshops, providing crucial insight into how the Keeper concept would resonate with Chinese audiences. By placing children at the core of the R&D process as co-creators, and testers, StoryFutures was well-positioned to gather valuable data from users.

This child-led approach spoke to the Shanghai Science and Technology and Museum (SSTM) and The National Gallery's aims to target younger demographics and, ultimately, increase engagement. In China, there has been a longstanding emphasis on attracting young visitors to cultural institutions, with 49% of audiences under 18 for the SSTM in 2018 (SSTM, Annual Report, 2018). In the UK, The National Gallery outlined its aims to reinvigorate interest and enhance engagement with young people and children through digital technologies (The National Gallery Strategic Plan: 2021-2026, 2021).

A direct result of this co-design research process was the creation of an innovation prototype itself: The Keeper Council Roblox experience. Due to the Covid-19 pandemic, the CAG worked remotely for most of the project, exploring the world of Keepers on the Roblox platform, imagining how they would access it in real life but also seeking to innovate on what a virtual National Gallery built by and for children would feel like. The children's creativity and enthusiasm informed the on-site AR game experience but also developed into a Roblox game in its own right: The Keeper Council.

Testing in a real-world environment: The Keeper of Paintings release at The National Gallery

As part of a structured R&D process, StoryFutures offered in-depth user testing in real-world environments to deliver crucial audience insight, which supported the creation of effective prototypes. 95% of participants rated *The Keeper of Paintings* experience 4 or 5 stars (out of 5) and overall visit times increased by 40 minutes (compared to 'regular' Gallery visits without the AR experience). Findings also demonstrated a clear effect on overall enjoyment, with 29% of children being 'proactively engaged' in contrast to just 9% of 'regular' visitors. In addition, the project showed significant educational benefits evident in positive changes in children's attitudes towards learning about art, as well as an estimated increase in knowledge about art compared to estimations made by parents of 'regular' visitors. Visitors also spent significantly longer on-site when using the app.

For more results on the audience experience of *The Keeper of Paintings*, see here: https://www.linkedin.com/posts/lawrencechiles_ar-immersive-activity-7135920295734882305-6FP9?utm_source=share&utm_medium=member_desktop

Arcade: The SME's Onward Journey

The outcome for The National Gallery was the creation of its first interactive digital experience (explicitly crafted for families) that can be seamlessly integrated with the permanent collection. Initially envisioned as a one-year offering, the project's success prompted the Gallery to allocate additional funding to ensure the continuous operation of The Keeper of Paintings for the foreseeable future. The experience will also be included as a substantial part of The Gallery's Bicentenary celebrations in 2024: with one project launching this summer as part of the Art Road Trip and another one launching at the end of the year.

Moreover, the focus on international development and addressing sector-wide challenges around enabling SMEs to create and own IP in immersive content enabled Arcade to develop and sell the Keepers concept as a format to other buyers. In the UK, this has included the sale and development of an AR experience 'The Keeper of Measurements', to the National Physical Laboratory, with other buyers in ongoing negotiation. Such IP-based sales are crucial in order for the immersive content-creation economy to grow and thrive.

> "The support that [StoryFutures] offered has been invaluable in taking off some of those project constraints. The management load off of us just meant that we were able to devote as much time as possible into making the creative as good as possible [...] providing us with all of those insights really made some substantial benefits - even as we were getting close to the launch, we were continuing to iterate and get feedback, and because there was such substantial support around us, we were able to do that."
>
> Jon Meggitt - Co-Founder, Arcade

Notably, The Keeper of Paintings earned a Webby nomination in the category of Best Experiential Design for the year 2023.

Value Networks

> "To go on and work with people like Digital Catapult and the British Museum, and some other massive heritage organisations like Glastonbury Abbey, [The 'Keeper' project] informed our credentials to be able to prove to those vendors that we'll be able to do this work justice, because we've got such a good proof of concept, further validated by the fact that The National Gallery took it beyond pilot stage after it had been running for a year."
>
> Jon Meggitt - Co-Founder, Arcade

For Arcade, *The Keeper of Paintings* provided multiple routes for the company to grow. The project also forged several important value networks. Whilst not as successful in building transnational collaborations as originally hoped for (The Keeper of Birds, built by Foremost in China was never released, owing to changes in management and priorities of the Shanghai Museum group), StoryFutures China enabled:

- 4 SMEs to take part in workshops on exporting and collaborating with China, including advice on IP, tax, co-production treaties and where to find support.
- 6 SMEs to undertake paid development projects with the Children's Palace located at the Technology Museum in Shenzhen.

R&D on Demand: Enabling early-stage project development

The R&D on Demand (R&DOD) programme was focused on unlocking domain-based university research expertise to facilitate early-stage relationship building between SMEs and academics, with the intention of creating an environment for experimentation and developing longer-term R&D collaborations. Up to £5k in financial support was made available to SMEs and a further £10k in-kind of university researcher time to provide access to academics from Royal Holloway, University of London, Brunel University and the University of Creative Arts:

1. Audience insight and testing of prototypes with users;
2. Support in business development and business modelling;
3. Collaboration on data and production tool development;
4. Story form development: technology and advice for creating and testing great stories.

CASE STUDY | REALITY CHECK PRODUCTIONS – 'THE ROUND'

Reality Check is an XR reality production studio that seeks to address challenges around the creation and distribution of performing arts experiences by exploring the creative potential of immersive mediums. 'The Round' was an augmented reality theatre distribution platform aimed at theatre creators and audiences, focused on extending the engagement of live theatre to broader, non-location-based audiences. StoryFutures facilitated the collaboration between Reality Check Productions and academics from drama and psychology, Prof. Helen Nicholson and Dr Elisa Ferré, who provided knowledge and insight. Together, they explored the impact of AR on user experience and the importance of shared experiences in virtual performances. The Round acted as a successful proof of concept, enabling Reality Check to develop the platform further through Digital Catapult's 5G Accelerator Programme with the help of EE. This resulted in the creation of a digital avatar of Liam Payne for EE's 2021 BAFTAs marketing campaign, showcasing 'The Round' to a wide audience. The platform has since gained traction, addressing the challenge of extending the reach of live performances and receiving coverage in notable publications.

> **"We wanted to bring theatre to life in a new way using technology that we all have at our fingertips. Creatives have the imagination and drive to produce these ideas, but not the tools to make it happen. What The Round does is bring a new way to enhance the physical theatre/artistic expression and another means to generate revenue from it."**
> Pip Brignall - Co-Founder, The Round

CASE STUDY | EXIT SUIT

An R&D on Demand grant enabled a collaboration between EXIT Suit's Willie Warren, Dr David Young, RHUL's lecturer in Digital Media & Technology, and Kai Lab to develop the first working prototype of the EXIT SUIT: the world's first commercially-available full-body performance suit for VR environments. Dr Young provided academic games engine research support, including creating an Application Programming Interface (API), which allowed for communication between the physical suit and virtual worlds:

EXIT SUIT has successfully delivered its first fully modular and open-source haptic-feedback suit designed for virtual reality, which allows immersive enthusiasts to build their own.

The prototype has garnered significant attention in the industry and amongst popular content creators (see here - https://www.youtube.com/watch?v=fS1CuhqUG0I). Moreover, the EXIT SUIT received an Auggie Award (the AWEsome award for Best in Show) at AWE USA, the prominent international XR expo held in California. Building on this success, Willie was invited to showcase a new version of the design at the AWE Europe 2023 Expo in Vienna in October, offering a glimpse of a commercial edition of the suit adapted for use in Location-Based Entertainment venues (LBEs).

> **"I came across StoryFutures at a time when I faced challenges advancing my project. I had a functional body support system and a solid understanding of its potential, but I required funding and specialised assistance. They generously provided me with R&D funding to bring the project to a stage where its potential could be more readily grasped."**
> Willie Warren - Owner, EXIT SUIT

Immersive Fellowships: Providing Blue Skies Time for SMEs

As part of the StoryFutures Immersive Fellowships, SMEs answered open invitations to join Fellowship programs that would provide funding for them to allocate time to innovative 'blue-sky' thinking. Rather than responding to 'top-down' challenges in the StoryLab model, Fellowships allowed for 'ground-up' approaches that developed ideas from within SMEs. Academic specialists provided domain-specific knowledge throughout this process to develop a collaborative R&D project. Immersive Fellowships mitigated company risk in investing in R&D by contributing to ringfencing time for staff to work on experimental innovation projects.

CASE STUDY | VALKYRIE INDUSTRIES

Established in 2017, Valkyrie Industries is an SME at the forefront of developing haptic wearables to be integrated into virtual reality experiences. They took part in one of our Fellowship programmes in 2021, along with academic leads Dr Birgitta Hosea and Dr Camille Baker from the University of Creative Arts. Together, they sought to develop a prototype for a functional VR sculpting software that would closely match the experience of sculpting in 'real life'. Over the span of 4 months, the team managed to achieve the following:

1. A new fully-functional VR sculpting app that was accessible on SteamVR-enabled HMDs and Oculus Quest and allowed natural sculpting of 3D organic objects.
2. An experimental version of the sculpting tool that uses hand and finger tracking (working with Oculus Quest and Valkyrie Industries gloves).
3. Proof-of-concept of using fully functional Valkyrie haptic gloves for sculpting: providing finger tracking and simple haptic feedback in the fingers.

Following on from the fellowship, the impact is clear. Valkyrie Industries have since completed pilots for BMW and UK Space Agency; secured additional investment of nearly £400,000 through crowdfunding on CrowdCube and an XR4ALL grant; been shortlisted for the GoTech Awards: Jumpstarter; and delivered a masterclass under the StoryFutures banner at The Festival of Digital Disruption 2020. The following year, they produced a new product, Argil. Taking inspiration from real-world sculpting techniques, the Argil experience provides an intuitive environment for the rapid and efficient crafting of organic 3D objects. The full product was made available on Steam and Valkyrie in 2021.

Chapter 2
LESSONS IN R&D PARTNERSHIPS

Benefit 2: Long-term strategic applied research partnerships

As a result of the R&D projects, training and funding opportunities offered through the Cluster programme, StoryFutures has forged a series of long-term research partnerships with SMEs and challenge-setters. These lasting partnerships have been achieved and sustained by drawing partners into a close relationship focused on a shared set of priorities and research goals that can invigorate, cultivate and mutually benefit all parties. Here, we detail the partnerships developed with both, large and small players: the BFI, The National Gallery and an SME, Figment.

Partnership with the BFI

The BFI was one of the founding cluster partners for StoryFutures, providing staff time to collaborate on research into audience adoption of virtual and augmented reality, and the potential offer to become a StoryLab challenge-setter. As those technologies gained early traction, thanks to the advent of the Quest and HTC Vive headsets, there was a strong interest from linear media organisations to understand how audiences might engage with and respond to new story forms and experiences – collectively, physiologically and emotionally. Understanding any changes in youth audiences was particularly important. Commencing with a long-range research project on this demographic, the StoryFutures x BFI relationship has turned into one of the most important and long-lasting of the Cluster programme. It deepened ties, resulting in the establishment of 7 VR Xperience Hubs across the UK, funded via the BFI awarding National Lottery funding.

> "Because of our partnership with StoryFutures and the strength of their leadership, we're all continuing to learn and understand the potential of this medium, which is daunting. But this research has given us the confidence to find ever new ways to collaborate and reimagine what we can do."
>
> Ben Luxford - Director of UK Audiences, BFI

Youth Audiences: MASSIVE Study

The audience team undertook a pilot longitudinal research project in 2020, providing loaner Quest headsets to 32 students for 10-12 weeks to understand how young audiences engage with VR headsets as part of their daily lives and media consumption habits.

With the BFI, we developed a second longitudinal project, aiming to recruit a more geographically and ethnically diverse group of young people between the ages of 16 and 30, from April to September 2022. 55 diverse young people from across the UK were recruited by MASSIVE, a BFI funded programme promoting British film to young, diverse audiences. With a donation of 60 Quest 2 headsets from Meta, each participant was provided with a headset for 6 months and a £23 Oculus voucher to purchase content from the app store. Following this, they were given a series of weekly tasks of which they completed a minimum of 10 tasks (of a total of 28 possible tasks), in order to be eligible for a £50 gift certificate at the end of the study. The tasks focused on certain genres and themes, such as social VR, VR film platforms, visual art in VR, creativity tools, gaming conventions and new ways of seeing. They covered a variety of content, including linear and interactive pieces and 360° video, followed by a series of closed and open-ended qualitative questions through a survey. We also invited the most active participants to take part in interviews and additional studies.

Through the BFI partnership, we learnt how VR related to young audiences' consumption habits and leisure activities. The student study revealed 'frictions' in home use of VR that acted as barriers to VR adoption. These included a lack of varied and interesting content, lack of sufficient space in the home for a 2m x 2m play area, perceptions of headsets being 'unsociable' the time commitment required to set up, frustration with not being able to multitask (to check messages on their mobile phones, for example) and the physical and cognitive toll of interaction, which limited most people's engagement time to a range from 15-40 minutes. In addition to well-known physical side effects of VR, such as eyestrain, headaches, nausea and fatigue, participants also indicated that the transition between virtual and physical space could be "a bit jarring" or mentally exhausting. The participants of the MASSIVE study were film enthusiasts, and, like the student group, largely VR novices. Three key findings about their experience with VR included the role of the sense of self, the use of VR for escapism and wellbeing, and a desire for different business models, notably a subscription model to experience different content[6].

[6]Whittaker, L. (2023) 'Onboarding and offboarding in virtual reality: A user-centred framework for audience experience across genres and spaces', Convergence: International Journal of Research into New Media Technologies, p. 13548565231187328. Available at: https://doi.org/10.1177/13548565231187329.

Finally, the BFI partnership enabled a detailed study of the BAFTA-winning filmmaker Asif Kapadia's virtual reality animation *Laika*, giving audiences the chance to be immersed in the real-life story of the first dog in space. Beyond the creative achievement of the film, it was designed to test a novel distribution scenario – after screening as part of the BFI London Film Festival in autumn 2021, it was taken on tour to cinema venues across the UK in spring 2022. It was screened via synchronised screenings to audience groups in cinema seats as an experiment in scalable VR experiences. Audience research on this scenario also revealed several benefits: 64% of people indicated they would prefer to view such content communally rather than alone; fixed cinema seating provided some audience members a sense of security and familiarity; and audience members appreciated the ability to view this kind of content without having to own a headset. *Laika* has gone on to be an audience favourite in the Xperience programme (below).

StoryFutures Xperience

Drawing on further partnership with Meta, who provided StoryFutures with their largest-ever donation of VR headsets in 2021, StoryFutures partnered with the BFI to establish 7 cinema 'XPerience' venues across the UK. The project provided ground-breaking infrastructure to community spaces in order to increase engagement and accessibility of immersive technologies. Ultimately, 6 cluster-funded VR experiences that originally showcased at the StoryTrails Unboxed events were selected to be included in a portfolio of content showcased as part of Xperience. 7 cinemas and 65 cinema staff were trained and equipped to host and deliver 50 events/ screenings with 7000+ attendees.

The programme has appealed to a diverse audience, with representation from all age groups, particularly 45-64 year-olds, and a healthy gender split, slightly female-leaning. Overcoming possible notions of VR as an isolating activity, 83% of audience members attended events with one or more friends or family members. Enjoyment levels were very high, with 64% of audiences indicating they enjoyed the experiences 'very much' and an additional 21% indicating "quite a lot". This reflected their willingness to repeat the experience, with 80% of respondents indicating they were likely or extremely likely to attend again. Significantly, the events seemed to equally engage new and existing audiences: 38% of respondents indicated they were attending an event at the cinema for the first time, while 34% of respondents indicated they had attended events in the last month, and 24% within the last year. Finally, the results also indicate that cinemas have done well with training their staff based on our 'train the trainer' approach, with audience members rating key enjoyment indicators 4 (agree) or 5 (strongly agree), such as knowing what to do at all times (85%), being comfortable throughout the experience (88%), being willing to recommend a similar experience to someone else (94%) and finding event hosts helpful (98%).

In partnership with the BFI, StoryFutures will produce a white report that documents best practices and captures vital learnings for building a nationwide XR distribution network.

StoryTrails

StoryTrails offered a citizens' and creators' view of the Metaverse, reshaping and celebrating what we mean by public space as the digital and physical collide. By bringing the past to life in virtual form, StoryTrails reanimates the meaning of public space for the Metaverse. Executive produced by David Olusoga, StoryTrails enabled 50 diverse creatives to make immersive experiences that explored the connection between the past, present and future, through AR, VR and mixed reality. Made in partnership with the BFI, BBC, Nexus Studios, ISO Design, The Reading Agency and Produce UK as part of Unboxed 2022, StoryTrails reached over 120,000 people in physical terms and 1.5m people in digital form, and has a continuing legacy in 18 libraries and 5 cinemas across the UK. Whilst universities were involved across the Unboxed programme, as UKRI noted in their deep-dive review of investments in creative industries, 'StoryFutures, [was] unique, however, in actually leading a [Unboxed] project working with some of the UK's foremost Creative technology companies SMEs.'

Crucial to StoryTrails' success was the BFI x StoryFutures partnership, which, through the audience research work, had provoked a range of findings that pointed to ways for engaging audiences in new ways through immersive storytelling. With David Olusoga onboard and access to the BFI National Film & TV Archive, the opportunity to explore 'history where it happened: past, present, future' became an obvious focus for the StoryTrails collective. StoryTrails therefore enabled a 'reanimation' of the archive for the metaverse, testing how 2D archival footage could be deployed in three-dimensional spatial storytelling. One of the significant benefits of the StoryFutures cluster was the opportunity for nine SMEs to create VR experiences with unparalleled and supported access to the nation's film archives and a creative licence to push the boundaries of reinterpreting, recontextualising and reanimating the archive.

StoryTrails audiences estimated a 20% increase in their sense of belonging to their town/city as a result of taking part. The innovative use of archival footage in VR led to StoryTrails receiving the award for 'Best Use of Footage on Innovative Platforms' at the FOCAL International Awards 2023.

Partnership with The National Gallery

StoryFutures initiated a partnership with The National Gallery as part of the initial Clusters' bidding process, with The Gallery agreeing to take on the role of our first 'Challenge-Setter' for our StoryLab open innovation process. After a 3-month development period to map-scope stakeholder needs and project KPIs, The Gallery launched our first StoryLab in January 2019.

The Gallery co-funded a challenge for SMEs to develop a prototype using any immersive technology available to help assess and determine: (1) How Gallery visitors experience and enjoy 'immersive storytelling' as a way of bringing art history to life; (2) How the experience created engagement with the painting; (3) The impact that it had on visitor's perception of The Gallery; (4) Business model insights for rolling out further immersive experiences in The Gallery and other locations (see Virtual Veronese Challenge - https://www.nationalgallery.org.uk/about-us/press-and-media/press-releases/virtual-veronese). Five companies attended a two-day open innovation event and collaborated with individuals from The National Gallery as well as academics from Royal Holloway, University of London. The challenge was won by Guildford-based SME Focal Point, who embarked on the 'Virtual Veronese' project, a collaboration with The Gallery to develop their first-ever VR and AR experience.

The Challenge: Visualising Veronese

Roughly one third of paintings in The National Gallery's collection of Western European art are of religious subjects, and nearly all of these are Christian. Covering the period from 13th to 19th century, religious paintings in The National Gallery's collection depict figures and narratives taken from the Bible and other religious texts. These images were typically made for specific locations, often churches, where they had a very particular function as aids to devotion that were meant to inspire and strengthen faith. This is, of course, very different to how such paintings are displayed and encountered in The National Gallery. The challenge asked SMEs to consider how to use digital technology to reunite The Consecration of St Nicholas with its original context and location in the church of San Benedetto Po (near Mantua, Italy). In doing so, the aim was to immerse visitors into the experience of encountering The Consecration of St Nicholas around the time of its installation in

the church in 1562, and to trigger an emotional and potentially devotional response within the visitors. Taking a technology-agnostic approach, the StoryLab collaboration asked SMEs to develop and pitch a scalable pilot and temporary installation that would be a multi-sensory, immersive experience.

> "Our experience with StoryLab was amazing. It put us in front of a client like The National Gallery that we might not otherwise have access to, but did so in a way that was really collaborative and gave us access to a range of research expertise. The approach to story development and audience testing really helped give us proof of concept as to what comes after the prototype: and that's been a great opportunity for our business to grow."
>
> Jonathan Newth - CEO, Focal Point VR (SME)

For The Gallery, StoryLab's open innovation process and the structured approach to R&D enabled them to confidently explore innovative new technologies within a busy visitor experience environment. The final prototype, entitled *Virtual Veronese*, was tested for two weeks in The Gallery's during regular visitor hours. Built across Oculus Quest, Magic Leap and Mira Prism headsets, Virtual Veronese enabled The Gallery to test different technologies and storytelling approaches to engaging audiences with the histories behind paintings. The results were outstanding, with 90% of visitors rating Virtual Veronese as a 4* or 5* experience and the prototype performance demonstrating a strong appetite for story-led approaches that encouraged The Gallery to explore more innovations in immersive technologies with and without StoryFutures in the subsequent years. Most immediately, the success of the prototype led to The Gallery investing in a full product development with Focal Point that ran as a dedicated exhibition in early 2020, whilst the findings from our audience insight report informed their development of immersive projects *Sensing the Unseen* (Gossaert, 2022-24) and *Experience a Masterpiece* (Da Vinci, 2019-20).

Following on from these successes, The National Gallery partnered with StoryFutures to collaborate on R&D programmes that enabled The Gallery to run testing programmes on its innovation roadmap and strategy. This included dealing with the disruptions of the pandemic which led to the closure of venues and cultural institutions. StoryFutures' Graduate Fellowship Programme enabled The Gallery to support SME Smartify in developing its AR product

(Smartify E-shop), by providing business insight into visitor's physical and digital user journey. In particular, it evidenced how AR could help guide visitors through one-way flows to manage pandemic social distancing as well as engage them with the art and direct them towards e-commerce opportunities. Professor Niki Pantelli and Professor Philip Wu from Royal Holloway's School of Business and Management supervised a graduate placement that enabled evidence collection and analysis to develop Smartify's innovative e-shop platform, aimed at increasing awareness of The Gallery's online shopping. The project helped The Gallery manage the challenge of pandemic visitor experiences, whilst it enabled Smartify, the SME, to maintain momentum behind product development at a critical time. It also attracted significant 'follow-on funding', with venture capitalists Pembroke allocating £ 1 million to Smartify to pursue export prospects with a particular focus on the US market.

The above collaborations with large organisations not only highlight the many long-term strategic research partnerships established through StoryFutures initiatives, but also demonstrates the vast benefits and value they generate. The success of this type of collaboration between SMEs and large, high-profile cultural institutions was key to evidencing the impact that StoryFutures' R&D programmes can have on product development and business growth – this enabled StoryFutures to attract a wide variety of businesses in the landscape of R&D, leading to further growth across the sector.

Partnership with Figment

Long-term research partnerships are key to providing SMEs access to valuable networks as well as R&D and business growth opportunities, whilst for university researchers they offer the chance to develop knowledge-exchange partnerships and see their work have real-world impact. Such long-term partnerships are, however, challenging for SMEs who often need to concentrate on immediate business needs and winning new work, whilst academic researchers tend to work in longer timelines and, due to other commitments, such as teaching and student support, can find being responsive to immediate partnership demands and opportunities challenging. As part of the Creative Industries Clusters Programme, StoryFutures was able to offer SMEs a regular point-of-contact via the operations team – championed by

an R&D Producer and Network Co-ordinator – as well as a business insights researcher. This team offered continuity of communication for SMEs, regularly sharing opportunities, organising network events and capturing monitoring and evaluation data. This regular contact enabled SMEs to develop a longer-term partnership that identified opportunities and priorities that were coming far enough ahead for both parties to plan mutually beneficial collaborations.

Figment is a prominent example of this relationship. The Surrey-based immersive tech company took part in the 2019 *Virtual Veronese* StoryLab challenge as a competing SME, where they pitched their prototype to The National Gallery. Networks built through the StoryLab opportunity connected Figment to researchers and other cultural institutions that offered future pathways for collaboration. For Figment, connecting with The National Gallery served as a springboard to work with other blue-chip institutions.

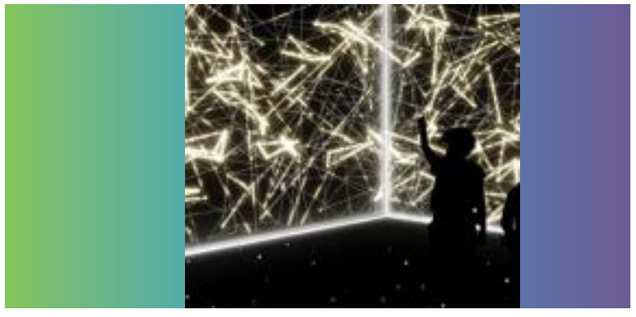
Shortly after their StoryLab experience, Figment were presented with an invaluable opportunity to work closely with the BBC to co-develop and deliver a series of workshops aimed at exploring the possibilities of immersive content targeted towards BBC3's youth audience.

> "I've grown to value the relationship with StoryFutures in a big way... They introduced us to the BBC, who we'd always aspired to work with, but hadn't been able to find a way in. StoryFutures opened the door, which was great. The project exposed us to a large group of production companies, many of which we still have active conversations with."
>
> Simon Reveley - Figment Productions

These networks built stronger ties between Figment and StoryFutures, which identified opportunities to develop new business models for Figment, based on production tooling. This led to the development of a successful Innovate UK application for the 'Hyphen' project starting in 2019. Figment Productions, the Royal Opera House (ROH) and Royal Holloway, University of London developed a project that delivered on two pivotal aims. Firstly, it entailed crafting 'Hyphen,' an integrated design and production toolset designed to streamline collaborative, iterative design and production processes for Hyper Reality experiences. Secondly, the project sought to validate Hyphen and its impact on both productivity and creative outcomes through the use of a location-based Hyper Reality demonstrator with the Royal Opera House.

The demonstrator *'Current, Rising'* unfolded as a 15-minute hyper-reality opera at the Linbury Theatre in 2021. This immersive experience seamlessly melded virtual reality with a multisensory set, blending historical stagecraft with cutting-edge immersive technology. It explored themes of isolation, connection and collective reimagination – delivering an impactful immersive encounter that resulted in concrete benefits for both partners. 'Current, Rising' improved impressions of the Royal Opera House in 87% of respondents and brought new visitors to the Royal Opera House, with 31% of respondents attending for the first time.[7] This collaboration also delivered on its aim to produce a touring model for virtual experiences – providing an opportunity to broaden the reach and visibility of immersive productions beyond their initial presentation. The project went on to be selected as the Winner of Best Out of Home VR Entertainment of the Year at the 2021 VR Awards.

As StoryFutures Creative Cluster draws to a close, the long-term partnership between StoryFutures and Figment continues. Figment has joined the Centre for Doctoral Training in AI for Digital Media Inclusion (CDT) led by the University of Surrey and StoryFutures as one of its inaugural partners.



[7]Current, Rising – Audience Report, RHUL, 2021

Chapter 3
LESSONS IN KNOWLEDGE AND SKILLS TRANSFER

KPI	TARGET	TOTAL	ACHIEVED
HEI industry placements for PhDs & ECRs in CI companies	26	13	
Early career researchers involved in R&D activities	10	16	

Benefit 3: Access to Knowledge, Expertise & Skills

The success of any creative cluster is reliant upon a strong foundation of top-tier talent, expertise honed through hands-on experience and a skills-pipeline that develops the workforce of tomorrow. Part of the opportunity of the Creative Industries Clusters Programme has been to draw upon, build and better network this capacity – linking together the rich spectrum of knowledge and skills within a region to enhance and capture economic benefits as well as strengthen the cultural impact on the lives of the local communities.

Knowledge exchange has been embedded in all our projects, with a particular concern to help academics and creative companies understand and codify what knowledge has been exchanged and for what value: captured through a project initiation process and documentation that onboarded both parties to the R&D collaborative framework and mapped-out expectations and responsibilities. Knowledge exchange is often achieved in two mutually beneficial ways: on one hand, knowledge from research teams informed and helped the development of prototypes, which were led-on and 'owned' by the SMEs; on the other hand, SMEs provided insight and market-relevant intelligence for researchers looking to apply their research and share it more widely to create wider impact and value – often in the form of white papers and reports.

Unlike our sister programme StoryFutures Academy, our skills initiatives were an ancillary focus of the StoryFutures Creative Cluster. We were particularly concerned with linking applied R&D collaborations with the development of academic researchers' skills to collaborate with industry, enabling companies to learn skills around structuring R&D into their business, whilst developing business model skills to make them more robust and resilient. Doing this was key, as, through interaction, we soon learnt that many creatives were unaware that creative drive and technological know-how were not enough for success – thinking about the business side of the equation in a structured manner was key: clearly defining value and thinking about the desirability, viability and feasibility of what they did, how they did it and who they did it with.

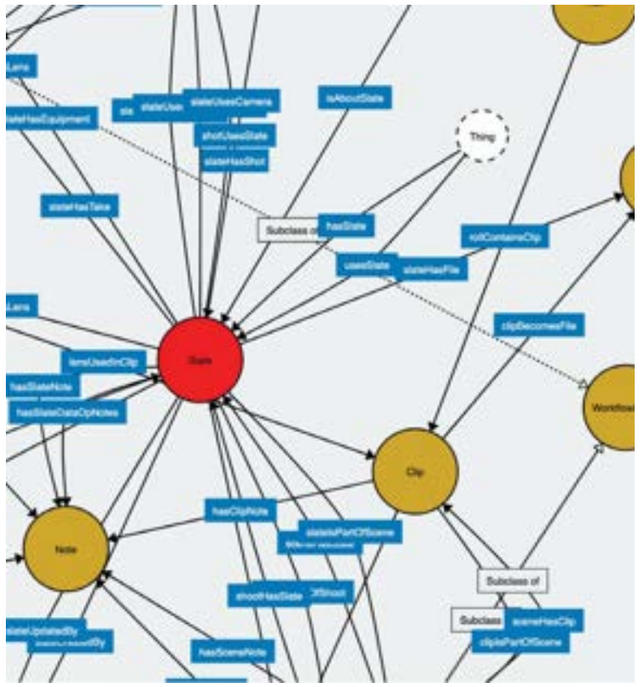
For academic staff, one of the strategies for enabling skills development was the use of placements. Initially set out as formal placements where academic staff were seconded to SMEs and partners, we eventually moved away from this approach due to the significant overhead in contracting involved, which, amongst all the other many hundreds of contracts being processed, became unsustainable. Resources required for contracting partners cannot be underestimated by future Clusters: each of the 142 collaborations established by StoryFutures required a contract, in addition to placements, new grants and amendments. Over 5 years, this was approximately 30 contracts a year, but with the majority of work clustered (forgive the pun) in years 2-4, the rate was more likely 40 contracts per year for 3 years, with the other 30 or so spread over years 1 and 5.

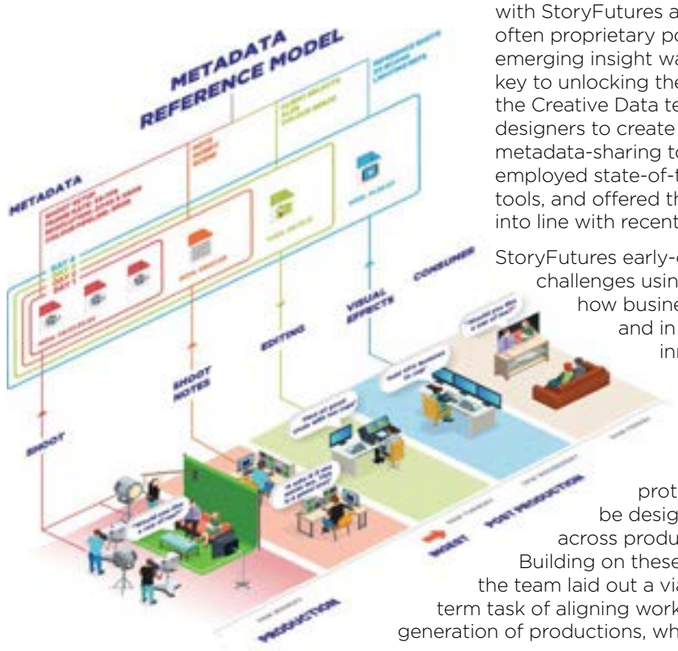
Contracting PhDs and Early Career Researchers (ECRs) into placements can be challenging, primarily due to the burden of administrative overhead involved. In future, the prospect of including placements in R&D requires future Clusters to integrate career services or doctoral placement programs from the beginning, but this is difficult as funding and regulations, in terms of purpose and scope, are not always easy to balance. As a result, we shifted our emphasis on placements to include Early Career Scholars (ECRs) within R&D collaboration programmes – working closely with the companies involved but not directly seconded to them. Through this strategy, we managed to over-deliver on our KPI related to Early Career Researchers involved in R&D activities.

CASE STUDY | CREATIVE DATA

How is production data shared in UK creative industries, what are the barriers to collaboration and growth, how can they be remedied? These are the questions addressed by the partnership between StoryFutures and world-leading post-production businesses: Pinewood Film Studios, multiple Oscar-winning DNEG visual effects vendors, and Evolutions, a leading London film and television post-production house. Over eighteen months, an ethnographic study looked for commonalities in workflows and for opportunities to better manage and capitalise upon the metadata emerging from productions.

Key industry pain points and challenges were the lack of metadata persistence across projects, difficulties around interoperability and the lack of any common terminology across neighbouring cultures of practice. Together, these have been frequent and costly sources of error, confusion and miscommunication.





The partners shared knowledge with each other and with StoryFutures about their highly complex and often proprietary post-production workflows. The emerging insight was that metadata could be the key to unlocking these challenges, and this allowed the Creative Data team to brief specialist software designers to create a template for a next-generation metadata-sharing tool. The solution arrived at employed state-of-the-art linked data standards and tools, and offered the potential to bring creative sector into line with recent advances in other UK sectors.

StoryFutures early-career researchers framed these challenges using ethnographic insight into how businesses operate, both internally and in collaboration, by designing an innovative ontology of metadata in the sector. In Figure A below is a concept map that allows software designers to navigate the complexities of data production, thus enabling a prototype metadata 'backbone' tool to be designed. This helps metadata to persist across productions clearly and consistently. Building on these new mapping and design skills, the team laid out a viable roadmap for the longer-term task of aligning workflows in readiness for the next generation of productions, whether traditional or non-linear.

CASE STUDY | CONNECTXR

ConnectXR was a StoryFutures innovation programme that designed and tested an innovation pathway for SMEs to create scalable XR in health and wellbeing solutions from development to implementation. The programme was designed as a pilot to address these challenges by exploring the potential of libraries to support better health and wellbeing outcomes in communities through engaging with XR. The pilot ran from July 2023 to January 2024 and involved a collaboration of the Department of Health Studies at Royal Holloway, University of London, The Royal Borough of Windsor and Maidenhead Council Frimley Integrated Care Board, Maidenhead social prescribing team and Maidenhead Library. An open competition in May 2023 saw one successful creative enterprise Hatsumi secure funding to further develop an XR solution, Soul Paint, which was demonstrated over a 2-week period in the library setting. This was extended to a second setting, Torbay & Devon NHS Trust, for further research.

The project exemplified how the Creative Industries Clusters programme facilitated new forms of Knowledge Exchange and enabled creative SMEs to access skills and expertise previously unavailable. ConnectXR brought together professionals and researchers in health, psychology, creative media, business as well as community organisations.

StoryFutures connected Hatsumi with Nick Peres, Head of Digital at Torbay & Devon Hospital, to provide insights into the health sector landscape from over 12 years of NHS experience. From an early stage, the objective was to map a model for NHS integration of immersive wellbeing solutions. NHS adoption, particularly for novel immersive applications, is an extended and multi-faceted process which sets out a number of requirements that must be satisfied in order for supply chain integration to be considered. One of the requirements to be evidenced relates to the delivery of economic benefits, which can be challenging for SMEs to demonstrate clearly.[8] Dr Aislinn Bergin from the University of Nottingham supported this aspect of the project by linking health economics, NHS implementation and VR mental health awareness to enable Hatsumi to develop a robust business case for *Soul Paint*.

Research across the project was led by Prof. Alex Palombi (Head of Department of Health Studies, RHUL) and Dr Laryssa Whittaker (Audience Insight Researcher), who advised on key in-depth quantitative research processes to demonstrate the impact of *Soul Paint* on social prescribing patients.

Crucial to this was audience testing, which included drawing on the diverse and nation-wide user testbed, created by StoryFutures through the 2022 StoryTrails initiative with local libraries. ConnectXR leveraged libraries' potential to promote well-being outcomes within communities, enabling insights into Soul Paint's functionality outside of typical healthcare environments.

The audience research demonstrated that Maidenhead Library, as a strong community hub, was an appropriate setting for this type of innovation. Users from a wide range of ages and technical ability engaged in the experience (n=131) and found it to be enjoyable, interesting and suitable. A large majority indicated they would repeat the experience and recommend it to others. There was a strong positive impact on well-being, through the opportunity to take time for reflection and to connect with others (link and full citation to full ConnectXR Toolkit here) https://bit.ly/toolkitconnectxr

The ability to draw together this diverse interdisciplinary team was only possible due to the flexibility developed through the StoryFutures open innovation framework and processes (see Chapter 1). Particularly important to this has been the growing emphasis on knowledge exchange activities across the university sector through the implementation of the KEF (Knowledge Exchange Framework) exercise. As a result of this and the associated potential income for universities, academic staff are increasingly looking to develop partnerships and applied research opportunities with industry. The ability to draw on R&D on Demand funding and support to unlock further academic time from across the universities was therefore vital to the success of ConnectXR.

In March of 2024, Soul Paint was awarded the Special Jury Prize in the XR Experience at SXSW in 2024.

[8]Strategic framework for NHS Commercial', NHS England (2023)

VR Archive New Creatives

The VR New Creatives R&D Scheme is a standout example of the tangible impact that StoryFutures has had in connecting talent with opportunity, facilitating free exchange of vital knowledge and skills across the sector.

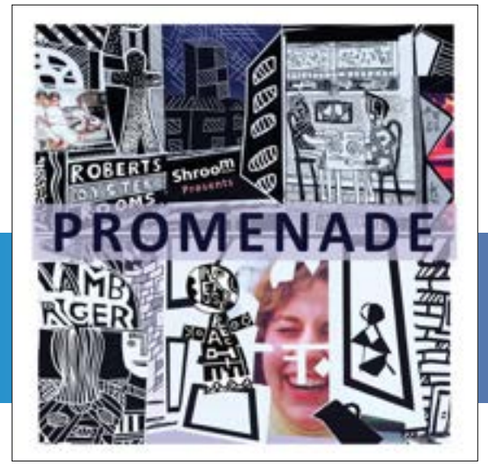
Utilising the StoryLab Challenge model supported by in-kind licensing and staffing from the BFI and BBC, StoryFutures allocated nine SMEs a £50,000 budget for the creation of VR experiences aimed at transforming archival material from the nation's treasures into captivating, immersive narratives. Some of the themes discussed as part of these experiences are as follows:

1. **Charisma.ai – Accessible Lives:** A virtual guide to experience how assistive technology has developed from the 1940s to the present day, exploring how technologies support the disabled and what they might look like in the future.

2. **Diverse Interactives – Contented:** Using real-life stories and accounts from extensive research within care settings to explore the lived reality of 850,000 individuals affected by Dementia.

3. **No Ghost – Off The Record:** A VR archival exploration celebrating British South Asians and their rich musical heritage.

4. **Shroom – Promenade:** An immersive insight into human histories of dislocation, alienation and assimilation of post-war immigration to the UK.



These experiences were not only developed by diverse talent but also aimed to shine a light on themes from within these communities that are often not afforded platforms, to raise awareness and generate understanding. The VR New Creatives Project provided a budget to enable SMEs to hire diverse recruits that they might not otherwise have access to or consider hiring in their day-to-day practices.

Roles spanned across disciplines such as writers, designers, producers, creative technologists and sound designers, ensuring a diverse array of perspectives and a fluid exchange of experience, skills and expertise from a range of specialisms. The nine SMEs were linked with academics from Royal Holloway, University of London with diverse areas of study to support the projects. Emerging creative practitioners also underwent training, covering immersive storytelling, technology in creative industries and VR/AR archive and content production. Monitored mentoring was structured around VR production, applied research and collaboration with academics in SMEs' R&D teams.

CASE STUDY | LUCY WHEELER

Lucy Wheeler embarked on her journey in the immersive technology industry through the VR New Creatives Placement Programme, commencing her role as a creative technologist in January 2022. Prior to this, Lucy had some exposure and experience in the industry teaching digital tech at London College of Fashion but faced challenges around identifying a definitive pathway to establish a sustainable career in immersive.

> **"[StoryFutures] introduced me to immersive storytelling. This helped me align - I think it helped me to have more clarity about immersive technology and particularly the storytelling side of it."**
>
> Lucy Wheeler, Freelance Creative Technologist

The StoryFutures Placement Programme kickstarted Lucy's freelance career as a creative technologist, where she gained valuable insights and established connections within the immersive technology sector. This also led to career advancement opportunities, as her role would later evolve from Creative Technologist to Lead Developer on the 'Museum of Imagined Futures' (MOIF) project alongside Studio ANRK and Indigo Storm Production, enabling her to enhance her technical skills whilst also gaining a deeper understanding of immersive storytelling and the methodologies that underpin it. Lucy credits StoryFutures for fostering a supportive environment which facilitated her transition to freelance work and sustained her career within the industry. Following her work alongside Studio ANRK on MOIF, she was recruited as a lead Unreal Engine developer and visual effects artist for their British Film Institute-funded VR storytelling project, 'There Exists.'

> **"StoryFutures brought me into the industry I think sometimes the most important thing, when you do these programmes, is that you're not just left afterwards... I felt like there was long-term support for a commitment to the programme - that made me feel heard and seen."**
>
> Lucy Wheeler, Freelance Creative Technologist

Chapter 4
LESSONS IN FLEXIBILITY: BUILDING A CLUSTER, ENGAGING A SECTOR

KPI	TARGET	TOTAL	ACHIEVED
Companies' engagement with Cluster[9]	1450	1060	

Benefit 4: Key Place-based/Sector issues are addressed

By the end of the StoryFutures Cluster project, we engaged with 1060 businesses, carried out 142 collaborative R&D projects and created or saved 374 jobs within the sector. However, this was not achieved without addressing various challenges. In this section, we discuss practical challenges and opportunities related to place-based and sector issues, detailing some of the strategies for sustainability and longevity that may help to ensure these impacts are ongoing.

Cluster Definition

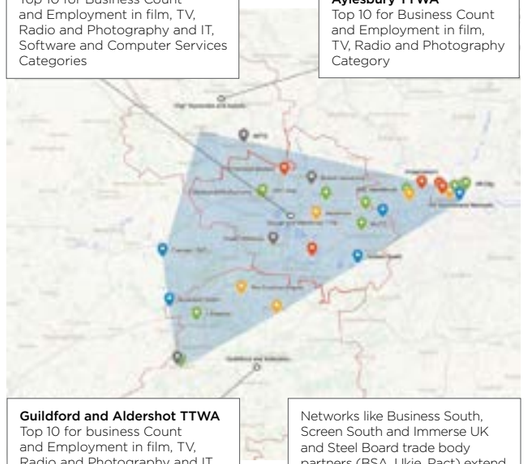
To deliver our Creative Cluster programme, it was first necessary to accurately assess the engagement of creative SMEs within the region and identify those that possessed the requisite expertise and specialism in creative technology. Secondly, it was key for us to assess such companies' readiness and inclination to participate in structured R&D.

Original mapping of the cluster had been based on data from Nesta's "The Geography of Creativity"[10] and "Creative Nation"[11] reports, relied upon by AHRC in developing the competition and supplied to all Creative Industries Clusters Programme bidders. This data suggested that over 24,000 creative companies operated within the region defined as the 'Gateway Cluster', mapped as a 'conurbation' – a geographical clustering of activity recognised by Nesta as areas needing greater networking and growth support in order to close the UK creative economy's productivity gap (2016: 40).

The Gateway Cluster was therefore defined as a network of 3 Travel to Work Areas (TTWAs): Slough and Heathrow; Guildford and Aldershot; High Wycombe and Aylesbury. Totalling over 100,000 jobs, the Cluster could be seen as having the potential to be the UK's largest creative employment and business base outside of London. Additionally, due to its proximity to the capital, the cluster had access to a further 80,000 creative businesses. Although the conurbation contained significant mini-clusters, such as Pinewood's 140+ SMEs, it had some of the lowest intensity scores for networking and inter-sector connectivity (Nesta, 2016: 35).

Slough and Heathrow TTWA
Top 10 for Business Count and Employment in film, TV, Radio and Photography and IT, Software and Computer Services Categories

High Wycombe and Aylesbury TTWA
Top 10 for Business Count and Employment in film, TV, Radio and Photography Category



Guildford and Aldershot TTWA
Top 10 for business Count and Employment in film, TV, Radio and Photography and IT, Software and Computer Services Categories

Networks like Business South, Screen South and Immerse UK and Steel Board trade body partners (BSA, Ukie, Pact) extend our reach for impact, engagement and dissemination nationally.

The role for StoryFutures Creative Cluster was therefore to try and bring this network more cohesively together, generating innovation through fusing companies from Pinewood in the region's north to the games cluster in Guildford to the south. Our work included collaborations with the games sector trade body Ukie, to put 'boots on the ground, able to connect local activities and national initiatives and opportunities' (Ukie). Over the first 18 months of attending and running networking events, generating calls for R&D opportunities and promoting these via web, phone and social media, we found that due to the dispersal of the conurbation, it was significantly more challenging than expected to find relevant companies, let alone networking them.

[10] 'Geography of Creativity in the UK', Nesta (2016)
[11] 'Creative Nation', Nesta (2018)

As a result, StoryFutures undertook a review of the Cluster data. Nesta's methodology used web scraping to classify companies based on SIC and SOC codes in datasets held by ONS, Companies House and others – the findings from this methodology were then used to extrapolate and ultimately estimate the number of companies actively operating in the area. Such an approach, however, relied on the self-categorisation of SMEs who would select SIC and SOC codes from a bewildering array of options for their businesses and jobs without necessarily understanding their relevant definitions. This led to significant misclassification and unreliable cluster data. StoryFutures ultimately manually re-mapped and re-examined businesses within the cluster to present a different view of creative business activity, verifying initial data against Companies House, company websites and social media to generate a clearer understanding (see Appendix 1 on methodologies).

Our findings suggested that, in fact, our region was home to a far smaller pool of companies, potentially as low as 1,924, with as few as 152 potentially 'R&D Ready' in terms of their growth stage or business model. This posed a significant challenge for meeting our Key Performance Indicators (KPIs), including targets for businesses participating in R&D, collaborations formed and companies engaged.

Figure 1.0

TTWA	Nesta	StoryFutures							
		Found through searches	% Nesta predictions	Relevant (not clearly outside creative industries)	% of Nesta predictions	Contactable (have a website)	As a % from Nesta predictions	Challenge - ready **	% of Nesta predictions
Slough and Heathrow	14,100	133	0.94%	87	0.62%	97*	0.69%	8*	0.06%
Reading	4,842	593	12.25%	418	8.63%	188*	3.88%	14*	0.29%
Guildford and Aldershot	5,120	326	6.37%	259	5.06%	153*	2.99%	13*	0.25%
High Wycombe and Aylesbury	3,262	208	6.38%	46	1.41%	43*	1.32%	3*	0.09%
Total	27,324	1,260	4.61%	810	2.96%	481	1.76%	38	0.14%

**The number also includes companies found through personal contacts and search engines.*
***This is an expert assessment of whether a company can create a creative product on its own based on its size and skills. Many companies in the cluster are just one person (freelancers or individual creators) who cannot develop a product on their own. There are also a number of companies that do not have enough skills or resources (e.g. local website designers).*

As depicted in Figure 1.0 (above), the findings from our re-evaluation of initial cluster-mapping showed a considerable reduction in creative companies that could feasibly engage in meaningful R&D initiatives. It indicated that as few as 1.76% of companies estimated by Nesta might be relevant and, when considering suitability for our high-profile R&D collaborations with organisations like The National Gallery, BBC Studios, Heathrow and Discovery, this was reduced even further to 0.14%. Overall, our analysis of the data showed that cluster might be home to as few as 810 existing companies aligned with our R&D focus from a projected 27,324.

In light of the aforementioned concerns, StoryFutures was faced with an important decision:

1. Continue to solely operate within the designated cluster and effectively forfeit aims to deliver on our KPIs.

   Or

2. Build a co-collaborative cluster approach, offering London-based companies the opportunity to work with StoryFutures on the basis of co-investment and collaboration with the region.

With the support of our Steering Board, including the local authority representatives of Bucks, Berks and EM3 LEPs, StoryFutures opted for the latter; London's vast size and high concentration of businesses across the creative sector offered vital opportunities for R&D and wide collaboration. Immerse UK's 2019 *Immersive Economy Report* suggested that 47% of immersive specialist companies were based in London and, in addition, the absence of a dedicated R&D base in London posed a significant challenge that we would be well-positioned to address.

As we discuss in the section below, the requirement for London companies to make an 'inward investment' in R&D collaborations with SMEs bases in the original conurbation region was a productive strategy that enabled new companies to meet and generate inter-regional collaboration.

The above is shared as a salutary lesson for future cluster development – at both the funder and applicant stages, there is a need to consider a range of methods in data mapping to ensure that Clusters can succeed in delivery. The revised Cluster boundary, and associated knowledge of what was inside the Cluster, aided the re-focused delivery of the StoryFutures project from the 2nd year of operation – of course, this would not have been possible without the support of AHRC's flexible approach enabling the project to go on to significant regional and networking success.

Impact, Longevity and Sustainability

Despite the challenges above, StoryFutures had an important impact on the Gateway cluster, acting as a connector across the conurbation to link the region together better, internally as well as to London. Linking the region's higher education institutions to provide a network of access to R&D across the region and a variety of entry points to the StoryFutures programme enabled greater success than our revised, pessimistic mapping may have suggested.

Over 1,000 companies engaged with StoryFutures, with over half of these located in the Gateway Cluster region. 19 companies delivered inward investment in the form of knowledge sharing, masterclasses, facilitation of new partnerships and hosting workshops. The relationship with London has always been a key driver of growth and innovation for the Cluster, and one that StoryFutures has helped foster – such as through collaboration projects and events with partners, such as The National Gallery, Science Museum, Royal Opera House, Imperial War Museums and BFI, as well as linking cutting edge SMEs with each other for future collaborations, such as ScanLab's work with Complecite Theatre with StoryFutures to produce Felix's Room:

> "The collaboration is key – connecting different resources and perspectives to build something that would otherwise be too challenging to consider drawing on different strengths available in London and surroundings."
>
> Matthew Shaw - ScanLABS Projects

The success of supporting and networking the cluster was recognised by Enterprise M3 (EM3), the Local Enterprise Partnership for the M3 corridor. EM3 were particularly important in helping connect SMEs across the region. EM3's priority was to support creative technology (or CreaTech), investing £1million into StoryFutures to distribute Covid relief 'travel kits', build a flexible virtual production studio and support the development of TestXR.org – a remote audience testing facility to help companies reach audiences during the pandemic with their pilots and prototypes. Used in combination with structured R&D programmes, such as our immersive fellowship and R&D programmes, the collaboration with EM3 helped safeguard 86 jobs, link 42 students with creative business opportunities and assist 53 businesses. One significant highlight of this collaboration was Electric Skies, which opened an office in the Cluster to access the facilities. With the help of a travel kit and access to audience testing via TestXR, *Electric Skies* began the development of 'Kindred', eventually selected for the Extended Reality (XR) section of the prestigious 2022 Biennale Venice Festival.

Over 15 companies opened offices in the cluster region because of StoryFutures' work, whilst London-based companies began co-investing to support the region in the form of collaborations with local companies, placements of students and network-sharing events to help companies and students learn from innovation projects. Sue Littlemore, then Joint Managing Director of EM3, was clear of the value and potential of StoryFutures as part of a wider cluster:

> "It is one of the most successful collaborations of academia and marketable innovation. It has exemplary partnership and leadership. We are very strong (here) in CreaTech and on how digital technology is providing value across other sectors. StoryFutures has a good commercial and creative lens. Going forward, we want to reach out and support more SMEs in this field, accelerate their innovation and growth and bring in venture capital to get them to the next level."
>
> Sue Littlemore – Managing Director, EM3

The Gateway Cluster has the continued potential to drive innovation and growth in creative technology with continued regional support developing more industry-specific initiatives, including Surrey County Council, which, alongside the University for the Creative Arts, is launching PixelRise. PixelRise is an initiative aimed at nurturing the existing Surrey games development ecosystem, with a focus on enhancing growth and diversity while increasing recognition, both domestically and globally. The initiative encompasses the development of games facilities for R&D; forging partnerships between higher education institutions and industry players; supporting start-ups with early-stage funding and guidance; and attracting top-tier talent to the region. In addition to this, Surrey County Council have supported the Games and Innovation Nexus (GAIN), led by the University of Surrey. The initiative, which received £1.5m from Research England, aims to strengthen the connection between universities and the games/CreaTech industry.

Place-based storytelling and inclusive innovation

Research within the StoryFutures' PhD programme explored the potential of clusters and cluster intermediaries to promote inclusive innovation. Angela Chan's action research revealed that clusters could effectively advance Equity, Diversity, and Inclusion (EDI) goals through their research and development (R&D) initiatives, especially via place-based storytelling. This was facilitated by actively managing dynamic 'proximity factors', encompassing geographical, institutional, organisational, social and cognitive aspects.

Furthermore, StoryFutures' flexibility allowed us to adapt our R&D activities online during the pandemic, fostering new forms of virtual proximity and knowledge exchange – including the travel kits and audience testing tool TestXR noted in the previous section. This approach contributed to the growth of understanding regarding inclusive innovation using convergent screen technologies.

Chan's action research uncovered several key findings regarding the creative micro-processes involved in the StoryFutures project:

1. Cluster intermediaries play a crucial role in managing creative ecosystems, adapting to virtual proximity when physical proximity is lacking. This highlights the importance of strong organisational proximity within consortium partners.
2. Treating R&D as an intervention in inclusive growth benefits the cluster, the creative sector and audiences, advocating for funding inclusive innovation to align regional economic policy with social benefits.
3. As clusters evolve, cultural intermediaries should consolidate learnings from inclusive innovation to demonstrate broader social value in future interventions in the creative economy.

Need for International Markets

UK's creative industries faced formidable challenges in the realm of exports, stemming from the convergence of Covid-19, the conclusion of the EU transition period and the lack of clear policy. These industries contribute significantly to the economy and play a crucial role in the country's trade surplus by exporting services worth £38 billion and goods valued at £13.8 billion in 2023.[12] Innovate UK's Immersive Economy Report (2018)[13] underscores the vital role of international markets within the sector. With 70% of specialist respondents and 50% of immersive participants exporting their products, the immersive industry demonstrates a growing inclination towards global trade. While the US emerges as a key market for immersive specialists, with 35% identifying it as their primary market, the EU also holds significant importance for immersive participants, with 32% viewing it as their major market. In 2024, the projected value of the global virtual reality market is anticipated to reach $39.2 billion, marking a significant surge of 216.8% since 2019.[14] More specifically, the global immersive technology market size is projected to rise to $134 billion by 2030[15]

The Covid-19 pandemic, Brexit and the implementation of the EU-UK Trade Cooperation Agreement (TCA), however, have all presented obstacles to service trading, most notably impacting the movement of professionals, recognition of qualifications and access to markets. It also created issues related to visa obligations and work permits, severely affecting cross-border work.

StoryFutures continued with its aim to promote export growth and establish cross-cultural partnerships. Despite various barriers to accessing international markets, we carried out a number of impactful R&D initiatives with our global partners, so as to drive immersive growth in international territories whilst creating strong links to the UK and establishing it as a global hub for XR R&D. This included StoryFutures China, supporting over 20 companies with insight on working, exporting and entry-points to working in the Chinese market, as well as providing business modelling support to StoryFutures Academy UK Canada Exchange programme in 2021-22.

Throughout the Cluster programme, StoryFutures worked alongside the UK Government's Department for Business and Trade's (DIT) Great Campaign to showcase the best of British innovation abroad. The Great Campaign is a government initiative in partnership with arms-length bodies, such as the British Council and VisitBritain, which aims to drive growth and prosperity across the UK and foster positive perceptions of the UK around the world. As part of this initiative, France was identified as a key market and VR was chosen as one of the mediums through which to showcase the UK as a hub for innovation and creativity. Collectively across the various showcases hosted around France, the initiative saw 2094 engaged participants, with 83% of VR users reporting feeling more positive about the UK.

DIT produced an annual publication called 'Experience on Mainstreet', which shines a light on companies that are carrying out innovative work to help revive UK town centres and main streets. StoryFutures have been featured multiple times alongside our industry partners – including Surround Vision, *Arcade* and *Factory 42* (see the latest publication here). https://viewer.joomag.com/experience-on-main-street-guide-2024/0218566001711717489?short&

This international work was only possible because of the focus on building the cluster network from the outset of StoryFutures. Partners committed to developing creative ecosystems were crucial to this, especially ImmerseUK, the Department of Business and Trade (as it then was) and the UK trade bodies, which provided invaluable insights, guidance, support and intelligence on the needs of the sector. Such partners are crucial to building a cluster, as it is not something that Universities can do alone, nor build from scratch: scaffolding on existing infrastructures and networks is vital.

Richard Parry, Head of the DIT Experience Economy team, said

> "StoryFutures has been a fantastic help in promoting cutting-edge innovation that goes on in the UK's immersive sector to global markets. It's brilliant to see vibrant, exciting projects coming of out StoryFutures' R&D programmes - its growing network of creative businesses is proving a great resource for the sector."

[12] Creative Industries Policy and Evidence Centre – 'International Trade Challenges and the Effectiveness of Support Measures for the UK's Creative Industries' (2023)

[13] The immersive economy in the UK: The growth of virtual, augmented and mixed reality technologies – Innovate UK (2018)

[14] MarketLine – Global Virtual Reality (2020)

[15] Precedence Research - Immersive Technology Market Size, Trends, Growth, Report 2032 (2023)

Chapter 5
LESSONS IN ECONOMIC & SOCIAL BENEFITS

KPI	TARGET	TOTAL	ACHIEVED
New products, services, experiences or IP	40	64	
SMEs reporting new export opportunities	21	30	
Jobs		374	
Leverage		£16,549,646	

Benefit 5: Economic & Social benefits

StoryFutures' programmes have demonstrated growth and development by securing significant co-investment, follow-on funding and routes to market for companies, products and services, creating hundreds of jobs in the process. As part of the Clusters programme, StoryFutures has enabled businesses to explore the commercial viability of their ideas and access essential expertise in business modelling, IP development and exploitation, investment opportunities and R&D pipelines that they wouldn't ordinarily be able to.

In this chapter, we take a look at business models, IP frameworks and the social impacts of StoryFutures projects.

The Challenge of Immersive IP

In 2022, StoryFutures commissioned Dr Aislinn O'Connell to explore the challenges of developing IP for immersive experiences, content and products, through a series of industry-practitioner interviews and analysis of current law and literature (See report here - https://legacy.storyfutures.com/reports-pdf/Report-IPinImmersiveTech-July22.pdf). Intellectual Property Rights are crucial for creative teams, underpinning the financial assets of many industries through control over the reproduction and distribution of creative content, as outlined by the Copyright, Designs and Patents Act 1988. The emergence of immersive technology to create unique experiences and outputs presents challenges in managing intellectual property due to the lack of established precedents. Dr O'Connell's research highlighted the diversity in intellectual property management approaches amongst the SMEs. Whilst this led to a lack of coherence and certainty for both clients and companies working in immersive, it also allowed for an opportunity to develop innovative practices in the AR and VR sectors.

Despite such innovations, the current practice of negotiating licensing on an individual basis leads to increased costs and highlights inequalities in bargaining power. Unlike established industries with standard rights-management practices, the immersive sector lacks a default approach, which calls for increased negotiation and causes uncertainty in project development. Many participants in the immersive entertainment sector have voiced uncertainties regarding licensing of their IP products and acknowledged that engagement with StoryFutures projects had propelled them into new considerations around IP management they hadn't faced before. We identified a pressing need for flexible, adaptable and predictable IP rights-management strategy to foster transparent and mutually beneficial practices, enhancing the value of immersive technology to the UK economy and securing its position as a leader in this innovative field.

Immersive Sector Business Insights

As part of a broader exploration into the economic impact of StoryFutures, Prof. Mark Lycett and Dr Marianna Rolbina built upon recent advancements in immersive business models and their integration into new creative businesses. Their aim was to understand innovation emerging from everyday practices, drawing out the challenges that SMEs face in undertaking R&D, how the path from R&D to innovation was understood and how business model thinking could improve that (see the SF Business Insight Report here - https://legacy.storyfutures.com/reports-pdf/Business-Insight-Report.pdf).

In-depth interviews were undertaken with 31 UK-based immersive SMEs across various disciplines and the analysis underscored the urgent need for a more robust integration of R&D with innovation. SMEs often grapple with commercialisation of their innovations, focusing narrowly on short-term projects without a comprehensive strategy for market engagement or business model evolution. Furthermore, the lack of structured methodologies to leverage R&D findings further exacerbates the issue, as SMEs contend with financial and time-based constraints.

The key findings revealed as part of the exercise are:

1. The need to bind R&D and innovation more strongly. Most SMEs face a significant, yet largely invisible challenge in translating R&D into innovation – while creative drive and/or technical expertise are prime motivators for our SMEs, they are not sufficient for success.

   The need here is in better understanding the pathways that translate R&D to viable innovations for particular audiences.

2. **The need to engage in R&D more effectively.** SMEs struggle to engage effectively with R&D – lack of time and money to do so being the key barriers. R&D often happens on the fly, funded from and within client projects and, consequently, the learnings from that R&D are lost and/or not capitalised on. Further, SMEs do not employ systematic practices for making the most of what results from their R&D efforts – readily acknowledging that they do not have the knowledge or infrastructure to capitalise on R&D.

3. **A necessary lack of 'killer instinct'.** Whilst innovativeness and risk-taking are high in the sector, competitive aggression (or killer instinct) is low. Only a small number of companies displayed any form of competitive aggressiveness and even in those cases it exists in very subdued forms. While this can limit growth, on the positive side it allows companies to better learn from each other and share knowledge.

4. **A limited ability to define 'value'.** There is a worrying lack of clarity within the sector about what constitutes a competitive advantage. A significant majority of our SMEs fail to clearly define their value proposition which, as a result, limits their ability to exploit outcomes in a market context.

5. **Re-thinking Innovation and risk-taking.** There is a clear culture of risk and the emphasis on innovation in product and service development is therefore strong. The notion of innovation is thought of in terms of creativity and artistic reward in good part, which has led to a proactive culture of shaping innovation in this way.

6. **Greater stability is required for growth.** The transition from creative to business owner is a difficult and treacherous path, given continuous changes in technology and a lack of stable workflows. Scaling up from successful creative projects to a stable business less reliant on winning the next project requires significant support for creatives to develop key business management skills.

In the context of the above challenges, the practices that lay the paths to success are: (1) Relying on the stability of industry background to venture into the new immersive market; (2) Leveraging engagement with your audience through co-creation practices and learning from that; (3) Clearly monetising immersive expertise as well as the products themselves; and (4) Leveraging R&D activities effectively and efficiently. The key thing not to do is dilute a company focus/effort and try to do everything simultaneously - time, expertise and financial resources are finite and at a premium, therefore, growth requires a clear focus.

Collectively, these outcomes reveal a need for SMEs to be supported by government and UKRI innovation bodies to help them take the initiative and re-think the way creative immersive businesses in the UK operate – where future policy should look to better weave business model thinking into the creative journey, orient funding at sustainable growth and develop the ecosystem (building on the collective ethos and plugging gaps, such as distribution). Such proactive approach could boost the sector's international presence and success. A key starting point is the need for education and targeted support programmes which are vital for enhancing SMEs' innovation capabilities, additionally, facilitating access to financial support and shifting funding emphasis towards the research aspect of R&D is also important.

Social Impact

StoryLab programmes have proven an effective innovation methodology, enabling large organisations to conduct agile R&D processes while navigating regulatory complexities. These have led to a number of important economic gains for partners, but as importantly, social impact as well, including increased visitor numbers to cultural partners, behaviour change around recycling and wider environmental impact of consumer patterns as well as interventions in mental health and wellbeing.

CASE STUDY | ROALD DAHL'S MARVELLOUS CHILDREN'S CHARITY X PLAY WELL FOR LIFE

SME Play Well for Life (PWFL) was introduced to the StoryFutures R&D model through the Immersive Fellowship programme, highlighting the commercial benefits of addressing health-related issues via gaming. In response to the StoryLab Challenge posed by Roald Dahl Marvellous Children's Charity (RDMCC), PWFL set out to create a tool to aid healthcare professionals in supporting young people with long-term illnesses during their transition from child to adult health services. This led to the development of an AR card game, 'Dragons of Afterlands'.

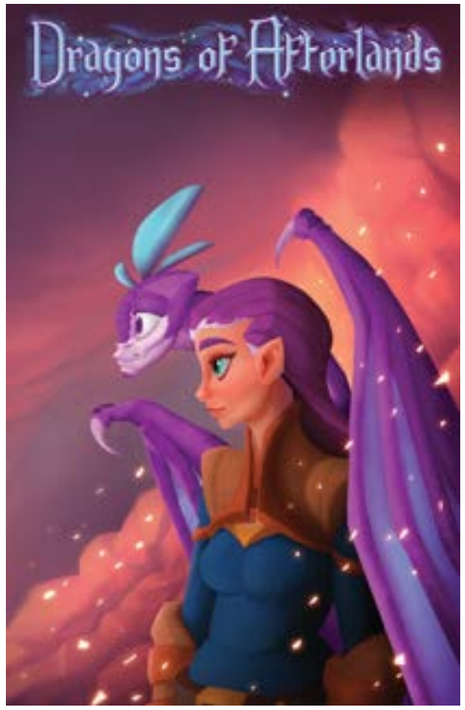
Audience insight research demonstrated the game's significant impact on young patients' comprehension of, and engagement with, their transitional care. Research enhanced their ability to manage their relationships with healthcare services more broadly. The production of "Dragons of Afterlands" supported twelve creative freelancers and achieved a 280% leverage on the StoryLab funded investment, with StoryFutures' cash investment of £30k attracting an additional £84k from the challenge partner and PWFL. The commercial viability of "Dragons of Afterlands" was further tested within schools, contributing to Personal, Social and Health Education (PSHE) classes. This adaptation allowed PWFL to maintain its workforce and aim for growth, with knowledge and expertise from academic psychologist Prof. Helen Pote from Royal Holloway, University of London, as well as additional support from EM3 Travel Kits, providing access to AR testing kits.

The game won the Games in Development competition at the European game-based learning conference (ECGBL23). PWFL and its academic partners secured follow-on funding through Innovate UK's Creative Industries Fast Fund, enabling further R&D into speech recognition and audio sentiment analysis to innovate gameplay. Prof. Helen Pote's ongoing collaboration facilitates the SME's engagement with the education sector's procurement processes, expanding the product's potential market. Additionally, PWFL received follow-on funding from UKRI Healthy Ageing Catalyst Award to explore new market opportunities.

This project exemplifies the value of the Fellowship and StoryLab model in assisting SMEs to develop prototypes that not only offer tangible social and health advantages, but also present substantial commercial potential.

"Working with StoryFutures was fantastic. The access provided to excellent psychologists at the top of their fields was invaluable for ensuring a solid, psychological evidence-based product was developed. The StoryFutures team have an excellent network of people which meant the workshops, innovation days and sessions were run by incredible people with fantastic expertise. [...] StoryFutures were able to introduce us to someone informed and helpful, covering all parts of the project from R&D, storytelling, creative, production and also business development. Our project would not be what it is without them."

Sarah Campbell – Founder & CEO, Play Well For Life



Chapter 6
LESSONS IN SUSTAINABILITY

Benefit 6: Sustainability

Although environmental sustainability goals were not a KPI or specific focus of StoryFutures, the period from 2017-2023 of Cluster delivery marked one of increasing environmental concerns in creative production and associated policy.

UN Sustainable Development Goal 13 stresses the need to take urgent action to combat climate change and its impacts, while Goals 9, 11 and 12 place the onus on every individual, organisation and industry to innovate for a sustainable future. The role of the creative industries is two-fold: (1) to eliminate negative impacts of activities the sector is responsible for and; (2) to use its unique visibility and vocational nature to lead by example. However, the size of the challenge is significant: 2022 data from BAFTA's Albert shows that one hour of TV produced contributes the equivalent of 5.7t CO2e. While this represents a 30% increase from 2021, conversely, 2020 data showed a 52% drop from 2019 levels caused by pandemic-induced changes in working practices.

Research has recently emerged regarding the potential sustainability benefits related to virtual production, with researchers from Ulster University highlighting that VP could lead to significant reductions in carbon emissions related to film/TV and immersive tech sector in the coming years.[16] The jury is still out on how compute power factors into these considerations, especially as AI is increasingly integrated into VP, but early studies all enthusiastically welcome the potential to reduce carbon impact of film, television and immersive production.

For StoryFutures, one of the areas in which we were most able to help industry explore sustainability was through how immersive storytelling may contribute to behaviour change. Three large-scale immersive collaboration projects run during StoryFutures tested the impact of immersive storytelling experiences on sustainability-related behaviour change. The results were often suggestive of positive impacts, pointing to a potential additional role for the technologies beyond the pressing concern of the carbon footprint of AI, virtual production and the creative sector more widely. Perhaps one of the ways that the creative industries could offset its carbon footprint by driving much broader behaviour change amongst citizens and consumers across all walks of life.

[16] Virtual Production's Role in Carbon Reduction and Net Zero Production in the Screen Industries – Studio Ulster at Ulster University (2023)

CASE STUDY | IMPROVING RECYCLING BEHAVIOURS THROUGH AUGMENTED REALITY

Over the course of our creative cluster project, we have strived to bring sustainable practiced to the forefront of our R&D processes; one standout project is Surround Vision's development of "Cupsy", an immersive experience designed to encourage sustainable behaviours at Heathrow Airport.

In partnership with Heathrow's Sustainability Team and Costa Coffee, StoryFutures launched a StoryLab challenge for SMEs to create a prototype aimed at boosting recycling of paper coffee cups within Terminal 5. The challenge was part of a broader initiative to improve recycling rates and reduce cross-contamination in waste bins, a significant barrier to effective recycling.

The winning SME, Surround Vision, introduced *Cupsy*, a prototype combining augmented reality and a sophisticated computer vision system capable of identifying coffee cups and interpreting the emotions of users. This was achieved through the use of an interactive system that utilised facial and object recognition technologies to identify when visitors held coffee cups and guided them on how to recycle them properly. The Cupsy initiative marked the debut of the world's first engaging and interactive recycling bin. It represented an amalgamation of consumer psychology and cutting-edge technology, all wrapped in compelling storytelling, achieving remarkable success.

Cupsy was deployed in the arrivals hall of Terminal 5 for a four-week trial period, during which extensive audience research and analytics were conducted to assess the project's impact on recycling behaviours. The results were outstanding, showing a 130% increase in the recycling of coffee cups, with over 6,000 cups recycled. Beyond its primary environmental goal, Cupsy significantly enhanced the airport experience, with more than 75% of passengers expressing enjoyment of the installation and 83% voicing interest in seeing similar initiatives. Before the Covid-19 pandemic and its subsequent effects on air travel, the Airport's Resources Steering Group had approved Cupsy for an expanded rollout across two terminals.

For Surround Vision, the project helped them to further develop their approach to sustainable storytelling, going on to launch a VR platform at the COP-26 event in Glasgow 2021. The aim was to give a fresh perspective on environmental issues through the use of VR, thus *'Transporting audiences into the heart of green innovation, with climate solutions they can see in action'* (The Innovation Pavillion: Visions of a Net Zero Future). The 'Innovation Pavilion' was a virtual reality exhibition aimed at unveiling the nation's vision for a net-zero future. At its core was a captivating VR experience centred around an interactive globe, offering viewers a transcendent 'Overview Effect' of our planet. Through intuitive hand gestures, visitors could navigate the globe, revealing the extent of UK-funded projects spanning the globe. Each project, whether in Kenya, Colombia, Ghana, China, Lebanon or Brazil, presented innovative solutions under the International Climate Finance umbrella. Furthermore, the pavilion operated under a carbon offset scheme, ensuring its environmental impact remained neutral.

For StoryFutures, the collaboration with Heathrow and Surround Vision helped demonstrate the potential for immersive storytelling to promote environmentally responsible practices within the creative industries and beyond.

CASE STUDY | FACTORY 42 X BBC AR GREEN PLANET

Factory 42 set out to merge the physical and digital realms through immersive technology, driven by the ambition to narrate environmental stories in novel ways. This vision culminated in The Green Planet AR Experience, inspired by the BBC's landmark natural history series and featuring narration by Sir David Attenborough. The project, a collaborative effort with BBC Studios, EE, the Royal Botanic Gardens at Kew, Talesmith, and Dimension Studio, was one of nine projects to win £2.2m funding as part of the 5G Create competition backed by the Department for Digital, Culture, Media & Sport. Held in London, the experience attracted over 10,000 visitors, receiving an unprecedented 96% approval rating from user -testing carried out by StoryFutures, marking it as one of the most enjoyed immersive experiences to date. Participants reported high levels of engagement, presence, realism, and wonder, underscoring the project's success in connecting people with nature in an impactful way. 99% of attendees reported leaving with a heightened interest in environmental sustainability. A month post-visit, follow-up surveys revealed ongoing positive shifts in their climate-conscious behaviours. This included purchasing eco-friendly products, opting for energy-saving solutions, and contributing financially to environmental initiatives.

The Further research undertook a comparative A/B test where some users were randomly selected participants were recruited to experience a 'flat' video experience and others an compared against the AR experience visitors to understand whether AR-based storytelling could lead to more positive outcomes than traditional video. Overall, Augmented Reality had a much more positive impact on users than traditional video across 4 key areas

- The Green Planet Augmented Reality Experience increased sustainability beliefs and behaviours, persisting for a month.
- Immediately after exposure, augmented reality event visitors scored higher in sustainability beliefs than video viewers.
- One month after exposure, augmented reality event visitors performed more pro-environmental behaviours than video viewers.
- Augmented reality induced greater presence and connection with nature than video, leading to greater impact on audiences.

These findings highlight the potential of leveraging such interactive and engaging methods in educational settings to enhance sustainability awareness and practices (academic publication available here - https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4730094#).

CASE STUDY | FACTORY 42: UNEARTHED

Funded by Meta and created by Factory 42, the "UnEarthed" VR project aimed to offer Oculus users a distinct departure from the usual game mechanics and story content of survival games. It promoted a gentler, nurturing approach, encouraging exploration and discovery to enrich users' understanding and appreciation of our planet through engaging play. UnEarthed incorporated compelling narratives about our environment, leveraged high-end talent, including Richard Ayaode, to enhance storytelling and utilised eco-influencer networks for authentic peer-to-peer communication. Such strategies were designed to draw new users to the Oculus brand through Meta's extensive social networks.

Factory 42 collaborated with StoryFutures to conduct iterative user testing at key development stages, ensuring "UnEarthed" delivered a meaningful and impactful entertainment experience.

> **"[The Audience Insight Team] are super knowledgeable and super passionate – obviously about storytelling and using technology, but also about making sure that the audience is really at the core as well [...] that kind of combination and working at that intersection with their expertise has been an absolute pleasure."**
> Mimi Harmer - Associate XR Producer, Factory 42

StoryFutures-led audience insight research showed 93% of participants 'learned something new' and 49% of participants indicated that playing the game encouraged them to engage in nature - including spending more time outdoors, interacting with nature-focused content on social media platforms, viewing nature-related television programmes, reading about nature, making efforts to clean their surroundings of waste and visiting environmental-themed exhibitions at local cultural institutions. Most significantly, results demonstrated again how immersive storytelling could lead to sustained behaviour change with participants reporting a significant increase in sustainable values and behaviours after the study.

> **"I think playing UnEarthed further solidified my love of the natural environment and definitely made me more curious to learn more."**
> Female testing participant, aged 47

The research highlighted ways in which "UnEarthed" could play a significant role in reframing how we feel and interact with animals and nature at large, resulting in positive effects on the perspectives of users.

> **"Using this game allowed me to not become so afraid of specific animals and creatures, I felt a sense of care and empathy for the world around us, and it encouraged me to spend more time outdoors."**
> Female testing participant, aged 29

Chapter 7
LEGACY

Although environmental sustainability goals were StoryFutures Creative Industries Cluster Programme leaves a significant legacy that contributes to the ongoing R&D infrastructure and capacity of the UK. These include the following 5 interventions:

StoryFutures Strategic Business Unit

The reconfiguration of the university, research funder and creative industries achieved through the Creative Industries Clusters Programme is made manifest manifested through the creation of the new 'StoryFutures Strategic Business Unit' at Royal Holloway, University of London. This unit is designed to enable university and creative industries collaborative R&D programmes between the University and creative industries to happen more seamlessly – taking the lessons from the Clusters programme forward into future programmes.

If one of the lessons for UKRI of the Clusters programme is that it is more effective to devolve certain forms of funding to bodies closer to sector needs, and then a perhaps an inevitable consequence of this will be the need for universities to not just act as research institutes but quasi-research funding bodies in their own right. To do this, universities require a change in their own infrastructure to not simply situate grant funding as projects nested within existing Schools or Departments. StoryFutures Strategic Business Unit is designed to act as a grant -holding structure within the organisation, independent of Schools and Departments –. This enables an approach that is *externally* attuned to acting as a grant -awarding entity for collaborating industry partners, whilst *internally* able to draw on domain expertise from across the range of arts, humanities, social and physical sciences.

CoSTAR: National R&D Lab for Creative Industries

Funded by The Arts and Humanities Research Council (AHRC) and, part of UK Research & Innovation (UKRI, R), Royal Holloway, University of London, is the lead partner for the CoSTAR * National Lab for R&D in Creative Technology - , a £51.1m investment by the UK Government in Applied Research to ensure the UK's screen and performance industries have the research infrastructure and research and innovation skills to compete globally.

Building on StoryFutures 'expertise in creative industries research and development (R&D), and by bringing together world leaders in applied technology research and story, Royal Holloway will support innovation for the UK's Creative Industries. Partnered with Pinewood Studios, BT, Disguise, the University of Surrey / Surrey Institute for People-Centred AI, Abertay University, Surrey County Council and the National Film & Television School, the CoSTAR National Lab will place R&D at the heart of UK storytelling and storytelling at the heart of R&D.

Partnered with Pinewood Studios, the National Lab will include dedicated studio space, featuring a large-scale virtual production system, a 5G/6G private network, a motion capture rig, and a state-of-the-art creative Artificial Intelligence (AI) compute facility accessible across the UK. Our vision for the CoSTAR National Lab will put the UK at the forefront of applied research in advanced computing technologies for the creative sector.

The National Lab will create an innovation architecture to enable the UK screen and performance sectors to lead the world in future waves of advanced computing technologies. We will do so by placing our nations' leading-edge advantage in creativity at the core of the CoSTAR National Lab, providing a centre for innovation that is unmatched anywhere in the UK.

The CoSTAR programme provides researchers, companies and institutions across the UK with the infrastructure they need to conduct world-class research and development in screen and performance technology. CoSTAR will support the design, development and creation of state-of-the-art facilities, as well as resources and expertise to underpin the long-term competitiveness of the UK's screen and performance sectors.

Established with £75.6 million of funding from the Arts and Humanities Research Council, with an additional private co-investment, the CoSTAR national network comprises a National Lab, three Network Labs and a Foresight Lab.

CoSTAR
THE UK R&D NETWORK FOR CREATIVE TECHNOLOGY
NationalLAB

StoryFutures Xperience

The extensive relationships we have nurtured whilst working closely with libraries and other local Arts venues across the UK have served as a catalyst for upskilling and knowledge exchange across sectors. We have observed a mutual transaction of value wherein staff at local arts venues are provided with skills and training around new technologies and Creative SMEs gain crucial user insights from the thorough audience testing we facilitate. This programme continues to support venues to prepare for the audiences of the future, supporting them in adopting new tech mediums whilst also supporting SMEs to understand and contextualise the user-experience, utilising libraries and arts venues as innovation testbeds.

Evidence of the impact of the XPerience and StoryTrails projects on libraries' ability to engage new audiences and build new kinds of relationships with their audiences was recognised in Baroness Sanderson's review of English libraries:

> "With increased attention on STEM learning and the government's new vision for the Creative Industries Sector to grow creative industries by an extra £50 billion, there is potential for libraries to introduce people to new educational software and technologies and inspire and upskill young people on careers of the future."[17]
>
> Baroness Sanderson, MP

TestXR: Inclusive Infrastructure & Training

TestXR was built during the StoryFutures programme to help R&D collaborations test XR experiences with online and in-person audiences. It is often the engine powering insights into the collaborations with partners discussed in the preceding chapters, from The National Gallery to BBC to SMEs. With over 3,000 registered participants, it remains a valuable tool for providing insight to companies developing XR products and experiences: https://testxr.org/

One of the most exciting legacy aspects of TestXR and StoryFutures is the development of an inclusivity tool set for audience testing – integrated into TestXR but also developed more widely as part of a ground-breaking new Collaborative Doctoral Training Partnership with the University of Surrey on AI for media inclusion.

> "A lack of accessibility hinders the interaction and immersion with virtual reality (VR) experiences to many consumers, becoming a barrier for global e-inclusion and equality of opportunities."[18]

There are no tools that can automatically detect usability and accessibility issues for immersive experiences developed outside the web browser. Due to the divergent spectrum of user needs, it is vital that developers integrate accessibility into projects from the outset – the key is to understand and acknowledge the differences between users so that experiences and interfaces can be tailored accordingly, making them more inclusive. For example, a button or dropdown-list within an app can be created in different ways, from being a 'stock' button provided by a platform to being hand-crafted via a GUI, generated in code, or a hybrid of these techniques.

To tackle this issue, in partnership with the University of Surrey's Centre for Vision & Signal Processing (CVSSP), we developed InclusivityXR as part of TestXR.org. InclusivityXR uses technology such as machine learning and computer vision to help developers identify problems around inclusivity and accessibility in their AR apps. Instead of looking at the code, it looks at the actual images within each app - – developers can simply upload a video of their app in action, and our tool generates a report listing any issues or barriers to access, such as parts of the app that may be difficult to use or where colours and text might be difficult to see. It is important for us that we take a proactive approach to addressing accessibility challenges to ensure that immersive is available to everyone.

InclusivityXR currently has a framework that can be readily extended with new bespoke detectors for other issues of inclusivity. A key next step is to identify which inclusivity issues the tool can have the most impact on for end-users and developers.

This project will continue to receive development via the new CDT partnership in AI for media inclusion that will train a new generation of over 80 industry-ready PhDs to lead the transformation to responsible AI-enabled inclusive media. This will forge a ground-breaking challenge-led model, co-designed and co-delivered with creative industry and end-user partners to remove significant real-world barriers to media inclusion. Working in multi-disciplinary cohort teams, we aim to develop comprehensive multi-faceted AI solutions combining creative, technical, behavioural, linguistic, social and legal expertise, designed with inclusion for all at their heart.

StoryArcs

StoryArcs is an AHRC initiative co-ordinated by Bath Spa University, aimed at defining the fundamental structures and values of Story Skills. The programme involves the collaboration between Story Associates from various regions in the UK, each spearheading distinct projects in partnership with a Host Organisation that requires Story Skills to address specific challenges.

Drawing insights from these types of Early Career Research placements, the StoryArcs team will develop a prototype 'Story Skill Set' to showcase how diverse story structures and competencies are applied in everyday life settings, whilst investigating the ways in which narrative skills contribute directly to the UK's economy and the wider creative sector. One of the central challenges for the StoryFutures Associate is to contribute to the formulation of the framework for the second version of the highly successful StoryTrails project. StoryTrails 2.0 represents the next iteration of the immersive storytelling project from 2022, offering communities a chance to reimagine and re-envision their local communities within the metaverse. The associate will play a role in advancing and testing innovative immersive formats through connections with public libraries.

[17] 'An Independent Review of English Public Libraries', Baroness Elizabeth Sanderson of Welton (2023)

[18] Immersive Media & Accessibility: Hand in Hand to the Future - ITU Journal: ICT Discoveries, Vol. 3(1), 18 May 2020)

LESSONS LEARNED

Challenge	Lessons Learned	Benefit/Impact
De-Risking of R&D and facilitating SME project development Structured programmes proved a valuable way to de-risk SME's R&D investment via: • Ring-fencing time for SMEs' staff to work on experimental projects. • Accessing expertise from university ecosystems – researchers, KE and Innovation managers, IP experts and students. • Providing access to funding and talent pools for SMEs, enabling them to take on innovation projects which they would not ordinarily be able to.	R&D is resource-intensive, meaning that many SMEs are less likely to participate given the pressures to turnover profits within short time-spans. Structuring R&D programmes so that they have familiar touch-points and clear 'added value' is an important de-risking method. This includes providing SMEs with access to commissioners and markets they might not otherwise access. For StoryFutures, this also involved providing market and audience insights as part of a virtuous feedback loop that helped SMEs see the value of R&D beyond immediate cash incentives.	Institutions should identify key barriers to R&D faced by potential partners before seeking to engage. Cash and in-kind incentives from Clusters and large organisations can pump prime the innovation funnel, removing immediate barriers to entry related to time and capital.
Creation of adaptable and repeatable frameworks SF initiatives, such as our Immersive Fellowships programme and StoryLabs, are examples of scalable and repeatable R&D models designed in such a way to be easily adapted and re-used by companies across different R&D opportunities. – for example, StoryLab open innovation model worked just as well for the Aviation sector as it did for the Cultural sector.	Scalability and repeatability of innovation models are a central aspect of growth. There is a significant operational overhead involved in developing a collaborative R&D Programme, requiring IP and contracting models, procurement and compliance as well as, ethics and data to be considered before one gets to the R&D.	Repeatable models provide one method for managing resource efficiently.
Integration of audience insight into impact and evaluation As part of our R&D programme, we integrated both qualitative and quantitative approaches to user testing audience insight so as to generate clear- cut objectives and answer crucial research questions in prototype development.	There is a real need for a balanced approaches to audience data collection and analysis. Quantitative methods offer succinct answers which can be utilised to produce reliable stats statistics and figures, but this often does not tell the entire story. Qualitative research gives a deeper insight into the impact that our programmes have had. Quantitative research might could tell us 'what happened', but Qual qualitative research often provides the story of 'how' and 'why'.	A varied approach to impact evaluation produces rich data which can underpin compelling stories to evidence delivery of KPI's. Our Audience Research Framework (see here - https://legacy.storyfutures.com/reports-pdf/Audience-Insight-Report-Complete-1.3.pdf) delivers real-world user insights to inform product development and provide evidence to funders, investors and commissioners of economic, brand and social value.

Challenge	Lessons Learned	Benefit/Impact
A strong, cohesive team with effective leadership We were able to build a dynamic and enthusiastic team of individuals with diverse specialisms and a commitment to core shared values through an investment to this culture in the senior leadership team.	Creative Industries R&D through the Clusters was a 'never been done before' programme of collaborative and , applied research. As crucial to the finance, structures and methods was a 'can do' attitude within the delivery team. Developing a shared vision and goal as well as opportunities to share knowledge within the team is therefore crucial.	Building and growing a team around common goals is crucial to addressing some of the big challenges. Finance and management need a flexible and adaptive approach to allow for interdisciplinarity to grow with the needs of the sector – providing a mix of long-term and short-term specialist and flexible knowledge. Having the ability for teams to work across different projects and re-align funding to different researchers is therefore key.
Academic and industry collaborations There can be friction between universities' aspirations for longer-term research and the challenges faced by SMEs participating in extended research programmes.	Create a range of R&D programme offerings of different lengths and intensity/scale with clearly defined end goals and outcomes for academics and SMEs. Short programmes can test and trial relationships at low risk, scoping longer partnerships that exist beyond the life of the single intervention.	Frictions can be reduced by acknowledging and documenting different expectations between SMEs and researchers at the outset of projects.
Working within an HEI Balancing the fast-paced nature of immersive tech innovation with a slower paced and bureaucratic processes of HEIs can be challenging.	Academics have a range of commitments including teaching hours. It is important to be aware of the rhythm of academic research in comparison to industry, before attempting to bring these worlds together. Furthermore, academic career progression is dependent on published research in academic journals which requires a longer-term approach which that is not always aligned with Clusters' funding models.	Work closely with HEI staff to train researchers in collaborative R&D methods and communications to promote a greater understanding in HEIs of nature of industry facing R&D support, helping to maximise synergy.
Identifying and addressing training needs Identifying gaps in training is key to ensuring partners are fully capable of working closely with immersive tech and able to 'code-switch' where necessary.	It became clear that bringing together individuals with diverse specialisms would entail a degree of training and upskilling. To ensure all partners and staff are fully prepared to delve into immersive innovation, we developed a filtering process, identified skills gaps and facilitated real-world training opportunities. This allowed us to generate a shared understanding of the role of academic participation in industry collaborations. Through this, we also delivered on our commitment to the exchange of knowledge and expertise.	A greater emphasis on training and upskilling, both internally and with external partners. Sharing of knowledge and expertise instils confidence in partners and users alike, leading to significant growth within the immersive sector.

LESSONS LEARNED

Challenge	Lessons Learned	Benefit/Impact
Industry co- funding There is a need to invest in business development capacity to identify challenge partners and SMEs able to invest in R&D.	Our experience saw senior management and creative staff heavily involved in outreach and engagement – seeking out new partnerships and opportunities, and ultimately nurturing these relationships.	Through the creation of a dedicated business development role, senior management and creative staff are able to focus on longer-term objectives.
Contracts Engaging with benefiting SMEs, collaborators and industry supporters demanded greater flexibility and nuance. Standard contracts from Higher Education Institutions (HEIs) can be perplexing and unclear for commercial partners.	Significant time from senior staff and legal teams is required for drafting contracts fit for engagement with the creative sector and developing templates that are easily understood by commercial partners.	Future Clusters can benefit greatly from accessing contract templates utilised in Clusters 1.0. The lessons learned around contracting between HEIs and SMEs are invaluable and could save significant time and expenses in future.
Cluster Definition Defining a cluster is not simply a matter of counting numbers of SMEs operating in creative.	SMEs don't do not reliably represent themselves on the web or via SIC and SOC codes. Moreover, this mapping doesn't does not provide detail as toon company readiness for R&D. Quantitative and qualitative approaches are needed to map and engage a cluster.	Interrogating data from the outset and focusing on building a core set of partnerships that can facilitate wider networks is crucial to success. Provide resources for network and industry facilitation.
Intellectual Property and assignment of rights Experience of commercial successes in applied science-based research has led universities to over-estimate the potential value of IP opportunities within humanities-based projects. This can conflict with the Clusters Programme's ambition to grow SME-held IP.	Discussions with institution's R&I and legal teams require a pragmatic and strategic approach to identifying where 'value' lies for universities, which is not always (or even often) with IP exploitation.	Future Creative Industries Clusters Programmes and universities working with the sector on R&D need to develop an industry-specific approach to build trust and identify value for all parties. Benefits to universities are more likely to lie in KE and impact than in commercialisation.

APPENDICES

Appendix 1: StoryFutures' Cluster Mapping Methodology

Nesta methodology1

Geography of Creativity: Office for National Statistics' (ONS) Business Structure Database (BSD), Annual Business Survey, and the Annual Population Survey (APS) for microbusinesses. GVA data collected, extrapolated to the level of TTWAs using proprietary Dynamic Mapping methodology.

Creative Nation: The Business Structure Database, The Annual Business Survey, Companies House API; GlassAI (proprietary AI for scraping website content). GVA data collected, extrapolated to the level of TTWAs using proprietary Dynamic Mapping methodology.

Inclusion criteria: Relevant SIC codes/keywords (see appendix 1).

StoryFutures' methodology

Search through DueDil (dedicated software to search Companies house database) filters: Active, Country - UK, Industry Keywords (see below), Trading Address (all postcodes within the cluster area). After that, a researcher checks if the company is relevant by manually looking at its website and social networks. Whilst the use of keywords is an additional filter compared to Nesta data, which may exaggerate the discrepancy between their findings and our approach, the search terms remain very broadly applicable to any company working in screen industries or audience-facing technology sectors.

Inclusion criteria (any of the below):

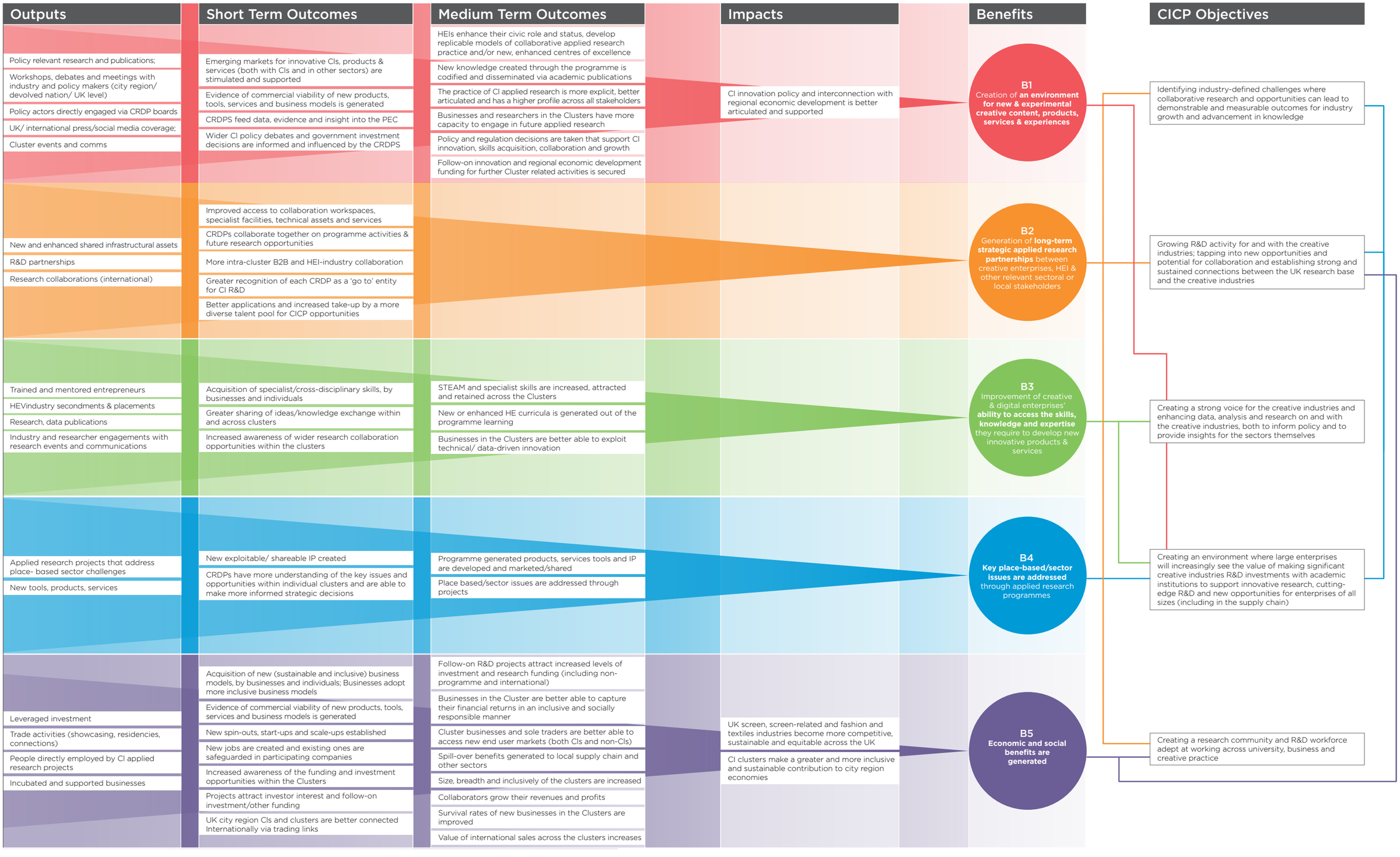
- Creative companies, including their distribution branches.
- Experience in immersive or interactive media outside creative companies (e.g. firms that use and develop VR solutions).
- Software developers that have experience with visualisation technology.
- Commercial and distribution arms of multinational companies whose creative division is abroad, separate companies comprising media holdings.
- Possible shell companies that have no website and no observable activities, but nominally registered as creative companies (e.g. Ingenious Media Group suspected of tax avoidance - https://www.accountancydaily.co/ingenious-film-scheme-ruled-tax-avoidance-appeal).

Examples: The Sound Agency Limited (soundscapes), Thunderbox (AR gaming company), Reality Check Systems Emea Limited (AR graphics), Volume Limited (AI developers), Because Experiential Marketing Ltd (multisensory marketing).

Exclusion criteria:

- Recruitment and consulting companies.
- Electronics shops that sell AR/VR hardware or DVDs.
- Any type of non-creative company (accountants, investment groups, law firms, farms).
- Software companies that work in unrelated fields (e.g. physics, accounting, logistics, project management) or do not produce content (e.g. software testing firms, data management).
- Printing companies (i.e. non-digital design and memorabilia).
- IT helpdesks/service centres, CCTV companies, video-conferencing services.
- Companies that rent equipment to creative companies.
- Physical toy manufacturers and sellers.
- Virtual server management software developers.
- Events companies.
- Duplicates: multiple divisions of the same local company that have different registration numbers; the same company coming up in different searches.

Examples: BAE Systems (logistics company), BAM Nutall (demolition company), Audley group (retirement homes), Aspen Worldwide (executive headhunters), Honeywell Security (security including video surveillance).


Outputs
Short Term Outcomes
Medium Term Outcomes
Impacts
Benefits
CICP Objectives
Policy relevant research and publications;
Workshops, debates and meetings with industry and policy makers (city region/ devolved nation/ UK level)
Policy actors directly engaged via CRDP boards
UK/ international press/social media coverage;
Cluster events and comms
Emerging markets for innovative CIs, products & services (both with CIs and in other sectors) are stimulated and supported
Evidence of commercial viability of new products, tools, services and business models is generated
CRDPS feed data, evidence and insight into the PEC
Wider CI policy debates and government investment decisions are informed and influenced by the CRDPS
HEIs enhance their civic role and status, develop replicable models of collaborative applied research practice and/or new, enhanced centres of excellence
New knowledge created through the programme is codified and disseminated via academic publications
The practice of CI applied research is more explicit, better articulated and has a higher profile across all stakeholders
Businesses and researchers in the Clusters have more capacity to engage in future applied research
Policy and regulation decisions are taken that support CI innovation, skills acquisition, collaboration and growth
Follow-on innovation and regional economic development funding for further Cluster related activities is secured
CI innovation policy and interconnection with regional economic development is better articulated and supported
B1
Creation of an environment for new & experimental creative content, products, services & experiences
Identifying industry-defined challenges where collaborative research and opportunities can lead to demonstrable and measurable outcomes for industry growth and advancement in knowledge
New and enhanced shared infrastructural assets
R&D partnerships
Research collaborations (international)
Improved access to collaboration workspaces, specialist facilities, technical assets and services
CRDPs collaborate together on programme activities & future research opportunities
More intra-cluster B2B and HEI-industry collaboration
Greater recognition of each CRDP as a 'go to' entity for CI R&D
Better applications and increased take-up by a more diverse talent pool for CICP opportunities
B2
Generation of long-term strategic applied research partnerships between creative enterprises, HEI & other relevant sectoral or local stakeholders
Growing R&D activity for and with the creative industries; tapping into new opportunities and potential for collaboration and establishing strong and sustained connections between the UK research base and the creative industries
Trained and mentored entrepreneurs
HEVindustry secondments & placements
Research, data publications
Industry and researcher engagements with research events and communications
Acquisition of specialist/cross-disciplinary skills, by businesses and individuals
Greater sharing of ideas/knowledge exchange within and across clusters
Increased awareness of wider research collaboration opportunities within the clusters
STEAM and specialist skills are increased, attracted and retained across the Clusters
New or enhanced HE curricula is generated out of the programme learning
Businesses in the Clusters are better able to exploit technical/ data-driven innovation
B3
Improvement of creative & digital enterprises' ability to access the skills, knowledge and expertise they require to develop new innovative products & services
Creating a strong voice for the creative industries and enhancing data, analysis and research on and with the creative industries, both to inform policy and to provide insights for the sectors themselves
Applied research projects that address place- based sector challenges
New tools, products, services
New exploitable/ shareable IP created
CRDPs have more understanding of the key issues and opportunities within individual clusters and are able to make more informed strategic decisions
Programme generated products, services tools and IP are developed and marketed/shared
Place based/sector issues are addressed through projects
B4
Key place-based/sector issues are addressed through applied research programmes
Creating an environment where large enterprises will increasingly see the value of making significant creative industries R&D investments with academic institutions to support innovative research, cutting-edge R&D and new opportunities for enterprises of all sizes (including in the supply chain)
Leveraged investment
Trade activities (showcasing, residencies, connections)
People directly employed by CI applied research projects
Incubated and supported businesses
Acquisition of new (sustainable and inclusive) business models, by businesses and individuals; Businesses adopt more inclusive business models
Evidence of commercial viability of new products, tools, services and business models is generated
New spin-outs, start-ups and scale-ups established
New jobs are created and existing ones are safeguarded in participating companies
Increased awareness of the funding and investment opportunities within the Clusters
Projects attract investor interest and follow-on investment/other funding
UK city region CIs and clusters are better connected Internationally via trading links
Follow-on R&D projects attract increased levels of investment and research funding (including non-programme and international)
Businesses in the Cluster are better able to capture their financial returns in an inclusive and socially responsible manner
Cluster businesses and sole traders are better able to access new end user markets (both CIs and non-CIs)
Spill-over benefits generated to local supply chain and other sectors
Size, breadth and inclusively of the clusters are increased
Collaborators grow their revenues and profits
Survival rates of new businesses in the Clusters are improved
Value of international sales across the clusters increases
UK screen, screen-related and fashion and textiles industries become more competitive, sustainable and equitable across the UK
CI clusters make a greater and more inclusive and sustainable contribution to city region economies
B5
Economic and social benefits are generated
Creating a research community and R&D workforce adept at working across university, business and creative practice

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ROYAL HOLLOWAY UNIVERSITY OF LONDON

Creative Clusters

UKRI Arts and Humanities Research Council

INDUSTRIAL STRATEGY