

## Gateshead and Newcastle Immersive Technology

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### Case Study Overview

**Characteristics and history:** The North East immersive technology industry is centred around Gateshead and its surrounding area alongside the River Tyne in Newcastle. The North East of England has been strong in the creative sector since the 1980s, when regional TV programming spilled over to support a wider range of industries, including video gaming and technology. Immersive Technology has historically developed through a small network of creative businesses. The North East houses the largest hub of Virtual Reality companies in Europe, a community that is close-knit and collaborative in nature. In 2014, the companies came together to organise an international virtual reality conference and expo, VR2GO, which unveiled opportunities for the North East to be internationally recognised as an important immersive location.

Since then, the North East and Tees Valley Digital Catapult (NETV), a UK organisation that contributes to the development of advanced technology in the region, has identified immersive technology as a main focus for development. The main actors in the immersive technology industry are a strong network of small and medium enterprises (SMEs); Gateshead Council; North East Local Enterprise Partnership, and NETV Digital Catapult. Currently, the cluster's assets and activities are centred in PROTO, the first digital production facility in Europe. PROTO's purpose is twofold: to provide a shared workspace for immersive companies that are mostly SMEs to collaborate; and to provide immersive technologies for these companies that are otherwise only accessible by larger companies.

In general, immersive technology is still at an early stage in its growth. Nonetheless, respondents of the study explained that the immersive technology industry has had an exponential growth through the pandemic. The past three years have allowed for a wider range of industries to realise the potential that immersive technologies could bring to business. In Gateshead, immersive SMEs are looking at the application of their technologies beyond the limited area of gaming and entertainment. Due to the limitless application of immersive technologies, its application and platforms can be used across multiple industries. Currently, immersive technology enterprises are engaging with the use of immersive technologies in areas such as *advanced manufacturing, crisis and hazard management, skills training, and education*, besides the more obvious routes of *games and entertainment*.

**Geography and size:** The North East of England comprises the urban centres of Tyneside, Wearside, and Teesside. Based on the North East LEP, this covers the local authority areas of County Durham, Gateshead, Newcastle, North Tyneside, Northumberland, South Tyneside and Sunderland. The area boasts 8,600 square kilometres (sq km) of land, although the Immersive Technology activities discussed in the report are currently located primarily in Gateshead and Newcastle. While immersive activities may have spillovers in the wider digital economy of the North East, the development of PROTO, the first digital production facility of its kind in Europe, in Gateshead has resulted in a concentration of immersive activities where the building is located and in its surrounding areas.

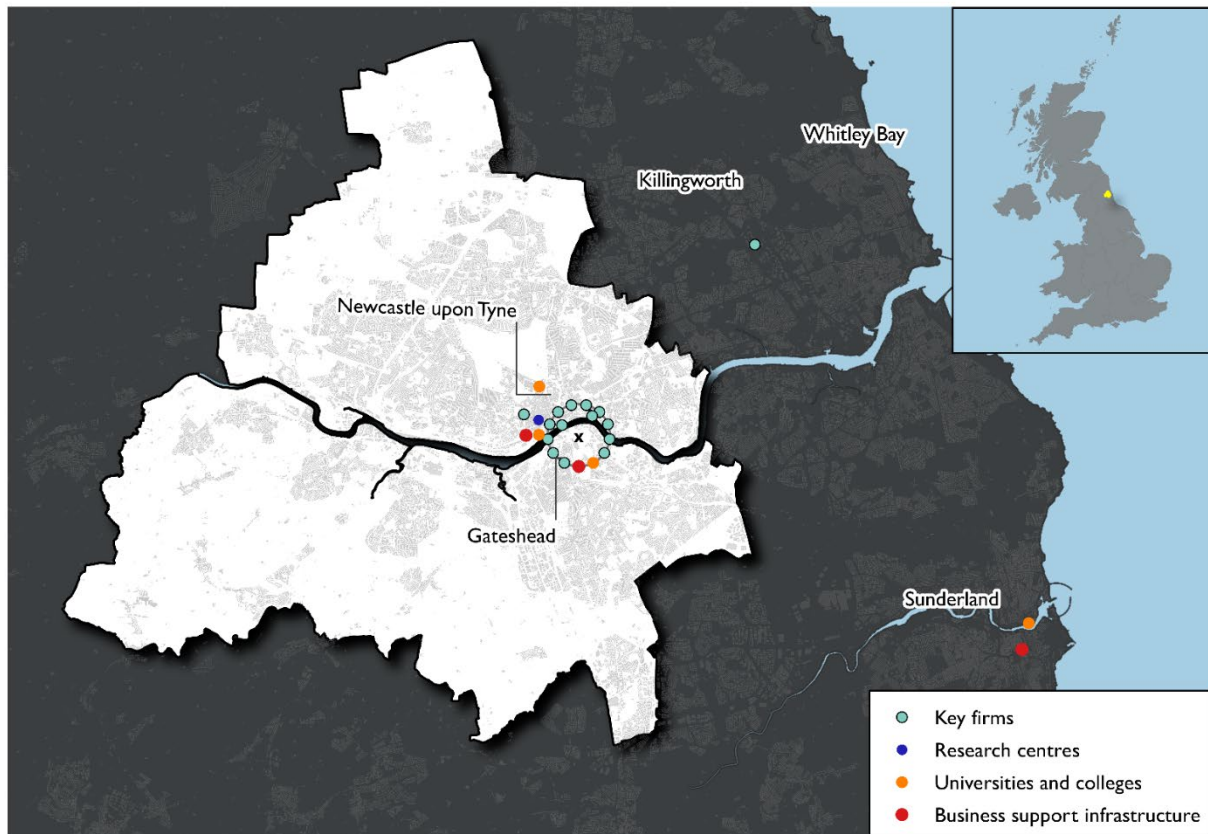


Figure 12: North East Immersive Technology Cluster map.

**Areas of potential future growth:** Internal indicative estimates by Gateshead Council suggest that the potential of embedding immersive technologies across a broad range of industries and applications could increase the UK's productivity by 4%. For the North East region, this could lead to a GVA of up to £159 million. In order to meet the challenges of slow adoption of immersive technologies by non-immersive companies, the development of Immex City in Gateshead aims to support SMEs to sell into a broader range of industries.

Currently, the Immersive Technology cluster is in a growth phase, with the adoption of immersive technologies in games development, software development, fintech, cyber security, space, artificial intelligence, BIM, cleantech and data science. There are notable activities in two core areas:

- **Creative Industries (including gaming and entertainment):** The measurement of gaming and entertainment in the North East could be done through the proxy of the Information and Communications sector, which was worth £2.2 billion in 2019. Gateshead is the centre of gaming and entertainment in the North East, with many creative businesses calling Gateshead Quays their home.
- **Advanced manufacturing:** The North East Manufacturing sector was worth upwards of £7.9 billion in 2019. The main challenge of manufacturing in the North East is in increasing the productivity level, which has varied between 3% to 15% lower than the national average in the past few years. Gateshead Council has identified immersive technology as a potential solution to bringing productivity levels back up in manufacturing, through the reduction of training costs and increasing output efficiency through the use of immersive technologies.

Other areas that are emerging as adopters of immersive technologies in the region include:

- Design, inspection and maintenance of assets
- Health and safety training
- Education
- Electrification and digitisation

**Reflections:** Spatially, the NEIT activities are concentrated in a small geography, although, given that immersive technologies can be applied through digital methods, its reach has no boundaries. Synergies with various sectors are increasing with more awareness around the adoption of immersive technologies. External to gaming and entertainment, opportunities continue to increase in areas of advanced manufacturing through electrification and digitisation; design, inspection, and maintenance of assets; health and safety training; and education.

## Core Assets

**Market structure and anchor firms:** There is no one anchor firm in the immersive technology industry. Instead, the industry is made up of a small cluster of SMEs who are centred around PROTO. Based on interviews, the majority of the SMEs are micro-sized. They are collaborative on knowledge exchange with each other and communicate well, given that many are being housed under PROTO, alongside authorities within the immersive technology industry. There have been a few firms who managed to grow its size by being acquired by larger, international firms. However, the challenge that remains among the micro firms is in scaling up their operations and services.

**Higher education and training institutions:** The North East has several important universities and further education colleges, although skills development specific to immersive technologies has come directly from the entrepreneurs and collaborations with local authorities. This research found skills shortages as a particularly important challenge in the cluster. Currently, stakeholders in the cluster are collaborating in developing skills training and education programmes on digital and technology that would feed into Immersive Technology. Education institutions that were mentioned in this study include:

- **Gateshead College:** working closely with businesses and authorities in the immersive technology industry to respond to the growth in demand for digital and tech skills since long before the pandemic. Gateshead College's Level 3 Emerging Technologies course provides students with access to PROTO's specialist kit. This collaboration allows for the education of young people interested in immersive professions to work with new technologies as they emerge, alongside tech-based start-ups. Gateshead College has engaged with 400 students across different courses, including healthcare, performing arts, dance, education and sport, to develop digital skills that include immersive technologies.
- **Sunderland University:** has a collaboration with PROTO enabling students to access PROTO's specialist kit for the creation of immersive games and content. Sunderland also has a **Digital Incubator** which supports skills development by connecting students and graduates with local immersive businesses to work on live projects and R&D.
- **The North East Futures University Technical College:** has IT, computing and healthcare science courses for 14 to 19-year olds that are co-funded by North East-based Accenture, Hewlett-Packard, Sage and Ubisoft.
- **Newcastle University:** houses the **Digital Cultures Centre**, which focuses on innovative engagements within digital public spaces. As part of this, their UKRI-funded project, 'Next Generation of Immersive Experiences', introduces innovative digital creative methods, such as changing working processes and practices using AR, into cultural organisations.
- **Teesside University:** has programmes in Immersive Technology that are a unique and

important asset in talent development specific to the spaces of immersive. The university also has expertise in immersive technologies and an in-house student digital production studio called **TUCan**. TUCan is run by experienced academic staff working with graduates to create R&D solutions and products in the areas of animation, immersive technologies, film production, app development, 360, artificial intelligence, and data analytics.

**Other research and anchor organisations:** While the wider North East has a rich involvement with research in digital technology, the study has found that there are several anchor organisations that are catering to the specific needs of immersive technology. It should be noted that these anchor organisations are involved with wider partnerships in the digital technology area, as well as industries in the region that are using the platforms and applications of immersive technologies, such as advanced manufacturing, health and life sciences, energy, and education, among others.

- **PROTO** is an immersive technology facility that is owned by Gateshead Council, and partly funded by the North East LEP, the European Union's European Regional Development Fund, Growth Deals, and the North East Tees Valley Digital Catapult. Based in the Baltic Quarter, Gateshead, the area has a United Kingdom Science Park Association status, housing 40 creative tech, digital and design companies. PROTO is the first digital production facility of its kind in Europe, developed especially with animators, film makers, and game developers in mind. PROTO currently houses the North East and Tees Valley Immersive Lab, a test bed of research in immersive. PROTO was developed to provide access to expensive leading edge hardware and software for businesses, with the hope that providing affordable access to these technologies could assist the growth of start-ups and allow existing businesses to understand the potential of immersive technologies and conduct research and development in new products and practices using immersive. The types of technologies that PROTO has include mixed reality green screen (LIV), haptic gloves (Manus), motion capture suits (Perception Neuron), pupil tracking, and holographic display hardware (The Looking Glass/Hololens).
- **National Innovation Centre for Immersive Technology** is an ongoing project, an ambitious project which aims to grow the cluster by providing access for entrepreneurs to a commercial workspace, R&D lab space, and an immersive visitor attraction centre (Invest North East England, n.d.).
- **TusPark** is a nationally- and internationally-connected incubator located in the city centre of Newcastle. It offers its members access to affordable office space, workshops, and a network of digital and technology entrepreneurs.

**Support structures and infrastructure:** The North East has a great range of assets and infrastructures that support the growth of the immersive technology cluster. These assets and infrastructures are also jointly funded by different authorities, including the Gateshead Council, the North East LEP, Digital Catapult North East and Tees Valley, among others. Co-investment assists in providing support to the businesses in the region and assists in collaborations among the actors in the cluster. The assets and infrastructures include:

- **PROTO** - has assisted in accelerating the growth of the cluster by allowing SMEs to have access to technologies that are usually only available to large firms. PROTO as a building is also home to many businesses in the area as well as several authorities, making it easier for knowledge sharing to occur.
- **North East and Tees Valley Digital Catapult** – The NETV Digital Catapult is a satellite centre of the national Digital Catapult.
- **Gateshead Council** - plays a key role in aligning the NEIT industry's strategy and vision to the overall economic and social goals in the region. Gateshead Council has been instrumental in

- supporting the aims that the NEIT businesses have as well as finding out new opportunities.
- **Dynamo North East** - a volunteer-led group that aims to grow the North East IT economy through collaboration, innovation and skills. It hosts regular events and an annual digital conference and runs several digital clusters and special interest groups to champion specialities like cybersecurity, digital construction, shared service operations, and fintech.
- **NOVA (North East Game Collective)** - a collective of game companies in the North East. The collective hosts meet-ups, conferences, podcasts, and provides online support for designers, developers, gamers, and studios of all sizes.
- **Sunderland Software City (SSC)** - is part of the NETV Digital Catapult and is a key delivery organisation for North East and Tees Valley. It supports technology start-ups as well as large businesses through regular meet-ups.
- **Innovation Supernetwork** - exists to connect businesses in North East England with the opportunities, finance and support needed to innovate and grow. Supported by 60 partners, including all five regional universities and high-profile organisations across the public and private sectors, it brings together the innovation ecosystem to support economic growth.

**Finance:** Immersive technology firms face the same issues as those in other places: a lack of growth and scale up funding. The firms interviewed have grown organically but remain at a micro- or small-sized scale. A potential constraint in attracting funding could be the cluster's current focus on applied immersive technologies, predominantly in gaming and entertainment. Interviewees explain that there is a cluster-wide collaboration for increasing awareness of the potential that immersive technologies could bring to different industries. This could be integral to attracting funding due to recognition of the untapped potential that immersive technologies could bring to the productivity levels of multiple industries.

Through the Digital Catapult, there is currently a startup programme that has recently funded six new startups in the region. The Venture Fest, where immersive technology firms can go if they wish to secure private investments, also runs annually. There have been some talks to establish an angel investors' network, although at the time of writing this network did not yet exist. While Gateshead Council has been instrumental in providing funding support for the cluster, it should be mentioned that a lot of the funding secured to build the infrastructures in the cluster came from sources that can no longer fund the cluster, such as Northern IT Research (which has since wound up) and the European Union.

Nonetheless, the North East is the only region that has a high potential opportunity (HPO) status for immersive technology, conferred by the Department for International Trade (DIT). The status means that the DIT recognises the national and international significance of the immersive technology industry and will support inward investment opportunities to the region. The immersive technology industry was given HPO status due to the national significance of its digital innovation in manufacturing, the potential for collaborations between universities and SMEs, the availability of R&D assets in the region, and its access to skilled workers. Because of the immersive technology industry's HPO status, companies seeking a UK base in this industry will be brought to the North East cluster. This could generate a lot of interest from the finance community and attract further investment.

**Reflections:** The NEIT industry has a great potential in terms of a growing market, strong assets and infrastructures, and a supportive network of actors. While the industry is currently composed of micro and SME firms, there is a strong drive by various actors to help the industry grow, specifically with a focus on scaling up firms.



## Skills

**Talent pool:** The North East has approximately 32,500 employees in the digital and tech sector, while 5 of its world class universities offer educational courses that are aimed at the immersive technology sector (Invest North England, 2021b). Despite this, a prominent challenge identified by respondents is the limited talent pool for the wider digital industry in the North East. Respondents described a lack of access to skills that could slow down the growth of the immersive technology industry. This could be related to the wider skills shortage faced in the North East. As one respondent said:

*Some of the entrepreneurs that have started businesses here; we need to make sure that we continue to retain them in our region. I think that's something that we've talked about, maybe not too much. But it's something that we've heard a lot about, right? That kind of talent leaving. They come into the region studying here and then leaving for opportunities further afield.*

Specific to immersive technology is the lack of a talent pool in the region that could cater to the industry. As respondents explained, due to the unique nature of the cluster growing from a small group of SMEs, rather than stemming from university spinouts or startups, the local educational institutions currently need to catch up with providing the right skills training that could cater to the immersive technology industry. The North East has a limited talent pool for immersive technical roles such as design architects, 3D artists, software developers, software engineers, XR gameplay and tools engineers, and system validation engineers. Respondents also identified the need for talent that have the drive to think of immersive technologies beyond the limited spaces of immersive gaming and entertainment.

**Local skills provision:** Based on Invest North East England, the region has nearly 6,000 computer science university students, which is the highest proportion of any other English region (Invest North East England, 2021b). There are also 32,500 people employed in the region's digital sector, with respondents claiming that talent in the industry tends to be loyal, based on lower staff shortages or turnover compared to other parts of the UK. To overcome skills shortages in the immersive sector, authorities and companies are working together with local educational institutions such as Gateshead College and Newcastle University to develop courses, skills programmes, and apprenticeships. Local skills provision by higher education institutions in the region have also been listed under the section of "Higher education and training institutions."

**Reflections:** Although there are a large number of employees in the North East digital and tech sectors, skills shortages continue to be a challenge for the immersive technology sector. These shortages are more pronounced in ensuring that potential employees have flexibility and creativity in seeing the potential application and adoption of immersive technologies. The immersive technology industry is also unique in that the cluster emerged from the pool of entrepreneurs themselves, rather than stemming out of university research, start-ups or spin-outs. Currently, collaborations between entrepreneurs, authorities, and local educational institutions have been instrumental in cultivating skills relevant to immersive technologies. Efforts should be put into place to retain talent by increasing the attractiveness of employment in the cluster.

## Knowledge Exchange

**Firm research and development practices:** This study did not capture that the firms in the immersive technology industry are research active, given that the majority of them are micro- or small-

sized. However, the world-class facilities of PROTO have allowed these firms to have access to expensive technologies which they would not otherwise have had access to. This access has allowed for creativity in identifying potential platforms in which immersive technologies can be applied.

**Knowledge sharing and flows:** Respondents express that there are many collaborations between stakeholders in the cluster, although much has to do with raising awareness of the potential that immersive technologies could bring to multiple industries. The study did not capture whether these collaborations generate income or not. Furthermore, collaborations between firms, authorities, and local educational institutions have been growing to support the development of skills specific to immersive technologies and to grow the local talent pool in the immersive technology industry.

There are also a variety of business networks in the immersive technology sector that are active in supporting one another through collaborations. These include:

- **VRTGO LABS** - bringing together companies, academics, freelancers and the authorities to collaborate on the commercial application of immersive technologies.
- **Digital Catapult North East Tees Valley** - focusing on supporting businesses in the digital and tech sector in the North East and Tees Valley, and encouraging collaboration through different types of events.
- **Dynamo** - a volunteer member group of firms and other types of institutions that are focused on growing the North East's digital and technology industries.
- **Digital Union** - the largest network of representatives of digital companies in the North East.
- **Innovation SuperNetwork** - 50 partners and over 5,000 members that come together sharing ideas, knowledge, funding and business opportunities to support innovative businesses in the North East

**Knowledge access and cultures:** Based on respondents, the knowledge exchange environment of the immersive technology industry is relatively open. As one respondent said:

*They all collaborate with each other, particularly at the outset to a certain degree. Quite a few times you get new startup companies in the space that benefit from being plugged into the cluster, and from some of the people in the space who were the new authorities and the visionaries. They get a lot of support from each other.*

While firms certainly guard their proprietary information, there appears to be a willingness to collaborate and share knowledge as evidenced by pre-COVID frequency of firm meetups and collaboration events.

**Firm network relationships:** Respondents describe the pre-COVID environment of the cluster as being a lot more active in bringing firms together. There is therefore an opportunity to increase firm network relationships by going back to the pre-COVID activities in bridging gaps between different stakeholders in the cluster. Nonetheless, respondents have described collaborative efforts to grow the cluster as integral to the cluster's success. Collaborations have continued to happen in terms of knowledge sharing, although there is an opportunity to facilitate more formalised collaborations through innovative projects, especially in the areas of R&D.

**Reflections:** Knowledge exchange happens at the industry level with multi-stakeholder collaboration being key to the success of the cluster's growth. However, there is room to increase awareness of adoption of immersive technologies, which remains a challenge. The growth of the cluster is dependent on cross-sectoral application of immersive technologies. There is a danger that entrepreneurs in this area are only focused on the narrow scope of creative industries. There is a challenge to ensure that they are aware of the business potential that immersive technologies could bring to different industries, and to market themselves as providers of solutions for these different industries.

## Networks of Coordination

There are three main governance networks dedicated to developing a vision and strategy for the growth of the sector:

- **Gateshead Council** - is instrumental in promoting the growth of the immersive technology industry. Together with Invest North East England, they have led the vision and strategy of developing the immersive technology cluster, as well as helped in obtaining the High Potential Opportunity (HPO) status of the cluster from the DIT. They currently continue to contribute in developing the vision and strategy for the cluster, providing support through collaborations with the industry.
- **The North East and Tees Valley Digital Catapult** - supports the competitiveness and growth of digital and technology entrepreneurs in the region. They provide small-scale funding to businesses, have invested in assets in immersive technology, and also provide support for innovation among SMEs.
- **North East LEP** - has a strategic economic plan which includes the tech sector as one of the key sectors for growth in the North East. Immersive technology has become one of the key areas of specialism in this space. Through the **North East Evidence Hub**, they provide useful data to support the need for growing immersive technology in the region. While instrumental in investing in key assets in the cluster such as PROTO, the North East LEP also provides R&D funding for SMEs in the region.

The three governing bodies are in constant communication with each other and do understand the vision and strategy for the growth of the immersive technology industry. They have a cohesive understanding of the cluster and are working well together to drive the synergies of the multiple stakeholders involved in the cluster.

**Reflections:** The governance of the immersive technology sector shows a recognition of the potential that the cluster may bring to the region. Different governance authorities have similar visions of how the cluster should grow and are constantly in communication with one another. The challenge remains in working together with the industry, especially in attracting large businesses to invest in the cluster and to support further development of the micro- and SME-sized firms in the cluster.



## Discussion: Innovation opportunities and support needs

**Evolution and market opportunities:** The immersive technology industry has accelerated its growth throughout the pandemic with the support and collaboration of stakeholders in the sector. This has allowed for the identification of opportunities to expand and scale up based on increasing awareness of the adoption of immersive technologies. The core areas of *creative industries* and *advanced manufacturing* will remain strong, although there are considerable opportunities for cross-sectoral synergies, especially through activities such as *design, inspection and maintenance of assets; health and safety training; education; and electrification and digitisation*. With a greater focus on ESG efforts and sustainability, immersive technologies have a great potential to cross different sectoral boundaries. Efforts should be placed on increasing awareness of the value of adopting immersive technologies and cross-sectoral synergies should further be encouraged.

**Resilience:** Globally, the adoption of immersive technologies is growing at an accelerated rate, and the North East will continue to benefit from this. The key challenge remains in the areas of (1) skills shortages, (2) access to private growth/scale funding, (3) increasing awareness among entrepreneurs of the cross-sectoral application of immersive technologies, and (4) increasing awareness among businesses of the value of adopting immersive technologies.

**Areas of potential support and intervention:** Overall, the immersive technology industry has great potential for growth. With support in the following areas, it can increase its untapped potential:

- Building links between different industries that can apply immersive technologies: Currently the resilience of the cluster could be dependent on increasing awareness of immersive technologies' applications in different sectors. An education initiative is needed to, firstly, increase awareness among those working in the cluster of the untapped potential that immersive technologies could bring in areas such as *design, inspection, maintenance of assets; health and safety training; education; and electrification and digitisation with a focus on sustainability*. Secondly, in a similar vein is the need to increase awareness among businesses in different sectors of the benefits that immersive technologies could bring to their businesses, in the same areas mentioned above. Conversations between these different stakeholders should be encouraged and facilitated where possible.
- Growing local private funding community: One of the core barriers for the growth of the cluster is access to funding to scale up the firms in the cluster. Support needs to be given in assisting entrepreneurs to prepare for private investment pitches, to be aware of their business cases, and to understand where the opportunities lie in emerging technologies. Efforts should be made in attracting investors into the region for immersive technology by creating awareness of the benefits of immersive technologies as a business solution.
- Increasing education initiatives and the potential of immersive technologies: Currently, many of the entrepreneurs in the cluster are still focused on creative industries and solutions. However, immersive technology solutions cut across multiple sectors. For example, there is an untapped potential that immersive technologies could bring in providing solutions for ESG, sustainability, or Net-Zero initiatives. The lack of understanding about immersive technologies does not only reside with entrepreneurs, but also among different industries in terms of knowing how immersive technology adoption could be beneficial to their businesses. Encouraging support in this direction could assist in opening markets and attracting investment into the region.

**Reflections:** The immersive technology industry has built its reputation as an important immersive technology environment not only for the UK, but also Europe. Its international reputation should be exploited to ensure the growth of the cluster. The challenge remains in skills shortages and the lack of funding for scaling up SMEs in the cluster. Currently, the strength of the cluster is in its multi-stakeholder collaboration that has been instrumental in the cluster's growth and success. This collaboration should continue to be encouraged and supported to ensure the sustainable scale up of the cluster.

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## Research note

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## About the Innovation Caucus

The Innovation Caucus supports sustainable innovation-led growth by promoting engagement between the social sciences and the innovation ecosystem. Our members are leading academics from across the social science community, who are engaged in different aspects of innovation research. We connect the social sciences, Innovate UK and the Economic and Social Research Council (ESRC), by providing research insights to inform policy and practice. Professor Tim Vorley is the Academic Lead. The initiative is funded and co-developed by the ESRC and Innovate UK, part of UK Research and Innovation (UKRI). The support of the funders is acknowledged. The views expressed in this piece are those of the authors and do not necessarily represent those of the funders.