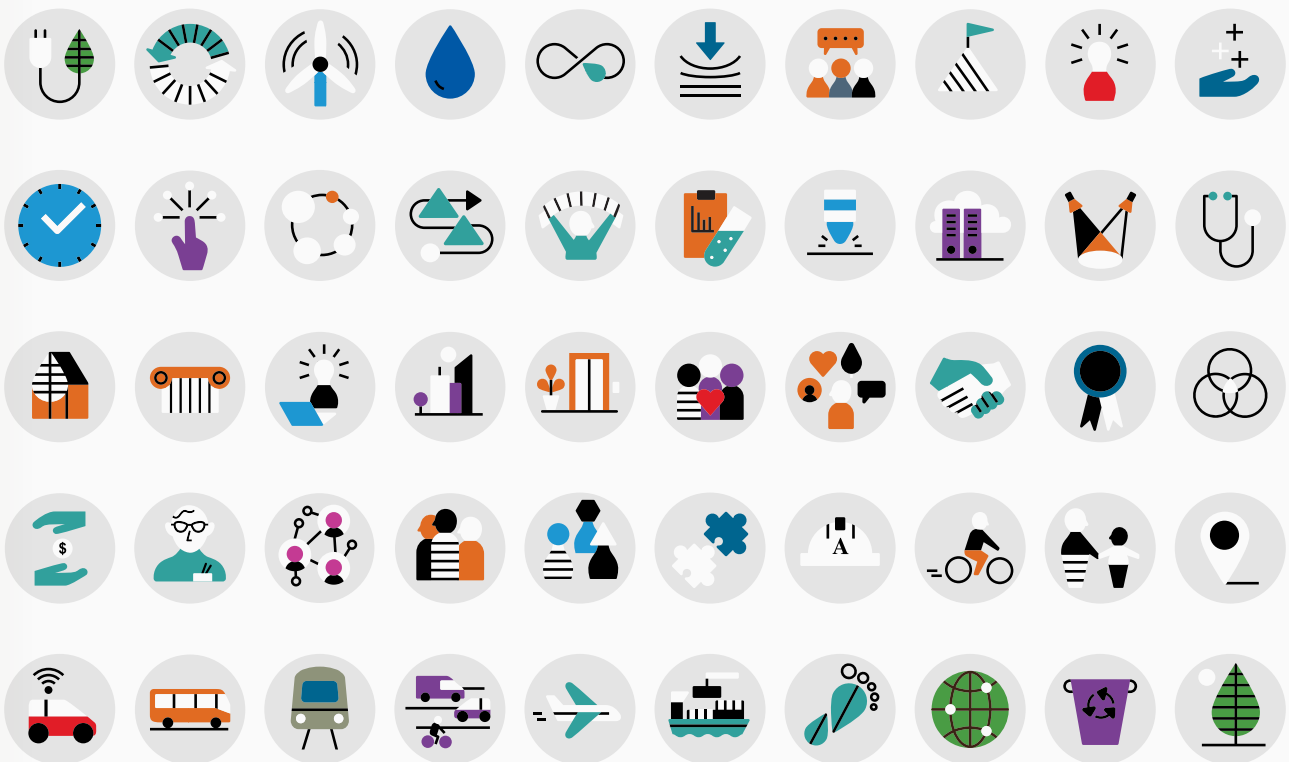


UK Cities Intelligence

November 2023
Innovation places





Innovation places

Welcome to the second edition of Arup's UK Cities Intelligence, packed full of perspectives and case studies all about the places where research, collaboration and creativity combine to unlock innovation.

Cities and towns around the world drive innovation and change. It is through this lens that we explore what innovation means for good growth and, how innovation can shape and influence places, from campus environments through to innovation districts that have been carefully shaped and planned to deliver productivity and agglomeration benefits with long lasting impacts.

Arup leaders in this space, including Tom Bridges and Arthur Smart, reflect on how they have delivered projects for our clients where innovation is at the heart of the proposition - both in the UK and internationally. We also hear from Arup's Olivia Schuster based in New York who discusses the impact of investment in innovation-based project delivery in the US context, with Tom and Olivia discussing lessons learned across geographies. And Emma Frost, who heads the UK Innovation Districts Group, talks about the sector's growth, her own experiences in London's Queen Elizabeth Olympic Park, and the importance of inclusive innovation.

This edition will also explore what we mean by innovation places and what the five key considerations are for placemaking and innovation, discussing how quality public realm and public space coupled with diversity of space and scale drives excellent outcomes.

Good governance, partnership working and letting places evolve over time are also parts of the puzzle for getting innovation places right. Our case studies describe what can happen in a place that drives innovation from city centre regeneration at scale through to campuses and town centre plans. We hope you enjoy reading about how to shape effective long term change for both people and place.



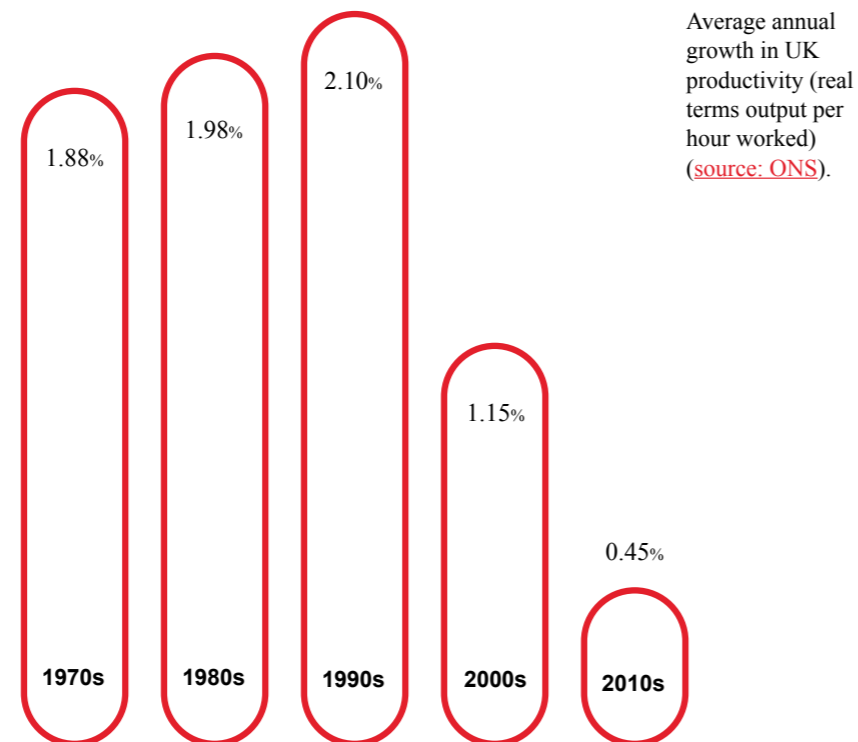
Joanna Rowelle
Director, Cities, Planning and Design, UKIMEA

Innovation places

Overview: Productivity, innovation and the knowledge economy

Innovation is defined by the UK Government as “the creation and application of new knowledge to improve the world.”

Along with other mature economies, the UK has seen productivity stalling in recent years, putting pressure on public services, individual finances and quality of life. Innovation is essential to unlocking this productivity puzzle.



Innovation

Innovation has underpinned rising productivity and living standards since the Industrial Revolution. More recently, it was estimated to account for 50 per cent of labour productivity growth in the 2000s (source: [UK Innovation Strategy](#)).

50%

Labour productivity growth in the 2000s due to innovation

Investment

UK investment in research and development (R&D) is 2.9% of GDP, but still lags major economies such as USA, Germany and South Korea (source: [UK Innovation Report 2023](#)).

2.9%

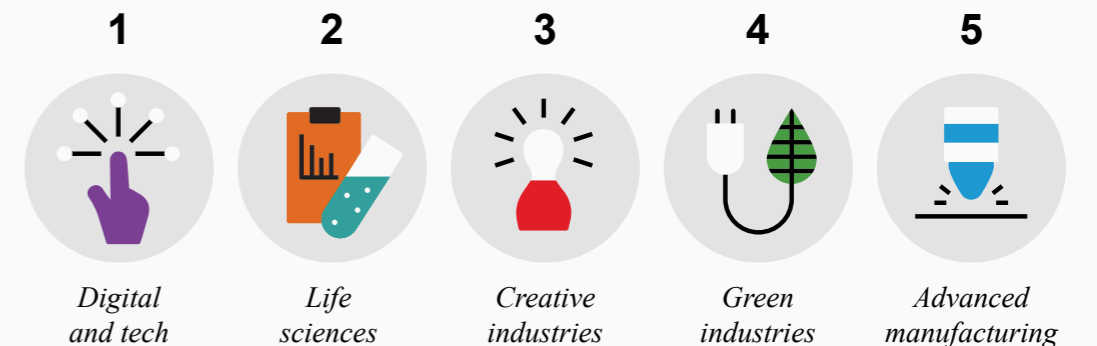
of UK GDP invested in research and development

Policy

Government has identified **five** priority “high potential” sectors for investment and growth.

5

“High potential” sectors



Innovation places

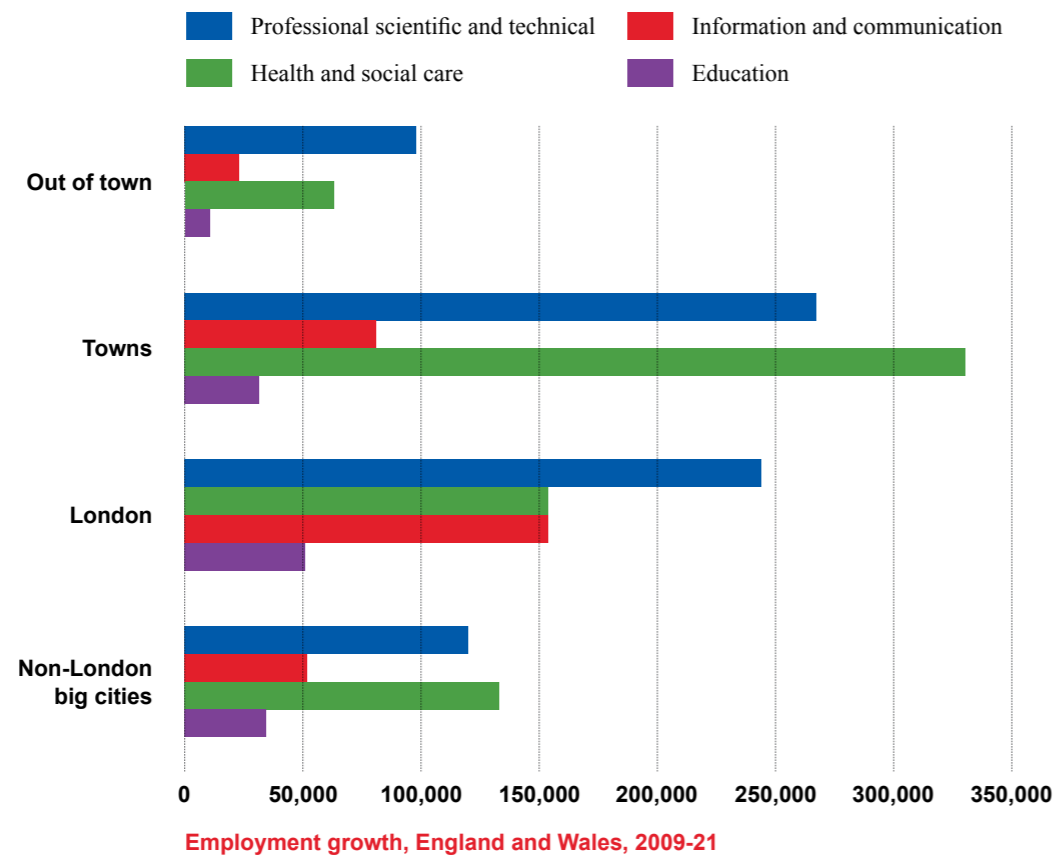
Overview: The growth of the knowledge economy

The increasing focus on innovation and its potential has accompanied the UK's growth in knowledge intensive sectors, which added nearly two million jobs over 12 years, not just in city centres.

(source: ONS)

“Business and technology parks are also popular locations for the new economy but where they are located depends on their popularity. Suburban parks have proved attractive – they account for 0.5 per cent of all land, 4.4 per cent of UK businesses and 6.2 per cent of all new economy firms.”

(Centre for Cities, 2022)

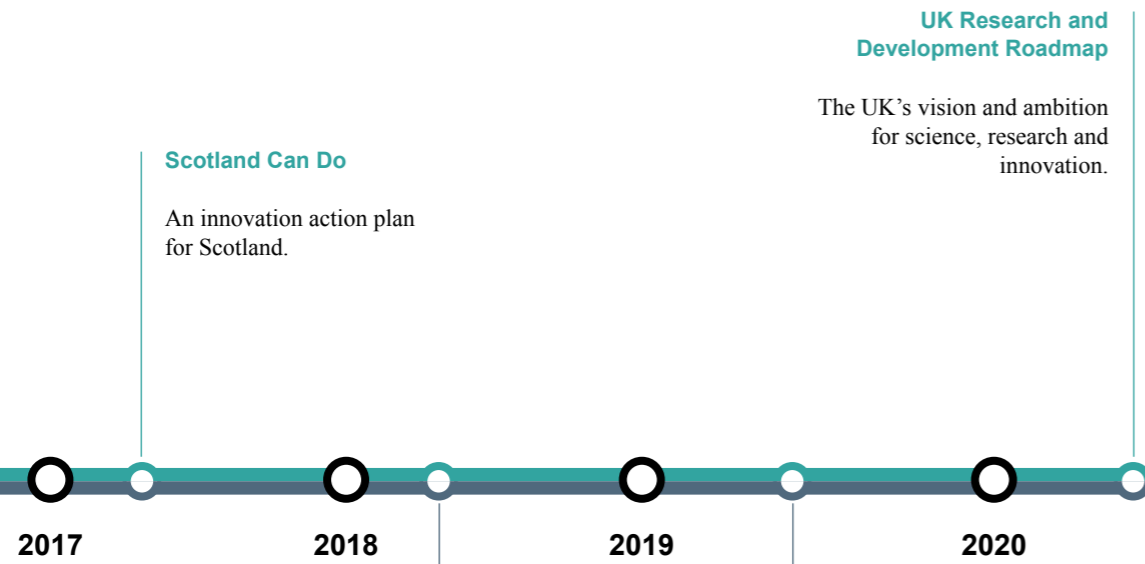


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Government policies
Research papers

Innovation places

Overview: UK Policy development



Scotland Can Do
An innovation action plan for Scotland.



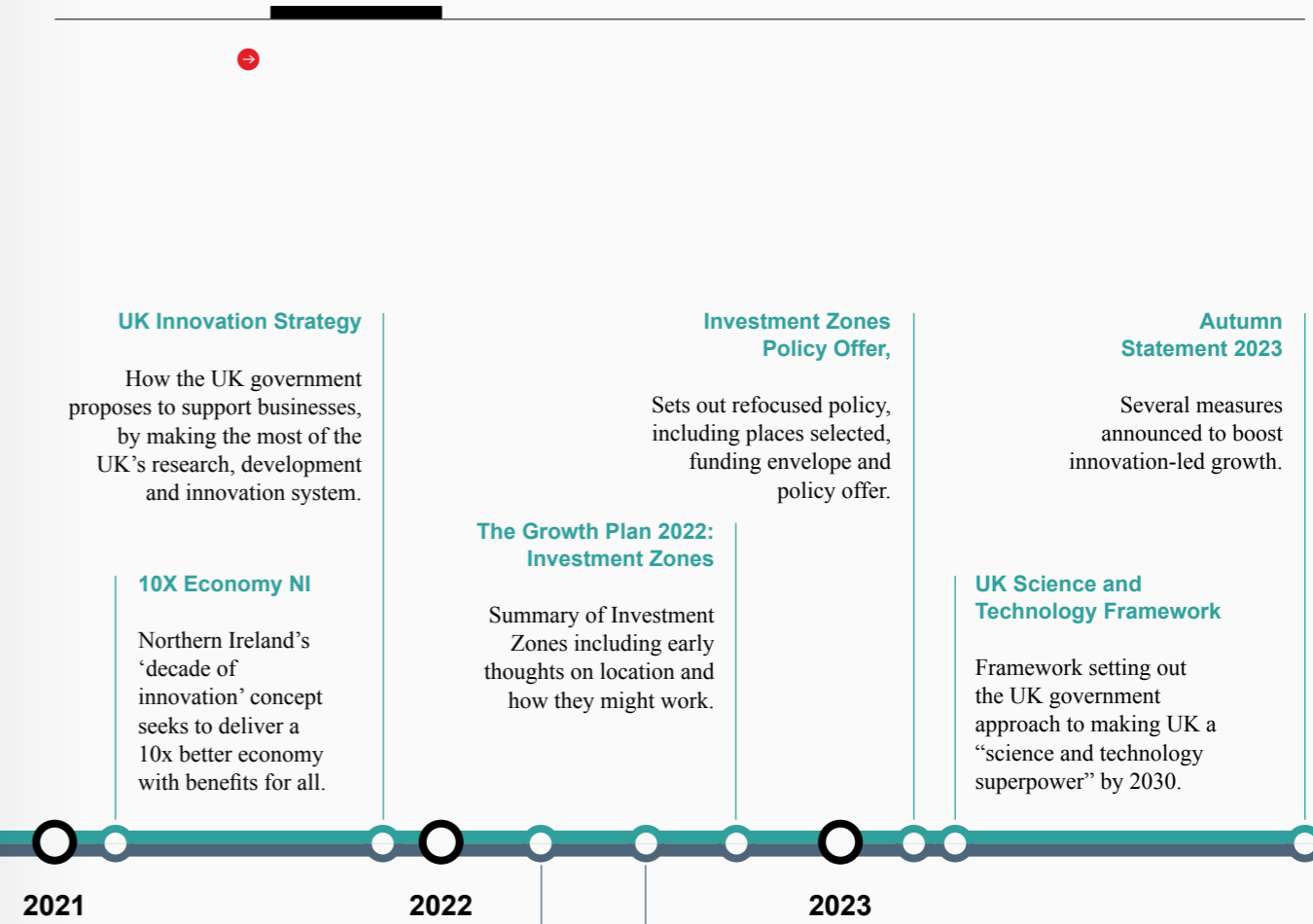
Innovation Districts
Arup survey of Innovation Districts in the UK, including the main trends, success factors and lessons for policy and investment.

UK Research and Development Roadmap
The UK's vision and ambition for science, research and innovation.

Testing Innovation in the Real World
Arup review of testbeds around the world and what we can learn from good practice.



The past five years has seen a renewed focus on innovation, with a particular focus on how 'innovation districts' can become driving forces for research and development, collaboration and commercialisation.



UK Innovation Strategy
How the UK government proposes to support businesses, by making the most of the UK's research, development and innovation system.

10X Economy NI
Northern Ireland's 'decade of innovation' concept seeks to deliver a 10x better economy with benefits for all.

The Growth Plan 2022: Investment Zones
Summary of Investment Zones including early thoughts on location and how they might work.

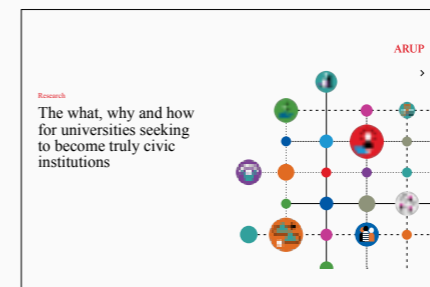
Investment Zones Policy Offer,
Sets out refocused policy, including places selected, funding envelope and policy offer.

UK Science and Technology Framework
Framework setting out the UK government approach to making UK a "science and technology superpower" by 2030.

Autumn Statement 2023
Several measures announced to boost innovation-led growth.

The what, why and how for universities seeking to become truly civic institutions
Arup research paper, recommending long-term objectives and strategies for delivering more effective civic universities.

At the frontier
Centre for Cities report on innovation districts in Birmingham, Glasgow and Manchester.



Innovation places

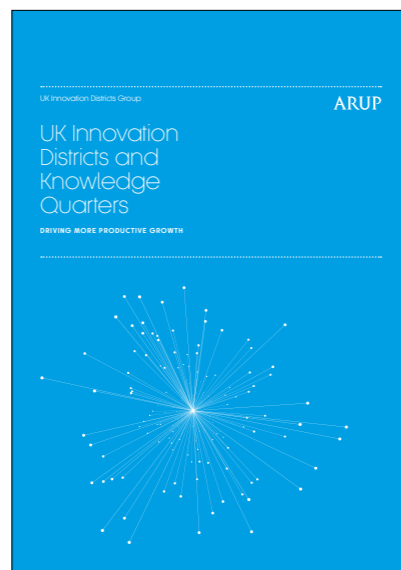
Overview: Innovation districts

Innovation districts go beyond clustering of businesses in specific towns and cities, to actively promoting collaboration between research, application and enterprise.

The concept of ‘innovation districts’ was promoted by Bruce Katz and Julie Wagner of the Brookings Institution in 2014. The rise of innovation districts reflects the growth of the knowledge economy, open innovation, urban regeneration, and increased mobility of and competition for talented workers.

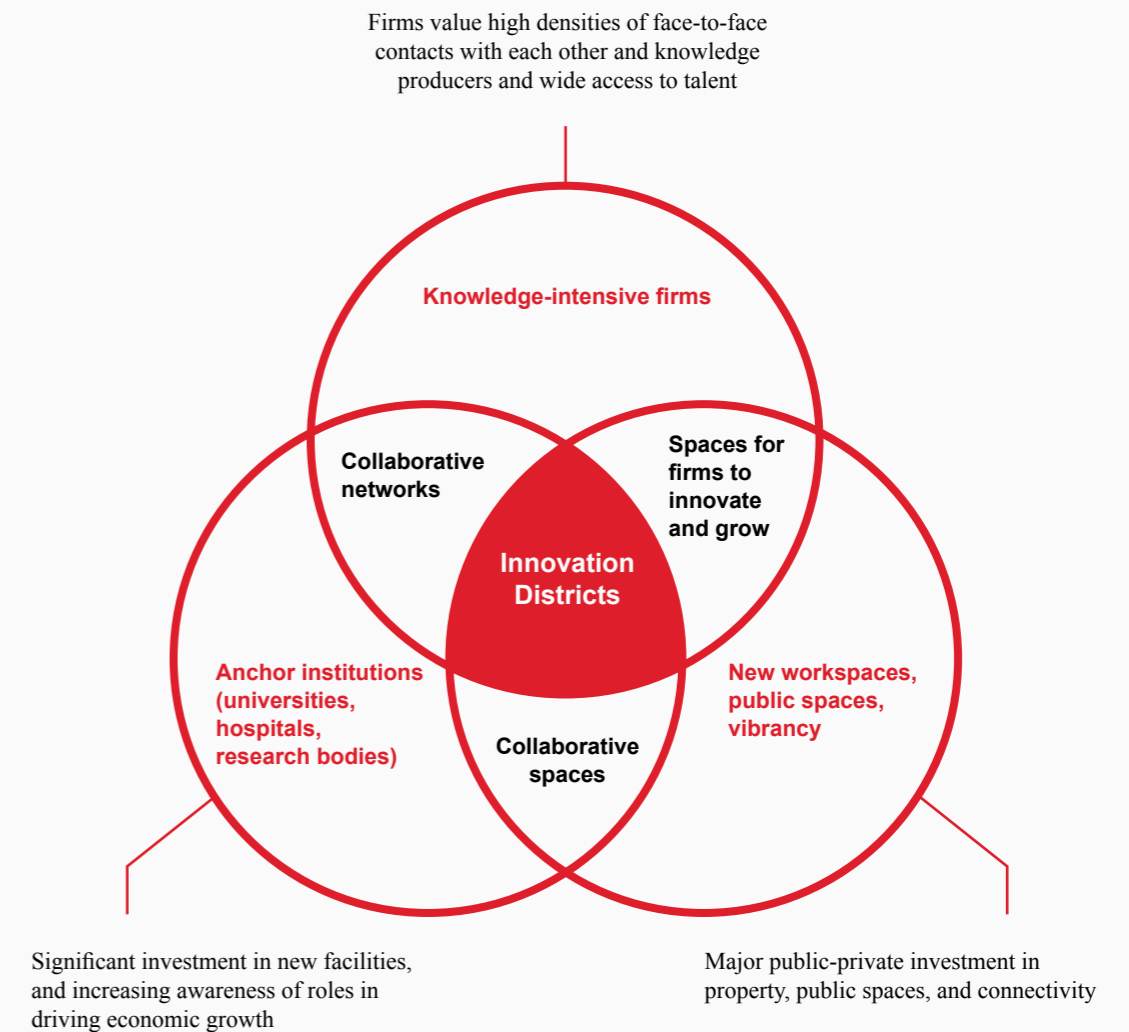
Innovation districts arise from the intentional interaction of:

- Anchor institutions, which generate new knowledge and secure funding for research
- New workspaces, public spaces and amenities, which attract talent, connect people and provide space for innovation and growth
- Knowledge intensive firms, who promote collaboration and help commercialise new products and services



[Click to download](#)

Main components of innovation districts



Innovation places

Overview: **Typology of innovation districts**

Innovation districts can be developed in city centre sites, in regeneration areas or in out-of-town locations.



© Arup

City centre expansion

The development of existing urban quarters or edge of city centre campuses, to expand the size and economic contribution of city centre economies and central business districts.

- Oxford Road Corridor, Manchester
- Leeds Innovation District
- Knowledge Quarter London (pictured)
- The Bristol Temple Quarter (emerging)
- Newcastle Science Central



© Arup

New urban quarters

Generally in inner urban areas, driven by expanding campuses and large-scale regeneration schemes, supported by major transport nodes, and improved connections to city centres and surrounding developments and neighbourhoods.

- Queen Elizabeth Olympic Park, London (pictured)
- Glasgow West End and Waterfront Innovation District
- Knowledge Quarter Gateway and the Paddington Village development within Knowledge Quarter Liverpool
- Stevenage Life Sciences

Out of town technology parks

Repurposed and reinvented as innovation districts, with a wider mix of uses, more amenities and shared spaces, and stronger links to nearby city-based innovation assets.

- Advanced Manufacturing Park, South Yorkshire
- Alderley Park, Cheshire
- University of Leeds Infrastructure Innovation Park
- National Manufacturing Institute for Scotland at Inchinnan, Renfrewshire
- Wellcome Trust Genome Campus, Cambridge (pictured)



© Arup

Innovation places

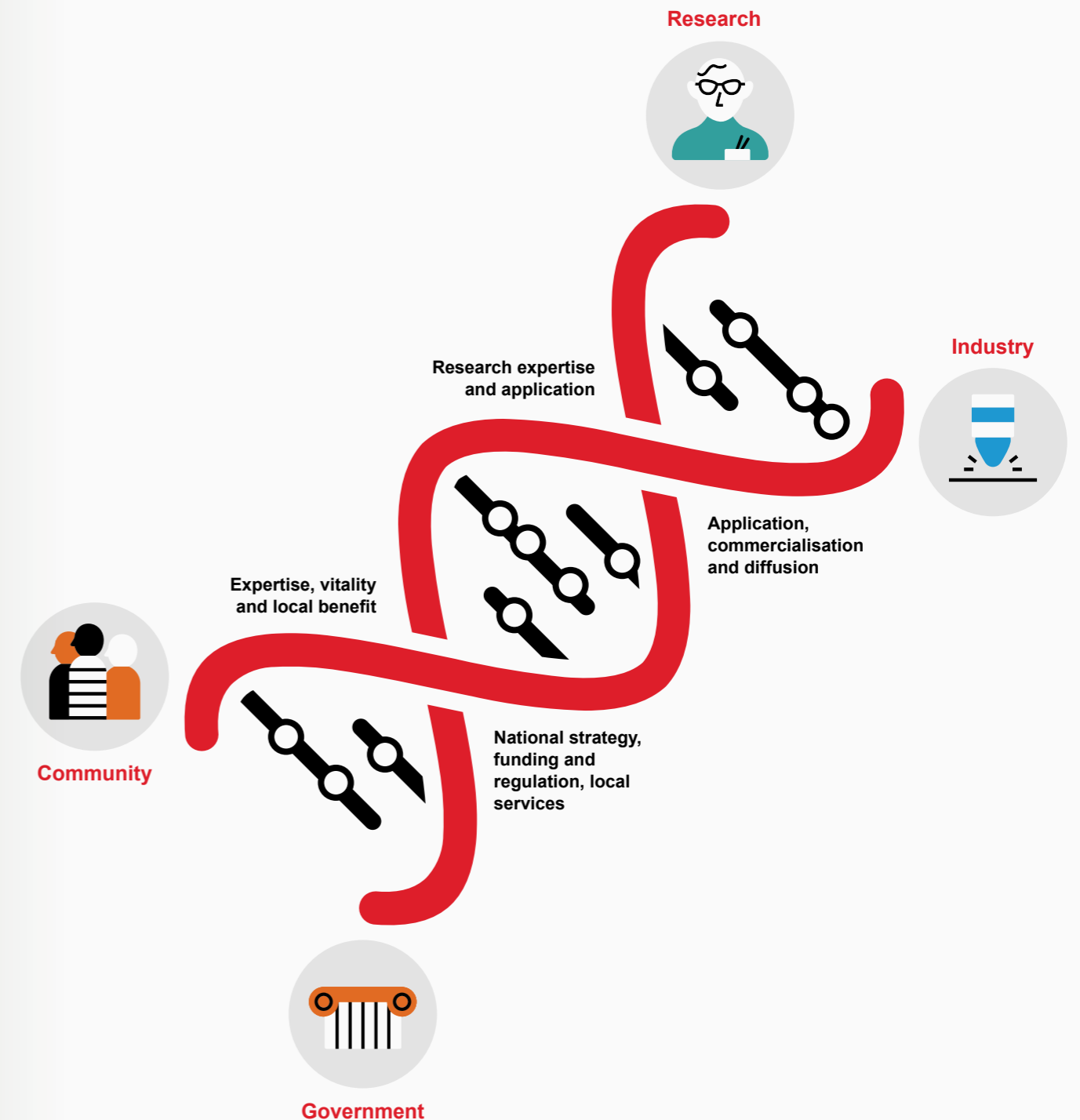
Overview: Roles and governance

Successful innovation places bring together a ‘quadruple helix’ of partners so that invention, commercialisation and community benefit can work together.

- **Research**
Universities, research institutes and joint ventures
- **Industry**
Entrepreneurs, investors, start-ups, growth companies, innovative corporates
- **Government**
From local authorities to government departments and funders
- **Community**
The social networks that connect within and outside the district

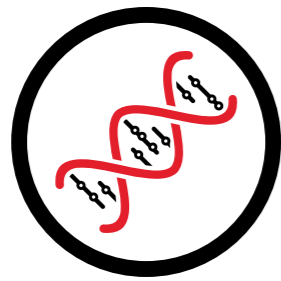
Innovation districts, their shared spaces and work programmes create a platform for these collaborations to happen – generating ideas, testing them out in the real world, then refining them into products or services with commercial or social value.

Many UK innovation districts are based around a single anchor institution (eg, a university, hospital, or specialised research institute), and different partners can play different roles in set up and growth: some innovation districts are more academically-led, while others emerge as part of a public-sector regeneration plan, or through private sector investment and developer initiative.



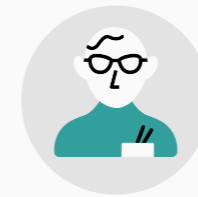
Innovation places

Overview: Roles and governance



Partnership can involve active collaboration and/ or complementary roles.

- Investor**
Supporting innovation, growth and implementation
- Knowledge generator**
Developing original research and ideas that can fuel innovation
- Connector/curator**
Making connections, and building the platforms for collaboration and serendipity
- Vision and brand champion**
Developing the concepts, culture and offer of the district
- Talent attractor**
Drawing in and retaining talent, through academic and employment offer, and the quality and affordability of life
- Implementor**
Taking ideas from research to market, through commercialisation, public sector adoption and social take-up
- Tester**
Trying out innovation through testbeds and living labs
- Supporting infrastructure**
Advisors, cafés, cultural spaces, IT support, transport and housing providers, regulators
- Landowners and developers**
Masterplanning, offering flexible spaces for innovative enterprises to evolve, and a public realm that brings people together



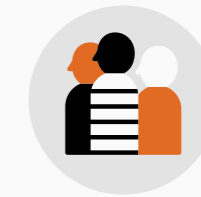
Research



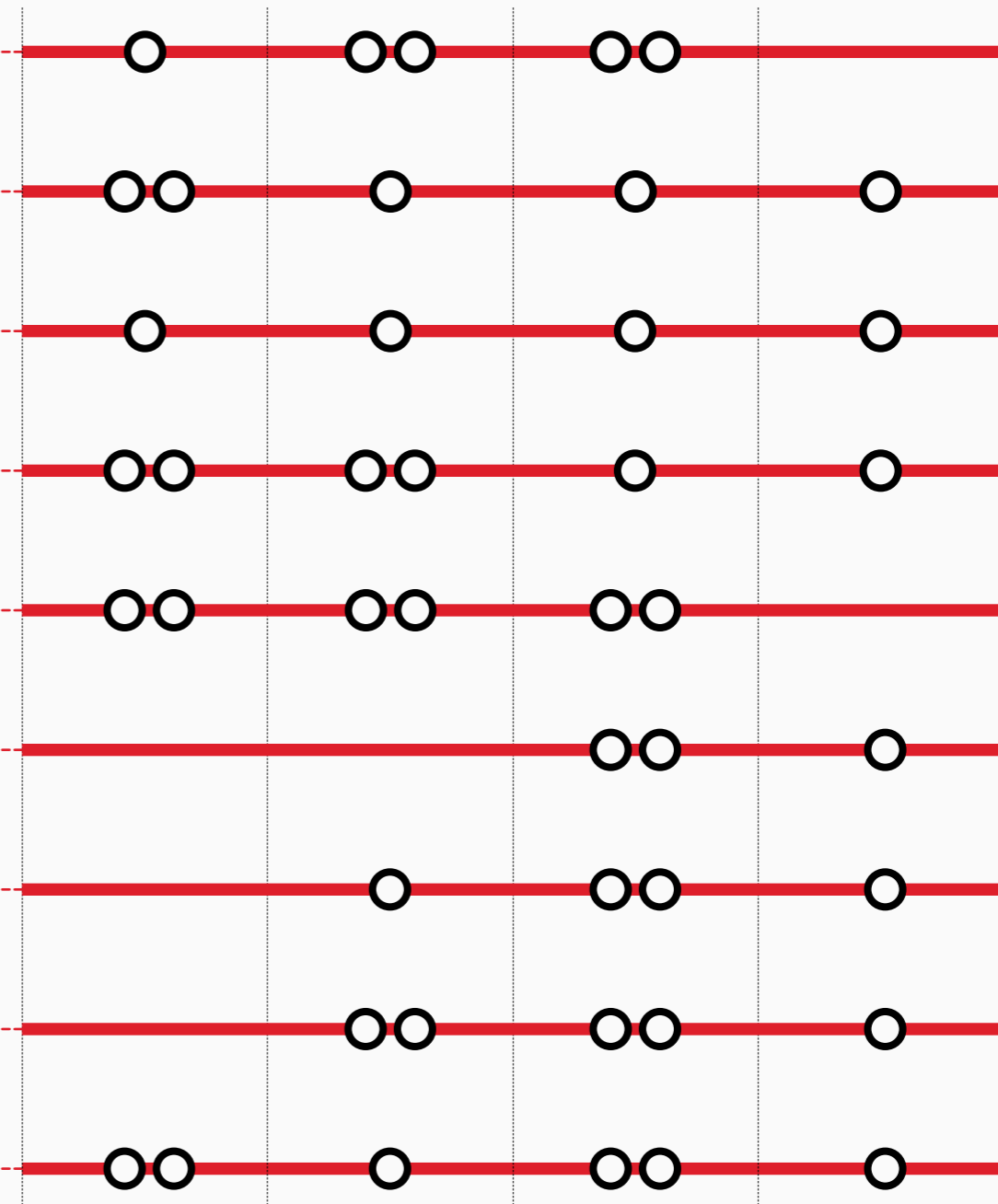
Government



Industry



Community





Translating research excellence into application

The UK is world-leading in academic citations and university quality, but trails competitors in capital investment, venture capital receipts and entrepreneurialism ([Global Innovation Index 2022](#)). Government policy and funding should focus on connecting UK research with commercial opportunities for UK companies.



Affordability and availability of lab space in knowledge economy hotspots

There is a huge imbalance between supply of and demand for lab space in southern UK hotspots, with rents rising rapidly in response, with underused capacity and potential languishes elsewhere. Policy should support growth in high demand areas, while using incentives to support levelled-up growth across UK towns and cities.



Public-private partnerships for innovation

UK Government expenditure on R&D remains low compared to other countries, particularly following the announcement of programmes such as the US Inflation Reduction Act. Better engagement of private sector leaders could enable better targeted funding.



Housing shortages and productivity

Shortages and high costs in areas of high demand make it harder for innovative firms to attract and retain workers ([Economics Observatory, 2023](#)). Housing affordability must be at the heart of plans for sustainable growth.

Innovation places

Overview: Five considerations for placemaking

1

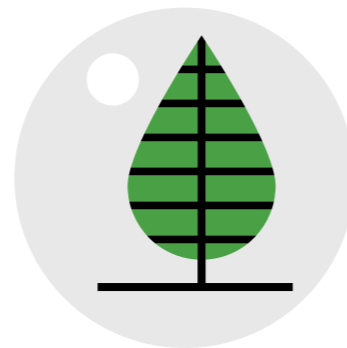
Innovation requires talent, collaboration, diversity and creativity. The places that foster successful innovation are hugely varied, but have some features in common.

Create shared space and excellent public realm

Shared spaces, and the informal encounters they can enable, are the stage on which the benefits of collaboration and clustering can be realised. While some elements of innovation will need to be isolated, for reasons of safety and commercial sensitivity, successful innovation places create shared space to enable collaboration, support inclusion, and attract and retain talented people and investors.

Arup has been working with the University of Bristol, as part of the consultant team for the new Temple Quarter Enterprise Campus, part of the larger Temple Quarter regeneration scheme. The new campus will include the University's Business School, a Centre for Entrepreneurship and Innovation, and space for local businesses and community partners. It will also open its public spaces and amenities to local people, including plans to work together to tackle local and global challenges.

Public realm and lighting design can also ensure that spaces are genuinely inclusive and embedded into local communities, feeling safe to men and women, and people from all different backgrounds, day and night. The Glasgow University masterplan developed a legible network of public realm that integrates spaces to allow for flexibility and social gathering which is easy to navigate through wayfinding and lighting.



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2 Encourage diversity and mix of uses

Whether they are located in city centres or remodelled industrial areas, innovation places benefit from a mix of buildings, activity and people.

Creating the right mix can ensure activity and safety throughout the day and evening; it can help support the cafes, cultural facilities and shops that offer benefits to workers, residents and existing local communities; and it can also create the type of lively environment that is most likely to attract skilled workers and support their interaction and collaboration.

A mix of occupiers, including research labs, but also business space and social infrastructure such as childcare space, can also create the critical mass of interactions and the quality of place that will draw people. As some office occupiers seek to rationalise their floorspace in response to hybrid working patterns, opening up space to new start-ups or community assets can help bring more vitality to places, as well as making best use of space.

Arup worked with the University of Melbourne and its partners on Melbourne Connect, a new innovation precinct bringing together the Melbourne School of Engineering, student accommodation, lab/research space, commercial premises, child care, and a flagship Science Gallery. Melbourne Connect will create a vibrant hub where staff, students, researchers, businesses and start-up companies will come together to tackle major societal challenges, such as food security, changing technologies and urbanisation.

Melbourne Connect,
Australia

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3

Go with the grain and allow space for change

There is no single template for innovation places, but the most successful are those that reflect local character and heritage as a starting point for development.

Some, like ‘Silicon Roundabout’ around Old Street in London, have grown organically in the existing urban form;

others have been designed within the fabric of existing industrial buildings; others are built as complementary sectors to universities, hospitals and private companies.

Continuity and integration with what is already in place can be particularly important to ensure innovation districts are inclusive of local communities. By reflecting the heritage of a place, and engaging with the people who already live and work there, innovation

districts can have the feeling of organic emergence from their town or city – even if they are newly built.

Innovation districts need to be able to absorb and respond to change. Local authorities should actively think about how expansion space can be made available, and how planning frameworks can maximise the potential for change, as new technologies and needs of the area emerge.

In Stevenage, Arup has been working with the Borough Council to integrate a fast-growing innovation district with other new development, while respecting the town centre’s heritage as the UK’s first new town. Enhancing walking and cycling facilities will be one critical element of integrating what was once an edge-of-town facility into the heart of a growing urban settlement.



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4 **Optimise connectivity and proximity**
Open innovation depends on connections and proximity. Clustering and agglomeration of similar and complementary enterprises has been a powerful force for economic development over time, as innovators compete, collaborate, and share knowledge and skills.

Connection and collaboration can also operate at different scales. High-speed rail and airports can strengthen regional and international links. London's Knowledge Quarter, of which Arup is a partner, also includes the British Library, the Francis Crick Institute, the Alan Turing Institute, Google and a number of universities. Located around Kings Cross and Euston stations, it is well connected to continental Europe and to cities across the UK.

But proximity does not automatically create connectivity. Businesses and anchor institutions can be 'apart together' if they each exist in secure compounds, primarily accessed by car. Creating a wider range of transport choices, focused on active travel (walking and cycling) and public transport is one way of promoting interaction and use of the public realm. Other communal facilities (eg, shared bike and car parking) can also encourage the development of the social ties and interactions that underpin innovation.

Kings Cross

© Arup



5

Encourage openness and create a strong brand

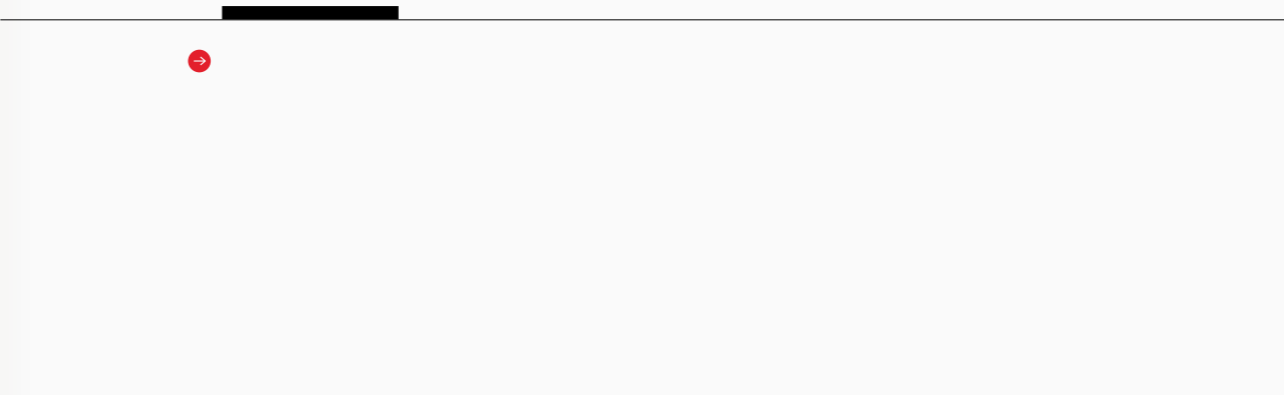
Making innovation visible and prominent can help attract new investors and innovators, strengthen collaboration, engage local communities and build a brand for investors, and occupiers.

Commitment to ‘open innovation’ (where innovation emerges from networks, rather than from within the closed environment of a single organisation) is the lifeblood of innovation districts, enabling highly specialised research and development of specific products to be supported by enablers such as AI, robotics and materials science.

Installing inclusive public realm and activated ground floor uses creates a clear physical connection between the innovation industries and the local community; giving a sense of ownership and understanding of roles of these sectors.

Research undertaken by Arup for Nesta looked at how ‘real-world’ test beds, which allow for the testing and trialling of new technologies, are becoming increasingly important, owing to the growth of smart-city technology which depends on effective and safe interaction with humans, and the need to find ways of testing increasingly complex technologies.

Arup worked with a consortium of forward-thinking local authorities, technology and automotive businesses, and academic institutions to enter a UK Government competition for integrating connected and autonomous vehicles (CAVs) into urban environments. Arup then worked with UK Autodrive, one of three winning consortia, on feasibility studies and practical demonstration in Coventry and Milton Keynes. These included autonomous cars, but also smaller vehicles that could be used for local ‘last-mile’ delivery and to enable people with mobility problems to access pedestrianised environments.



The Spine, Liverpool

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Tom Pike
Deputy Chief Executive
Stevenage Borough Council



Arthur Smart
Associate Director, Architecture
Arup

Innovation places

Case studies: *Stevenage Borough Council*



Stevenage Borough Council is leading a £1bn regeneration programme to transform the UK's first New Town. As life sciences investment in Stevenage grows, Tom Pike, the Borough's Deputy Chief Executive, and Arthur Smart, Associate Director in Arup's Cities, Planning and Design team, discuss how they have worked together to shape the plans for the town.

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Q. How did the Arup and Stevenage collaboration emerge and develop?

Tom

Our relationship goes back to 2015, when local partners commissioned Arup to work on a vision and masterplan for a new station, and how this could interface with the town centre. More recently, we have been working with them to look at the placemaking and economic potential of the area called Gunnels Wood Road, which is where GlaxoSmithKline, and an increasing number of other life sciences firms are based, along with a range of world leading firms such as MBDA and Airbus Space and Defence.

Both pieces of work, but particularly the station work, were to think through how Stevenage can maximise its potential. What would continue to be needed for Stevenage to be attractive for businesses and investment, work and opportunities for local people, be greener, and over all be a more compelling place? The work has stood us in really good stead, looking at the next eight to 15 years for the town, and remains integral to our thinking about the future of Stevenage.

Arthur

I think Tom's right, the principles we set out nearly eight years ago still ring true. The first commission really focused on framing the argument and making the case for a better station within the transforming town centre. Now our work has broadened into thinking how to shape the future of Gunnels Wood, how to knit and connect its assets together and how Stevenage's quality of place can help it to punch its weight in a competitive context.

Q. How has thinking about the town evolved in recent years?

Tom

For a number of years, there's been a positive direction set by Members within the Borough Council, supported by Hertfordshire County Council and the Hertfordshire LEP, who make the case for the transformation that is needed in Stevenage.

Elected Members have set a clear vision and tone: even before more recent discussions about climate and transport, they have really emphasised the importance of being a place where people can walk and cycle.

Additionally, for a town centre to thrive, it needs to have a more diverse offer. The town centre wasn't originally designed solely for retail but over time some of the alternative uses have been pushed out. Revitalising the centre needs to work for the people of the town and to respect its heritage, including its iconic 1960s architecture and public art.

Arthur

Stevenage is the oldest New Town and is really experimental and ambitious in what it was trying to do. It's quite zonal - it has a large civic and retail core, a set of surrounding residential communities, a large industrial area and a transport network that has that 1950s optimism for driving. This gives it great 'bones' but also many challenges for how people move between those uses, across the big infrastructures, and - as lifestyles have moved on - how these zones might become more mixed. So a lot of our thinking has been about how you tie it all together in a meaningful way, reflecting its DNA and thinking how this mixing and connecting can be delivered by many different stakeholders.



Stevenage Town Square and Clock Tower

© Stevenage Borough Council

Q. What's the background to life sciences in Stevenage?

Tom

For context, it's worth saying that there are some fundamentals in the Stevenage economy that are really strong: it's home to the Lister Hospital; we have a high proportion of public sector jobs in the town; there are advanced manufacturing sectors – the Airbus space and defence UK headquarters is here. So there is a heritage in advanced manufacturing, STEM and defence.

GlaxoSmithKline (GSK) has a long-standing presence, but life sciences growth started in the 2010s through the emergence of the Stevenage Bioscience Catalyst, with a mission to support early-stage companies with product development, commercial advice and design. Over more than a decade, this infrastructure has grown: they have a facility that can allow early-stage companies to go and test out ideas and products, and they have business specialists who offer mentoring for chief executives of these cutting-edge bioscience companies. This ecosystem was then strengthened by the national Cell and Gene Therapy Catapult being established on the same site.

For the Council, there were some challenges. Firstly, there are 'place' conundrums: could investment be made into public infrastructure, like improvements to highways, public realm and cycling infrastructure that supports businesses around Gunnels Wood Road and the central parts of the town to grow sustainably? For example, without investment in the public highway as well as sustainable travel options, there is a constraint on the growth of life science firms.

Secondly, we have to respond to companies that are going through high growth trajectories that we're not used to – and to find ways to open up career routes for local people. That's where the test of credibility comes for us all. If high growth potential companies can't locate in the town and they choose Maryland or Frankfurt or Dublin over a UK location, then we all lose out. I think thus far we've been able to step up to the challenge.

Arthur

The new Reef Life Sciences Campus planned for the town centre will respond to those challenges, accommodating some of those uses – but right in the centre of town. This will help to create that richer mix, bringing the traditional life sciences cluster in from the edge to the middle of town, a 'mixing-up' which is potentially very exciting as the town centre evolves from a place to shop into one to live, work, learn and more.

Tom

That's right. Part of the northern edge of the town centre in design terms looks and feels like a classic edge-of-town shopping centre. It was acquired by UBS with Reef, and has planning permission for new life science buildings, all with ground floor activation with cafes and restaurants, and new connections to link the development to the swimming pool.

There is a market factor too; we have found that a number of businesses want to be in a town centre location. Today's workforce is excited by a vibrant location that's easy to get to by train, or where you can live your life nearby. It's important that the development doesn't look and feel like an out-of-town

science park and planning colleagues worked hard through an extensive design review process to make sure it is integrated and works for the town and our community. The upside of that was a quick turnaround: the application was submitted in early January 2023 with full approval in June 2023 following the completion of a S.106 agreement.

As a local authority, we've wanted to show good awareness of what partners are doing and what they need, but also to be clear on our ambition to see this place transform in a way that benefits local people and businesses and uses great design to create a great town centre.



© Stevenage Borough Council



Q. How are you connecting new and growth businesses with local skills provision?

Tom

We have a project called Stevenage Works which pairs the local college with our supply chain and is a really good way of creating learning opportunities. I think there's a level of cynicism that lab or research jobs aren't for local people, but in manufacturing gene therapy products there are many jobs that are. For example, Autolus (who have come through the Catalyst and are currently going through regulatory approval for new therapies) put together some video diaries of local people who have worked in other industries or have just started their careers and are now in product development and product management roles.

Arthur

It's an often-used example, but a great lesson from King's Cross in London, was to put the public realm in first, to make a physical line of sight between new jobs and opportunities and local communities in Somers Town and beyond. That's an exciting part of bringing those jobs into the town centre. Walking past a cell and gene research building on your way to the supermarket or to school could be a wonderful thing – strikingly different to the traditional town centre and the closed campus model – inspiring!

Q. How has the relationship with Arup developed over time?

Tom

Arup's work on the Station Gateway has given us a strong idea and foundation for regenerating the town centre. The work produced by the team was excellent

and anticipated the rising importance of climate issues. Some of the proposals, such as finding ways to help connect bus services with the railway station, have already been delivered, and the importance of the Station Gateway is now reflected in our local plan and policies.

The next step we need to do is to make the case for further investment and funding. Arup's engagement has been helpful, because it helps show how the local economy is changing and the great potential in the local area, and practical steps that can be taken such as rebranding and greening. One of the things that Arup team are doing is helping us think differently, to set out the scale of the opportunity, to embed ambition into the thinking about what we can achieve for the area, which I believe will set out a strong proposition for infrastructure funding.

Arthur

What has been really refreshing here is the closeness of the relationships and the speed at which the Council and other stakeholders have been able to respond to what businesses and the community need – we're excited to be helping make that growth count.

Tom

My experience with Arup is that the business doesn't simply try to find quick fixes but looks at how we could make this place successful, really trying to tease out the issues before anything gets confirmed, which is really healthy. It's just the type of provocation and collaboration that we need.

City centre regeneration, led by city council and university

The Temple Quarter Enterprise Campus (TQEC) will be a catalyst for the wider redevelopment of the Bristol Temple Quarter, creating an estimated 22,000 new jobs and 10,000 new homes, and bringing £1.6 billion every year to the city economy.

Arup supported the University of Bristol in developing the business case for the TQEC – a flagship project for the University and Bristol City Council, designed to create a dynamic ecosystem which harnesses the potential of the creative and digital sectors.

The scheme will anchor the transformation of a derelict part of Bristol city centre into an innovation district, acting as a catalyst for development of new homes and business space. Innovation lay at the heart of the case for investment, and Arup supported the University from 2016 as it developed the vision and project objectives.

The project includes the development of a new Quantum Technologies Innovation Centre and Bristol Digital Futures Institute, to bring together researchers, social scientists, government and industry to research and test new quantum and digital innovations to make sure that the next generation of technologies have people and communities at their heart.

Arup worked with the University to develop the Strategic and Outline Business Cases, to make the case for TQEC as an anchor investment for a thriving urban innovation district. Our economists quantified the potential direct and wider benefits, in line with HM Treasury Green Book guidance, demonstrating how the project would support sustainable and inclusive economic growth for the city region.

The business cases helped secure £100M funding from Research England for the Bristol Digital Futures Institute, and £20M from the West of England Combined Authority (through the West of England Growth Deal) for the Quantum Technologies Innovation Centre.



Innovation places

Case studies: Wellcome Trust Genome Campus, Cambridge, UK

A campus expansion to enable collaboration and public understanding

Wellcome Genome Campus in Cambridgeshire has grown significantly over the past 25 years. To accommodate this growth and plan for the future, Wellcome commissioned Arup to develop a vision and masterplan for a campus expansion. The masterplan principles are to create a science community with focus on flexibility; to be open to the public; to create new spaces and opportunities for collaboration; and to design with a focus on both human and planetary health.

Our team incorporated nature-based solutions as part of the masterplan design, which included sustainable urban drainage, biodiversity corridors, natural open spaces, retained farmland and an additional 16ha of woodland to help improve the environmental systems of the site. These solutions complement the character of the area while assisting the campus in adapting to climate change.

The team developed proposals for several new social amenities, including open spaces, public education, retail, a nursery, and conference facilities accessible to the Genome Campus staff, its future residents, as well as the wider community. The masterplan seeks to promote inclusive and sustainable transport by creating an extensive 18km network of walking and cycling routes.

The campus design also supports Wellcome's ambition to develop an adaptive campus that responds to future innovations, while continuing to support local communities and environments.



A centre for interdisciplinary learning

Arup designed this new Cyprus International University (CIU) campus to be an innovation testbed for new ways of learning, promoting collaboration and generating ideas – including a new interdisciplinary innovation centre – as well as to harmonise and celebrate its local environment encouraging synergies across different parts of the university and with the local communities.

Arup developed a masterplan for the Cyprus International University (CIU) campus to support its growth plans to expand student numbers and be a testbed for new ways of non-classroom learning. Arup were initially briefed by CIU on the development of a number of buildings for faculties ranging from Medicine to Fine Arts. After an analysis of campus operations, we recommended the co-location of these buildings into a series of clusters, like the Civic Cluster with the central library and convention centre, and the Innovation Cluster with the innovation centre, now known as ‘Ideas Nest’. The purpose of this co-location was to help CIU unlock innovation synergies across departments, whilst freeing up space for public realm and nature on campus, enhancing the student and staff experience.

The masterplan focused on the quality of the student experience. By looking at learning beyond the formal walls of the classroom, the campus landscape could be used for informal alfresco learning. The masterplan was also designed with climate change in mind. The university is located in Nicosia, an arid semi-urban environment, with landscape integration, sustainable energy generation on campus and building water conservation all priorities.

Arup worked collaboratively with CIU to develop a strong masterplan designed for the University’s growth, and to support innovation and the development of the regional economy.

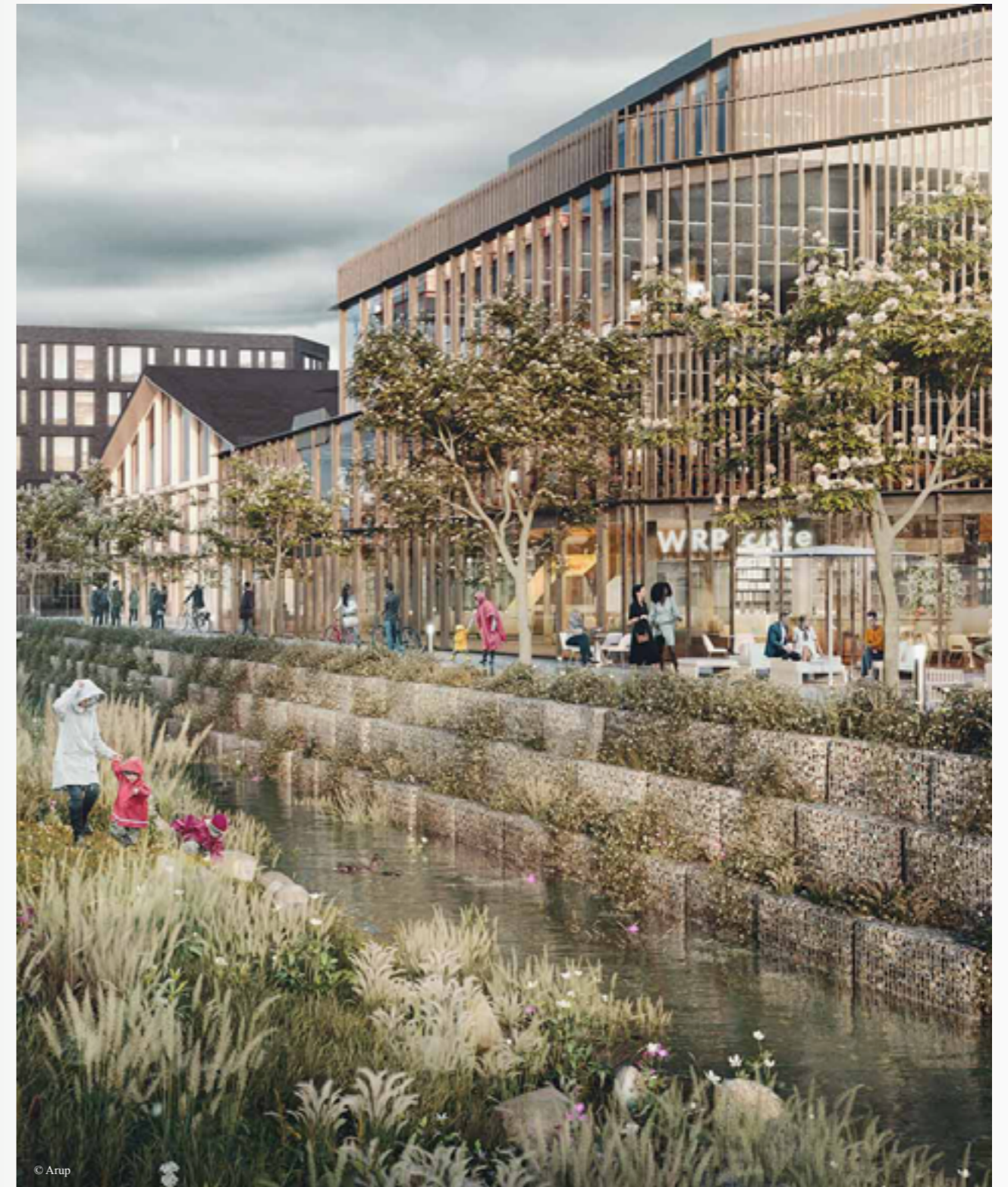


A business park with human-scale connectivity

‘Sustainability underpins everything’ is the core message of the masterplan for the expansion and redevelopment for the future innovation district at White Rose Park (WRP). Arup’s WRP Masterplan is a blueprint for the business park’s evolution for the 21st Century, and for cementing its role as an innovation driver in Leeds and the wider city region.

In 2021 Arup was appointed by Munroe K to lead the masterplanning strategy for the WRP Campus expansion in South Leeds. The site is planned to almost triple in size, becoming a 30-hectare mixed-use site for employment and housing, plus other amenities and services for campus residents as well as the wider South Leeds community. A new railway station, which will open in 2024, funded through a public private sector partnership will transform the site’s accessibility.

A fundamental starting point for the project is its Sustainability Strategy, which establishes the guiding principles for WRP’s future design and operation to ensure it delivers a sustainable and net zero future. The WRP public realm has a design, which seeks to benefit workers and residents by connecting them with nature, and with biodiversity, ecology and hydrological systems. By enhancing and animating the spaces between buildings, the health and well-being of workers will be enhanced, and opportunities will be created for sharing knowledge between people and firms. The built environment of WRP will use low carbon and modern methods of construction, including retrofit of existing buildings, to become an exemplar for 21st Century development.



Catalyst for Norway's New Space economy

The space industry has been present in the Municipality of Andøy for decades - attracting some of the most renowned organisations in the world, including NASA and ESA, for launch services and atmospheric research. With the development of a new spaceport underway, Innovation Norway commissioned Arup to develop a strategic vision and spatial framework that considered how the fast-growing New Space industry could act as a catalyst for wider economic development and sustainable growth for Andøy and the wider region.

In a place characterised by pristine natural environments, close communities and long traditions, co-existence was considered a prerequisite for success - growth must be balanced and delivered in a way that benefits could be shared by all. Extensive stakeholder engagement with local communities, local and regional government, academia and key members of the space industry ensured a holistic approach to the development of the framework.

The team identified priorities for growth, highlighting cooperation with parallel space industry clusters, value chain development and the need for key supporting physical infrastructure, including new roads, expanded harbours and the development of a New Space innovation hub.

A dual centre approach to the distribution of new residential and commercial uses and social infrastructure ensured better access to jobs, services and amenity for all residents while also safeguarding large areas of Andøy's natural environment. Improved transportation and sustainable residential typologies were explored to bolster Andøy's target of carbon neutrality by 2050. These initiatives were tailored not only to support the existing community, but also to offer better options suited to the needs of future residents and workers.

Ultimately, the project's outcomes support Norway's ambitions in the global space industry and chart a path towards a strong and sustainable future for Andøy and its people.



University expansion to enable regeneration

The University agreed a new estate strategy which seeks to develop a campus that is “...fit for today and the future, is innovative and courageous in design, and is reflective of the University’s history and of its ambition, inspiring current and future generations...”

The new extension of the University of Glasgow’s Gilmorehill Campus saw the acquiring of a fourteen-acre site adjacent to the southwest corner of the main campus. The site provided an important and historic opportunity to reshape the University campus and to introduce business and commercial development. It was also a unique opportunity to catalyse regeneration of the surrounding area. The University had a key mission statement for the site, which was to bring inspiring people together, and create a place that would provide a world-class environment for learning and research to discover and share knowledge that can change the world.

Arup was commissioned, alongside 7N Architects and LUC landscape architects, to provide a masterplan integrating engineering designs and environmental studies which supported a planning application to Glasgow City Council for a more integrated campus that provided a network of hubs with overlapping spaces to provide opportunities for greater collaboration and social activities between buildings.

The public realm has blurred boundaries between the surrounding neighbourhood and campus providing greater public access across the campus. A fully integrated lighting design was provided for the public realm to provide clear access routes at night to key transport hubs and the adjacent park. Consideration has been given to the night time use of the space and through the implementation of an integrated lighting approach to the site a more inclusive and safe environment has been created. Occupancy drives the energy use of the space with lighting only being on at full brightness when the spaces are in use at night. This allows light levels to be controlled and considers the ecological impact of the scheme to the adjacent Kelvingrove Park.



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Tom Bridges
Director, UK Government
and Innovation Leader
Arup

Tom Bridges leads Arup's UK Government and Innovation services, as well as being Leeds Office Leader. He reflects on his career working in and for UK cities, innovation policy, levelling up and urban futures after Covid-19 pandemic.

Innovation places

Arup people: Tom Bridges



Q. What was your route into Arup and into leading on UK City advisory work?

I've always been interested in cities and passionate about their positive role in creating opportunities for people, driving economic growth, and fostering innovation and the sort of solutions the world needs to respond to its big challenges. Having studied geography and done a masters in urban studies, I started my career working for London First, advocating for London at a time when it didn't have a mayor, its leadership was fragmented, and it wasn't receiving the investment and backing it needed from national government.

After three years there I joined Arup in London, then in 2006 moved to

Yorkshire, to head our planning, policy and economics team in the North of England. That was a big move for me and one of the things that rapidly became apparent was that, while London had begun to make significant progress in terms of investment and big transformational projects, other big cities' potential was going unfulfilled. They had a growing base of knowledge-intensive businesses, good universities, and skilled populations, but they lacked the powers and resources to invest and deliver on their potential.

I've always operated on the intersection between town planning, regeneration, transport infrastructure, economic development, skills, innovation – and Arup has given me the opportunity to take that holistic and integrated view.

Q. You've talked about cities' unfulfilled potential. What needs to be done to unlock that?

Firstly, we need to recognise that cities, particularly our main regional cities, are critical for UK growth. That's not to say towns or rural areas aren't important, but the battles for improved productivity, for creating more and better jobs, and for raising people's level of prosperity will be won and lost in our big cities.

There needs to be a much stronger focus on backing entrepreneurs and innovators in our cities. We have world class universities – I'm sat here in Leeds which has a global top 100 university – but we don't translate that expertise in innovation into commercial pull through. We're good at the R in Research and Development (R&D); we're less good at the D. I think the Atom Valley project in Greater Manchester is really interesting in that respect, because it's about how you drive innovation through into the everyday economy.

We also need to think about more inclusive entrepreneurship. How can we get more female founders and entrepreneurs? How do we support people who don't have access to seed funding from the Bank of Mum and Dad in starting a business or scaling it up?

Finally, our cities are under-powered and they need much greater freedoms and flexibilities to invest, to plan for their growth and to capture its benefits. Growth is a means to an end, not an end in itself, but it's a vital ingredient.

Q. What are other cities or other countries doing that we can learn from?

I was part of a study trip from Leeds, which went to look at how innovation districts work in Cambridge, Massachusetts. There's a building on Kendall Square called One Broadway, and more venture capital is invested from that building every year than in the entire UK. They've identified five stakeholders who need to work together – with the right connections, the right culture and the critical mass to succeed:

- entrepreneurs,
- universities and other big knowledge producing organisations (teaching hospitals for example),
- R&D-intensive corporations such as Arup,
- investors of risk capital, who provide capital but also expertise, and
- government agencies.

We need to build much stronger ecosystems with those stakeholders in the UK, so we've got the right conditions to not just do great research but to commercialise that research; not just to have good start-ups but to grow those start-ups to have that pipeline of investable businesses. We also need the right supply of the right physical space: spaces for collaboration, formal lab spaces or innovation spaces. I think we've got some way to go in the UK to replicate what might be best in class globally in that respect, but we are making progress.



Q. Can Government's Innovation Zones policy help create more effective partnerships?

The [Investment Zones](#) initiative is a well-designed policy with lots of potential. The focus on cities and research institutions of genuine global strength is a great positive. And it can really harness what's happening in innovation districts across the UK. There's also an interesting and generally positive mix of public sector investment incentives, capital and revenue split.

I think there are lots of ingredients for success, however, maybe the drive for these investment zones to be sector specific is not quite the right approach. In some cases, there might be an argument for a more sector agnostic approach. I'm also a little bit sceptical about how powerful the tax breaks will be. I think it'd be much better for places to invest in building the ecosystem.

We need a debate about planning. My own view is we need faster planning, not less planning: good quality spatial frameworks can provide certainty, can provide clear signals to the market and can also ensure that we're delivering quality places that meet our ambitions, whether it's around design, net zero, or inclusion.

My biggest note of caution is that, if you compare innovation zones to what's happening in the US, where you have the [CHIPS and Science Act](#), [Inflation Reduction Act](#) and [Defense Appropriations Act](#), the scale of Innovation Zones investment is of a different order of magnitude. I think if we are going to really fulfil the potential of our innovation districts in our big regional cities, it's going to need much greater investment and it's going to need much more levelling up of R&D investment.



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Q. Does 'levelling up' mean a switch away from London and the wider South East?

It's not a zero-sum game, where one place can only grow at the expense of another, or where constraining the south means investment will go north. I think as a nation we need London and the wider South East, including global powerhouses like Oxford and Cambridge, to be successful and to grow.

But the cities of the Midlands and the North need to work with those in the South East for mutual benefit. And I think it needs to be more sophisticated than saying London will create the wealth and tax revenue to spend on public services in the North; we need to really understand those business to business and university links and how they can be strengthened.

I also think the cities of the Midlands and North need to think of themselves as an ecosystem, as a network, because the UK is a small place in global terms. If you drew a triangle between

Liverpool, Sheffield and Newcastle, which would contain all of Northern England's big cities, that's roughly the same geographic area as LA or Beijing. These places are geographically close together, but functionally separate - principally because of poor transport and there's a risk they spend time competing instead of harnessing complementary strengths. That's why improved transport connectivity is so important.

But it's not just about transport improvements, it's also about research capabilities. For example, for health innovation; you may have expertise in Leeds around health informatics and medical devices, and expertise in Sheffield around manufacturing, and expertise in Newcastle around ageing, and vaccine manufacturing capacity in the Humber and in Teesside, how do you harness all that to be a real leader in life sciences - instead of having lots of small isolated capabilities, none of which quite have critical mass to be genuinely competitive on the global stage?



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Q. What are some Arup projects you've been particularly proud of?

We did a number of pieces of work for the University of Bristol on the business case for their Temple Quarter Enterprise Campus. The University, whose main campus is up in Clifton, has often been seen as 'in Bristol but not of Bristol', a bit cut off. So creating a new campus and innovation district next to Temple Meads station, anchored by the Bristol Institute for Digital Futures and a new quantum technology centre, shows a real commitment to civic engagement. I think it's a really positive project and an exemplar in terms of how a university can develop a strong civic role and manifest that through its own estates and capital investment.

I'm also proud of quite a small project we did for the University of Nottingham and Nottingham Trent University called the 'Universities for Nottingham Civic Agreement'. Those two institutions showed real commitment to leaning in, and supporting the city and county. They

thought deeply about how they could use their own capital programme and campus development to help regenerate the city centre, how they could work with the health system to address some big health inequalities, and how their global reach and alumni networks could be mobilised to help Nottingham and Nottinghamshire to drive inward investment and exports.



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Q. What about the future - do you feel that the pandemic and the rise of working from home has changed the economic geography of towns and cities?

I think the pandemic has posed big questions for cities. Throughout history, people, businesses, knowledge-producing organisations, professional institutions, investors have been attracted to cities and that's because of their concentrations of and diversity in flows of ideas and opportunities. In turn that is enabled by density, and by access to a large workforce via the transport network, and critically by close networks of collaboration that work face-to-face.

When people talk about productivity and working from home, they are often thinking about their own productivity in terms of how quickly they can get through their own 'To Do List', as opposed to productivity at an organisational or an economy-wide scale. The fact is, our most productive places in recent years have been the places with the highest densities of face-to-face interaction, not just within organisations, but between organisations. Smart people want to work alongside other smart people; people want to collaborate, to compare, to compete.

But having said all that, I'm actually very optimistic about the future of cities. Firstly, it's in cities where we can innovate to tackle some of the big societal challenges we face, whether that's about health and medical technologies, climate change or about harnessing new technologies such as AI for public good. Designing spaces and cities for collaboration will become more important, because when people choose to come into cities they'll do so much more purposefully, with much greater intent to collaborate. Finally, I think hybrid working is also enabling cities to extend their catchment so people can live further away if they're not commuting every day.

And if you take a long run perspective, history tells us that cities adapt and change in response to shocks. When John Snow mapped the London cholera outbreak in the 1850s, the Victorians built sanitation systems and hospitals and made huge health breakthroughs. And after 9/11, many commentators predicted fundamental changes, such as a retreat from tall buildings and global travel, but instead we adapted our cities and transport networks with security measures.



Innovation places

Policy perspective: **Emma Frost**

Emma Frost, Chair of the UK Innovation Districts Group, a network currently comprising 12 innovation districts across the UK, talks about the challenges facing innovation spaces in the UK and her own experiences at Queen Elizabeth Olympic Park.

Q. Can you tell us how the plans for SHIFT London, the Olympic Park's innovation district evolved?

The Olympic Park and Stratford have been on a transformational journey since long before the 2012 Olympic and Paralympic Games. After the Games we started looking at the mix of organisations and anchor institutions – some new, some long established – in and around the Park and we realised that we had the beginnings of really quite a unique innovation district.

We had the physical assets – in the venues and infrastructure built for the Games and afterwards. We had the economic assets that arrived in the wake of the Games, with major institutions like Loughborough University London, UCL, University of the Arts London, V&A, BBC, Sadlers Wells, BT Sport, Cancer Research UK, British Council etc. And then we had the social and networking assets, which have always been strong in East London but have deepened, with London Legacy Development Corporation and others working hard to build those relationships and connections.

And just as we delivered the Games differently by planning with legacy first, we wanted to think about a different way of doing regeneration, thinking really intentionally about blending the social and economic, with the physical transformations. In a similar way this notion of doing things differently to deliver better, gave rise to SHIFT, which is the innovation engine based at the Olympic Park. It will be London's 'living test bed' and an innovation district that's explicit about wanting to support more inclusive innovation.

We've got so many big societal challenges at the moment, from climate change to water quality standards, (really important given all the canals and waterways here), to the social and economic challenges faced by the communities around the Park. Using the Park as a test bed brings different players together to try to solve some of these problems, through experimentation and piloting. We won't solve everything in one go, but iterative testing and learning in practical real-life environments is an important mindset that I think is going to get us closer to solutions.



Emma Frost
Chair

UK Innovation Districts Group





Q. How did you bring the organisations together?

The way that we've approached that is by having a really clear mission-led central objective, and organising partners around that. That's not to say that everyone has to play the same part. In fact, it's to say everyone has a unique contribution to make, so part of the exercise is really understanding the different partners and stakeholders and the contributions they are best placed to make. So the engagement that we have with Here East, for example, is different from the engagement with UCL, and the engagement that we might have with a community partner like Badu Sports again is very different from the engagement that we have with London College of Fashion.

Q. Can you say more about how the test bed concept works?

The test bed is the defining element of SHIFT; there are others around, but they are few and far between, and the reason for that is they're incredibly complex to run. In basic terms, these are places that are genuine, operational pieces of city, but ones that we put different test projects or test interventions into. So you're working at the edge of what's acceptable or what's comfortable all the time, at the edge of public tolerance, at the edge of things like regulation – even going where regulation doesn't exist or fully exist yet.

We worked with Arup to research and develop the concept. We wanted to understand global best practice and the critical component parts of what makes a test bed function well. But we were also trying to plot out together a route map for how we could turn Queen Elizabeth

Olympic Park into London's living lab. What's involved? What are the different kinds of resource and capacity that we're going to need to grow?

A good example of the approach is our work with driverless vehicles. These had proved themselves in lab conditions, but when we brought them to the Park, what we learned was that the sensors were at slightly the wrong level to detect smaller children walking in front of them. They were fine with children of four and five and over, but the sensors were just at the wrong angle to be sure to detect smaller children in good time. These are the kinds of critical details that can be identified and resolved through real world testing.

There's loads of demand because people realise just how critical this stage is, but it does take a lot of time and care and effort because you are asking people to work with different disciplines. When you have someone who's working on public engagement, someone on tech, and someone who's doing evaluation, alongside health and safety experts, even a two-day project can actually be quite a complex stakeholder partnership exercise.

Q. How did the UK Innovation Districts Group come into being?

It came together, as sometimes the best things do, almost through lucky accidents. It really was born out of awareness that just as I was developing all of these plans for Queen Elizabeth Olympic Park, there were loads of other places in the UK alone doing similar kinds of work but no obvious or easy way to exchange experiences or learning together.

Especially as places think through the economic and social aspects, they're so massive and complex that it's the sort of thing you can't really untangle on your own. So, through informal conversations with others in similar situations, the UK Innovation Districts Group was born as a bit of a mutual aid group, to bring together people who are doing this sort of work up and down the UK.

It started off very informally with five of us, and we now have 12 members. We've partnered with Connected Places Catapult, who have funded a full-time programme manager, who works alongside me to run the Group. Our main objective is still sharing best practice, but we're also working together as practitioners at the forefront of this agenda in speaking with one voice to central government, to shape and inform where central government innovation policy thinking is going.

Q. As UK innovation districts mature, what are the big challenges facing them?

I think we are moving on from just asking 'How do we get more out of the innovation economy?', which is really about a UK Plc growth agenda, to thinking about 'whole place return'. So how do these innovation clusters really connect into their local economy and social fabric? In the past there has been quite a lot of detachment, with hidden enclaves of really amazing research and innovation. It may be embedded in the physical fabric of a place, but has it been truly embedded in its economic fabric? And those are the issues that we were trying to unpack with the first piece of research that we did with Arup in 2018, which tried to get innovation districts

properly on the map and understand them in policy terms, particularly the connection between inclusion and inclusive growth, and productivity.

This central question facing innovation districts – "what type of value creation and return do they deliver for their places?" – leads to other related challenges of mission purpose, environmental sustainability, equity and inclusion and governance.

Q. How does that inclusion play into the physical design and layout of innovation districts?

It's a really key element. For example, public realm is one of your core assets, but all too often we haven't really thought like that. Historically, you look at some of the intensive innovation in places like academic or research institutions, the public realm is not a key consideration – or if it is, it's not actually always that public! Sometimes it's almost like a fortress environment. But then you flip that and look at somewhere like King's Cross, where the innovation cluster is actually centred around public realm. They've opened up the whole area and they've made those meeting and mixing spots really public.

Q. How has governance evolved? Is there a single template for how innovation districts work?

No, they're really varied. I think the way governance structures are evolving is really interesting. While there isn't a single model, there are some consistent qualities and characteristics that you see woven through the strongest partnership structures. They often go back to the 'quadruple helix' model – integration of

private, public, academic and community sectors. Most of the innovation districts forming and reforming now are focused on that model.

Q. How was it working with Arup on the UK Innovation Districts Group research?

I've always enjoyed working with Arup; it's always been a really positive experience. I think that that comes from the fact that Arup is spread across so many disciplines, but with a consistent passion and level of expertise. We definitely saw that when we were working on the 2018 report, which was trying to understand the state of play of innovation districts in the UK. That involved a lot of detailed interviews and discussions with [UK Innovation Districts Group](#) members, also with other people

who are on the fringes of this world. I've always found that to be a really engaging way of working, and in my experience Arup colleagues have also been very receptive to going the extra mile, and having that dialogue not just with the client but with all the stakeholders.



Innovation, Bidenomics and Levelling Up – transatlantic perspectives.

President Joe Biden’s US administration has passed measures such as the Inflation Reduction Act, and the CHIPS and Science Act, which provide for extensive government investment in technology and green infrastructure, sometimes called ‘Bidenomics’. At the same time, the UK has been pursuing Levelling Up and growth plans.

Olivia Schuster, who has been leading Arup’s consulting on the US programmes, and Tom Bridges, UK Government and Innovation Leader, discuss the investment programmes, how they compare, and what transatlantic lessons might be learnt.



Olivia Schuster
Consultant,
Technical Advisory
Arup



Tom Bridges
Director, UK Government
and Innovation Leader
Arup

Innovation places

Policy Perspective: Investing in innovation in the UK and US

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Q. What was the driving force for Bidenomics and for Levelling Up in the UK?

Olivia

Joe Biden ran for President on a policy of decarbonisation and pro-climate intervention. And Covid focused us on the need to onshore or “reshore” many of the critical supply chains that we depend on – from general consumer goods, to food and agricultural supplies, to electric vehicles and renewable technologies such as photovoltaics – for reasons of security as well as resilience.

So Biden’s programme really emerged from mingling and meshing those objectives – decarbonisation and reshoring. And the programme is much more than just one law or bill. It’s a series of legislation, using pretty much every tool in the toolbox, meant to spur innovation. The CHIPS and Science Act is more focused on advanced technologies, the Infrastructure Investment and Jobs Act invests on upgrading core infrastructure such as transport, power and broadband, and the Inflation Reduction Act is more focused on energy and climate tech. The President has also used the Defense Production Act to boost innovation in green tech, in the name of defence. We are seeing the DoD (Department of Defense) fund R&D in clean energy technologies like small modular wind turbines, deployable on bases and military expeditions, which have civilian applications as well as military.

Tom

There are also some common trends across the US and UK, aren’t there, in terms of deep and widening inequalities in economic performance between

places, and the sense that people and places are being left behind. And you’ve also got this massive crisis around the slowdown in productivity growth since 2008, which is affecting household income, which in turn is affecting public finances in terms of creating revenues to pay for public services.

Olivia

I agree. The Biden administration has shaped their policies to focus on reinvigorating the areas that were left behind. So traditionally you have technology innovation concentrated in places like California and New York. And some of the new programmes – hydrogen hubs, carbon capture hubs, semiconductor hubs – are not going to those areas, but to middle-tier places with mid-size populations and research centres; places that have a good amount of backbone to them, but aren’t necessarily at the level of MIT or Stanford.

Q. How do programmes compare in terms of scale and targeting?

Tom

There are some big differences in terms of scale.

If you take the CHIPS and Science Act in the US, the federal government has allocated around \$10 billion over five years for 20 technology hubs, so roughly around \$500 million per hub. If you scale that to the UK on a per capita basis, as LSE’s Neil Lee has done, that would be equivalent to around £1.7 billion for four centres.

I think what Olivia is describing is an approach in the US that has sought to strike the right balance between



recognising there are centres with genuine research expertise and a track record of commercialising that research, and also thinking about how that then affects the wider economy.

I think in the UK we’re spreading this investment quite thinly. Over 340 local authorities are in receipt of Levelling Up Fund and Towns Fund in one form or another. But the total budget is only around £8.4 billion.

And then more recently, we have Investment Zones, of which eight have been announced in England, with two more in Scotland. So that is focusing investment, but while £160 million for each of the English zones

over ten years is not to be sniffed at – particularly as a good proportion is revenue funding – it’s a drop in the ocean compared to what is happening in the US.

Olivia

And the investment in some of the other hubs has been even higher. For hydrogen hubs, there are eight hubs with a billion dollars each. And they are located across the country, with most in heartland areas, such as the Dakotas, a huge oil and gas region, and the Appalachians, which are also fossil fuel communities.

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It was Senator Joe Manchin who pushed that approach forward in the Inflation Reduction Act because his home state of West Virginia is a very much an oil and gas state. The legislation includes bonus incentives for energy communities and low-income communities, so basically the entire state of West Virginia qualifies for one, if not both, of those bonuses, so if you put a solar or battery storage project in the state, you could quite easily get 50% of your investment back from the government, compared to a standard 30%.

Tom

That illustrates how in the US and the UK some of the places that are at risk of being increasingly left behind are also places with high carbon-emitting industries historically and currently. And I think one of the things Biden has done really well, is to try and link the green agenda with a future jobs agenda. And you saw some of that in Boris Johnson's ten point green plan for a green industrial revolution, which also tried to align levelling up with the green economy energy transition.

Developing new green technologies, such as offshore wind and sustainable aviation fuels, is a huge policy challenge, but there is also a huge economic opportunity. And I think there is something the UK can learn from the US example, particularly as the green transition is at risk of becoming a political dividing line.

Olivia

I personally agree with you, Tom. But that's not something that many Americans actually agree with, particularly in industries such as

automobile manufacturing. People are worried their jobs are going to be affected by the transition to electric vehicles, and to be quite honest with you, they will be.

While many of the new jobs are subject to 'prevailing wage' regulations, not all of them are, and one of the measures that is exempt is the 'manufacturing credit'. Maybe this was an accidental omission, or maybe it was because you had manufacturers saying if you make us pay prevailing wage, we won't be able to afford to onshore these facilities.

But, whatever the truth of that claim, the consequence is that while some of the new manufacturing facilities are unionised, many are not. So union labour in the US is definitely, and I think understandably, very hesitant towards this green transition. Even with the growth that we're seeing in these very traditionally industrial regions, they're worried that these new jobs aren't going to be good paying jobs.

Q. How are different partners engaged in this new industrial policy? How do the partnerships involved compare in the US and UK?

Olivia

It varies from place to place. In some, university-led partnerships have the innovation and science expertise, and can bring in industry partners and you have a lot of traditional research institutions leading in this space, particularly in California. Whereas in the South, you have partners that are outside of the university sphere, and they're bringing together their own ecosystem.

Meanwhile, within federal government, the programme has led to a new government focus on integration,

bringing together all these previously siloed different parts of the Departments of Energy, of Transportation, of Agriculture, of Commerce, of Defense – to accomplish one mission, with funding allocated to whatever federal entity is best equipped to distribute the funds to the intended recipients. For example, the Department of Energy is generally responsible for any energy programs, but the Department of Agriculture, for instance, is actually responsible for distributing a lot of new funding to small rural electric co-ops, which need a lot of investment, since they don't interact a lot with the Department of Energy, but they do interact with the Department of Agriculture.

Tom

It's interesting that it's a very much a cross government effort in the US in terms of the federal government.

In the UK the Levelling Up missions set out in the White Paper are intended to provide a framework for cross-government working, and to overcome the very fragmented and centralised nature of the UK government. And to achieve Levelling Up, you need to be coordinating investment across research and innovation, across transport, across housing and regeneration, across culture, across skills and education, across energy, and across all those things dealt with by different government departments. The White Paper is almost trying to retrofit coordination.

Olivia

So I'm wondering, Tom, what you think is holding back the UK Government from integrating? Because the US wasn't set up to do this either before the Inflation Reduction Act.

Tom

I think there's probably a number of things.

One is clarity of mission: my sense that this agenda has been defined through a series of significant and long-term programmes in the US, with detail and structure around them, whereas in UK Levelling Up has been much more of a woolly concept meaning different things to different people. So the design of the investment and the programmes has not been given that same level of thought and planning as in the US.

The second thing is that there are fundamental challenges with the UK's machinery of government, which is a very centralised system with many decisions that affect people's lives relating to tax, taxation and investment being made in Westminster. And I think that creates real challenges because we don't have effective mechanisms to try and coordinate and focus policy, action and investment at local level.

I also think that presidential leadership in the US is very powerful, whereas in the UK we've had frequent recent changes in political leadership and I think there's a question about ensuring that consistency of political mission from the top.

And finally it feels like the private sector are not sufficiently at the table on this agenda in the UK. Levelling Up feels like a discussion that's being led by policy experts, universities and the public sector. They do need to be involved but I don't see the R&D intensive businesses, the entrepreneurs, investors of risk capital playing sufficiently strong roles in our innovation ecosystems or in shaping policies and programmes.



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Q. We've talked about a lot about the federal departments. What's the role for state governments and city government?

Olivia

There are also programmes from the federal government that distribute federal money to the states, but once the money gets to the states, it's up to them what they want to do with it. And that is a challenge to the green transition because the state might get the money, but if they're not politically motivated to encourage the green transition, then they're not going to be proactive with that funding.

And then you have states that are being very proactive, not just with the federal funds that they receive, but also with their own state budgets. You have states themselves offering billions of dollars in some cases to individual manufacturing plants as kind of extra incentive on top of whatever they're getting from the federal government. So that's been very common in West Virginia, Kentucky and Arizona, states that are known for being favourable to large industrial project development. And that becomes part of the site selection process: what companies can get from different states and localities, in terms of funding, in terms of infrastructure, in terms of permitting.

On balance the state's ability to bring their own funding to the table is beneficial. But it does also build on top of an already inherent inequality. If you have states that don't have the finances to support those sorts of incentive programmes or they don't have the political will to do so, then they are going to be left behind.

Tom

You need to integrate leadership and action at a national level, with local leadership building local ecosystems and also local investment. I think in the UK the Investment Zones initiative begins to do that. The prospectus for Investment Zones was not overly prescriptive; and it wasn't a bidding process but a structured conversation between central government and the combined and local authorities around what a sensible programme and projects look like locally.

One of the conditions was that the local places had to demonstrate involvement, engagement and support from the local ecosystem; their submissions needed to be signed off by universities, who needed to be properly involved. So this isn't about central government versus local government, this is about the right mix and the right integration, the right partnerships between the two.

Q. It's interesting to note how it's the green agenda that is really driving innovation in the US, and being integrated with traditional manufacturing industry. Is there a lesson for the UK there?

Tom

I think what's interesting about the US is there's a very conscious attempt to link those urban hubs of innovation and centres of R&D expertise based around world-class universities with the wider manufacturing base, and I think that is an opportunity and a challenge that the UK needs to respond to.

Too often in the UK there's been a conversation about innovation districts, and that's been about jobs in R&D and digital and professional services, and then there's been a manufacturing

conversation, which is separate. One of the issues with the UK economy is that it is really good at cutting edge innovation, like the COVID vaccine or Deep Mind or ARM Holdings, but so much of our economy is miles away from that frontier.

So the question is how we get that diffusion of innovation throughout our economy, particularly the manufacturing base. There are some attempts to do that in the UK. The Atom Valley initiative in Greater Manchester is a very conscious attempt to link the research and innovation strengths of Manchester City Centre, and its universities and innovation districts, with manufacturers and manufacturing sites in North Manchester, Oldham, Rochdale and Bury.

Olivia

I would agree with that. There's a conscious recognition in the US that innovation really needs that commercialization aspect. With semiconductors for instance, a lot of the stakeholders were saying pre CHIPS, 'We can innovate in our heads, but if we don't have the fabs on the ground so that we can tweak the manufacturing processes to go along with these innovations, we're not really going to see the returns on R&D'.

Tom

And if we don't get this right, the beneficiaries will only be in the big cities, and we can't rely on 'trickle-down' to spread the benefits: it doesn't work economically, and it certainly doesn't work politically. Manufacturing matters, It's not towns versus cities. It's not manufacturing versus digital and services and research, it's about taking a coherent view across them, it's about convergence.

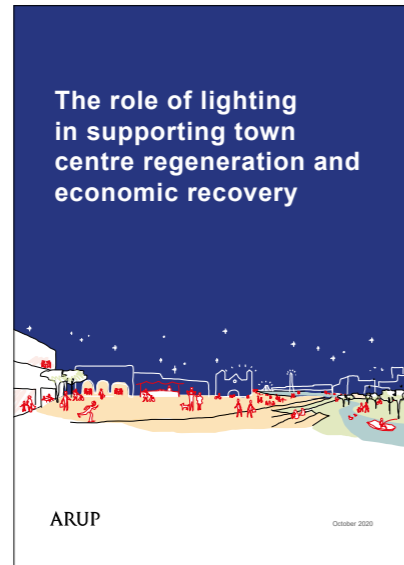


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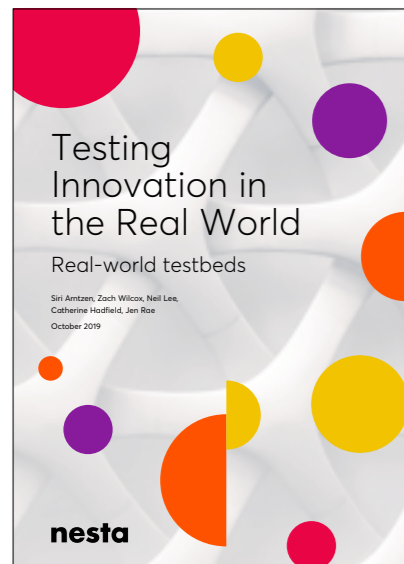
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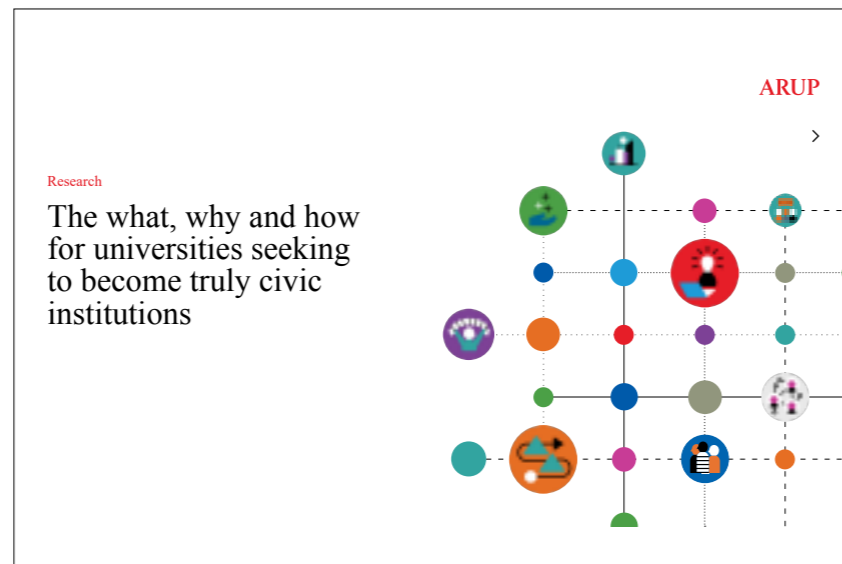
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