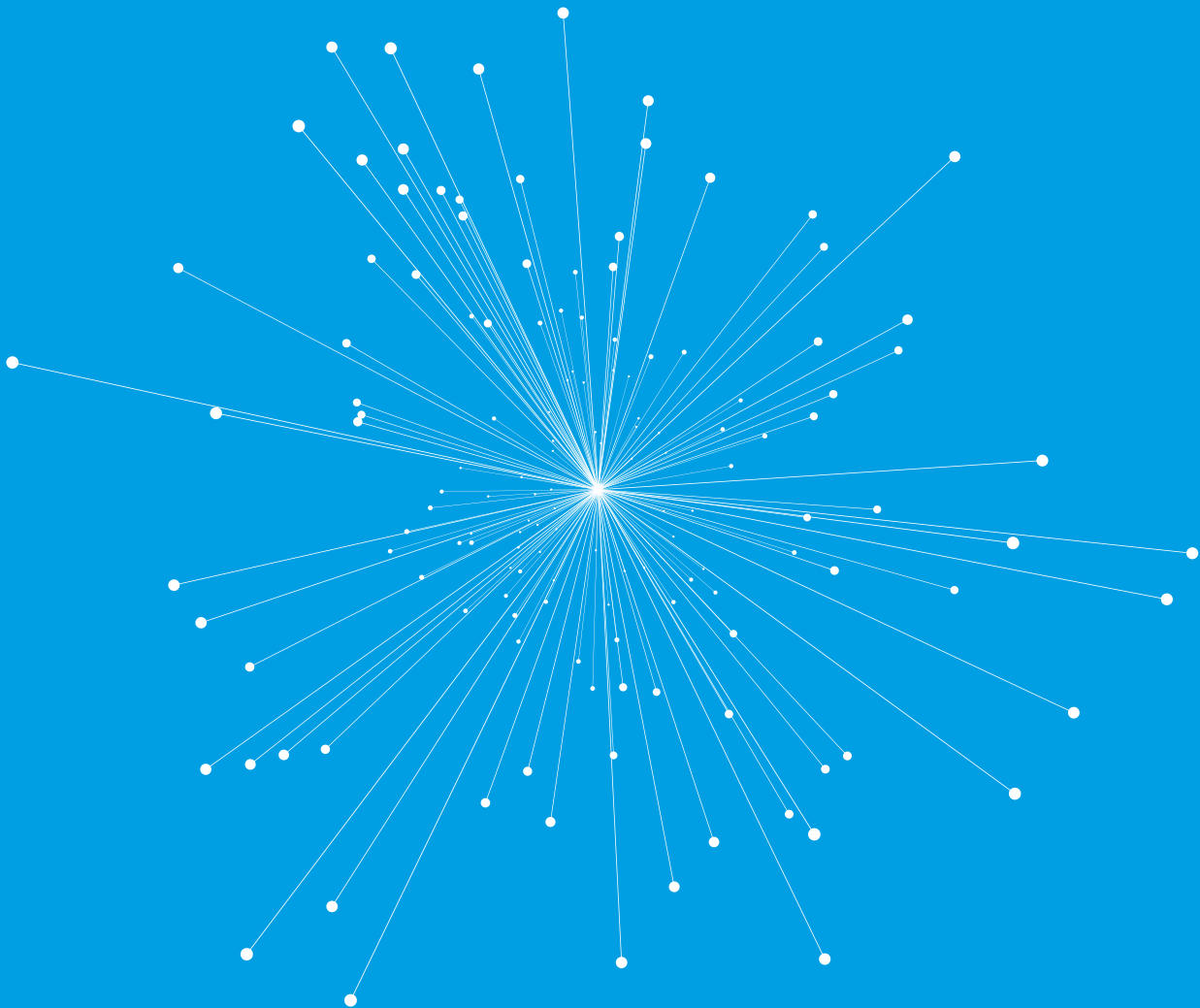

UK Innovation Districts Group

ARUP

UK Innovation Districts and Knowledge Quarters

DRIVING MORE PRODUCTIVE GROWTH



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UK Innovation Districts Group



Executive Summary

Innovation districts are urban areas with networks of knowledge-producing organisations such as universities, research bodies, teaching hospitals, cultural institutions, and knowledge-intensive businesses. They bring together innovators, entrepreneurs, researchers, creatives, knowledge workers and investors to work together, to collaborate, compare and compete, creating the conditions for business growth. These people and organisations value the vibrancy, connectivity and networks of these dense urban locations. Innovation districts are becoming the locations of choice for spin-out, start-up, and scale-up science and technology driven firms, as well as for larger businesses undertaking research and development.

Innovation districts are reshaping and regenerating parts of major UK cities, creating and attracting new high quality jobs in accessible locations. They provide a focus for knowledge organisations and employers to engage with people and communities in new ways; increasing awareness of and access to the range of learning and career opportunities available in the knowledge economy of today and the future.

There has been previous work on innovation districts in the US and London, but the UK story is less well-known. This research looks at the progress and lessons from the six Innovation Districts that form the UK Innovation Districts Group. Whilst these projects are at different stages of development, their success to date and future potential is clear. Through major investments in new campuses and cultural buildings, public spaces, physical and digital infrastructure, and proactive curation of social, research and business networks, innovation districts are emerging as some of our most significant and productive economic locations.

Innovation districts provide a unique opportunity to address, in an integrated way, two of the main economic and social challenges facing the UK: productivity and inclusive growth. The UK's sluggish productivity growth stems partly from not spending enough on Research and Development, not diffusing and commercialising innovation as well as our competitors, not creating and scaling up enough high-growth, high export firms, and a "long-tail" of less productive small firms. Poverty, low skills levels, and low pay are also holding back growth. Boosting productivity through inclusive growth by getting everyone contributing to and benefiting from the economy to their full potential is an increasing priority for cities and city regions. The national and local industrial strategies are seeking to support a place-based approach to increasing productivity.

The main conclusion from this research is that Government should prioritise place-based investment in innovation districts to boost productivity, support inclusive growth, and to deliver the Industrial Strategy.

Specific recommendations are set out on how:

1. Government and cities and city regions should prioritise innovation districts to support the delivery of the Industrial Strategy;
2. Innovation districts should build on their existing work to help lead the way in increasing productivity through inclusive growth;
3. Innovation districts should work together more closely as a national network;
4. Cities, city regions and innovation districts should continue to secure capital investment in public spaces, physical and digital infrastructure, and new buildings in innovation districts; and
5. Government, LEPs and Combined Authorities, and cities should invest in developing the hard and soft networks to support business growth in innovation districts.



1. Introduction

Innovation districts are emerging as the destinations that can help UK cities create, scale up and attract fast-growing firms, together with new products and processes which will drive more productive and inclusive economic growth. The geography of innovation and the economy is changing. Knowledge-intensive jobs are moving back into city centres and regeneration areas, where skilled and creative workers, innovative firms, researchers from educational institutions, healthcare clinicians, and investors are sharing knowledge and ideas. They are collaborating, comparing and competing in city centres and urban areas, benefiting from the knowledge spill-overs which come from high densities and close networks of knowledge functions and collaborative spaces.

Cities, universities and other anchor institutions for innovation are seeking to support and capitalise on this trend through bold investments to create new campuses, business space, public realm and urban districts. These are the science parks of the 21st century, regeneration hotspots, magnets for inward investment, and the places that have the potential to change our cities and our economy.

There has been increasing interest in innovation districts in the US, but the UK story is less well-known, despite the success achieved by the first wave of innovation districts and the huge potential of others. As a result, there is a risk that the UK will not grasp this opportunity fully. We need to ensure that innovation districts secure the investment and support necessary to maximise their success.

Arup have worked with the UK Innovation Districts Group to assess the progress made by innovation districts, factors for success, issues to be overcome and the priorities and opportunities for the future. The research has included a review of literature and interviews with those involved in Innovation District projects. This report sets out a series of recommendations for Government, cities,

promoters of innovation districts, and institutions within them on what is needed to make the most of the opportunities. The main research question was:

How are UK cities developing Innovation / Knowledge Districts to support more productive and inclusive growth, and what are the main trends, impacts, factors for success and lessons for future policy and investment decisions?

The UK Innovation Districts Group brings together some of the UK's most significant Innovation District projects: Glasgow West End and Waterfront Innovation District; Leeds Innovation District; Knowledge Quarter Liverpool; Knowledge Quarter London; Queen Elizabeth Olympic Park; and Manchester Oxford Road Corridor. This group is open to involving other innovation districts in major cities, which are seeking to build on genuine world class research and development strengths.

The purpose of this project is not to compare or rank these different initiatives, which are at different stages of development; it aspires to be forward-looking, identifying the steps that can be taken to increase their positive impact. The trends shaping innovation districts are not exclusive to these projects; and it is hoped that this report will be useful to those developing other innovation districts in the UK.

"Innovation districts constitute the ultimate mash-up of entrepreneurs and educational institutions, start-ups and schools, mixed-use development and medical innovations, bike-sharing and bankable investments - all connected by transit, powered by clean energy, wired for digital technology, and fueled by caffeine"

Bruce Katz and Julie Wager,
The Brookings Institution 2017

UK Innovation Districts Group

2. Context

Whilst there has been analysis of innovation districts globally and in London, the story across the UK is less well researched or known. This section sets out the main points from the previous work, providing an overview of some of the drivers for change. These include the challenges of increasing productivity (particularly through inclusive growth), the changing geography of the knowledge economy, devolution, and the Industrial Strategy. It concludes that in the context of these changes, innovation districts are emerging as opportunities of huge economic and social significance, and will be catalysts for more productive and inclusive growth for our cities.

Below: University of Leeds robotics system, developed jointly with the Universities of Vanderbilt and Turin



DEFINING AND RESEARCHING INNOVATION DISTRICTS

The emergence of innovation districts is a global trend, as the knowledge economy becomes increasingly important for cities and regions. The rise of Innovation Districts in US cities and urban regions was identified by Bruce Katz and Julie Wagner at Brookings.¹ They define innovation districts as:

“geographic areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators, and accelerators.”

They define “anchor institutions” as research universities and research orientated medical hospitals with extensive R&D. In the UK, cultural institutions, professional and scientific bodies, and research-intensive government functions can also be defined as anchor institutions in the context of innovation districts. It is also clear that a concentration of a diverse pool of highly skilled knowledge workers is a feature of innovation districts. In the UK, innovation districts are found in major cities, whereas in the US they are also found in mid-sized cities and urban regions.

Katz and Wagner identify three main features of innovation districts:

- Economic assets – the firms, institutions and organisations that create or support innovation;
- Physical assets – the buildings spaces, streets and infrastructure which support collaboration and innovation (including what they describe as “the hyper-cafeinated spaces” between the buildings); and
- Networking assets – the relationships between different organisations and people that generate, develop and help commercialise ideas.

They set out five broad recommendations to those developing innovation districts.

The Brookings Recommendations on Developing Innovation Districts:

1. Build a collaborative leadership network, bring together the decision-makers and leaders from the organisations and sectors to cooperate formally on the design, delivery, investment and promotion of the district;
2. Set a vision for growth based on understanding competitive advantage, setting out how institutions can work together, and re-imagine the physical landscape, buildings and infrastructure;
3. Pursue talent and technology, through initiatives to attract, retain and develop talented and skilled people, and by integrating new technologies into the activity and physical infrastructure of the innovation district;
4. Promote inclusive growth through neighbourhood regeneration, increasing labour market participation, and stimulating local entrepreneurship; and
5. Ensure access to capital by leveraging public and private sector sources of funding to support the growth of innovation districts.

The Centre for London Recommendations

The main UK research on innovation districts has focused on London.² The report by Centre for London set out five main recommendations for developing innovation districts in London:

1. Local Authorities should understand local innovation assets and build skills for long-term;
2. The Mayor of London should adapt the London Plan to reflect the importance of innovation districts, and should develop sectorally and spatially focused inward investment plans aligned with innovation districts;
3. Government should allow universities and innovation districts to sponsor tier 2 visas;
4. Universities and other knowledge producers should develop their role at the civic level to promote economic growth; and
5. Developers should take an active role in place-shaping with a focus on creating spaces and places that promote collaboration and entrepreneurship, and are attractive to skilled people and knowledge-intensive firms.

ECONOMIC TRENDS

The Productivity Challenge

The UK is facing a major challenge around productivity. This matters because, as Paul Krugman said, ultimately the ability of the UK to improve living standards and re-invest in growth depends on making productivity gains.

“Productivity isn’t everything, but in the long-run it is almost everything. A country’s ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker”

Paul Krugman
New York Times

Whilst there has been strong job growth in recent years, productivity growth has been sluggish, particularly outside London. This issue has been termed the “productivity puzzle” with many theories about the cause and potential solutions.

There is a consensus that the UK does not spend enough on Research and Development (R&D) compared to other countries. Some commentators have argued that this problem is exacerbated by big regional differences in R&D spend, particularly Government spending. The Government has committed to increasing R&D spending from 1.7% to 2.4% of GDP by 2027 to match the OECD average. Some economists have argued that the main problem is not the amount of innovation, but that commercialisation and diffusion of innovation geographically, and through the business base, is too slow.

“An alternative way of accounting for slower productivity growth is that it arises, not from slower rates of innovation, but from slower rates of diffusion of innovation”

Andy Haldane,
Deputy Governor, Bank of England

There is a debate about the extent to which industrial structure matters. Centre for Cities have argued that parts of the UK, particularly outside London and the South East, do not have enough productive, knowledge-intensive, high export firms (high export firms are generally more productive). The work of Sherry Coutu and the Scale-Up Institute has highlighted the importance of creating more fast growth scale-up firms. There is a general consensus that significant concentrations of highly-skilled, diverse workers help drive more productive growth, and this now underpins the methodology for assessing the wider impacts of transport schemes. But others, including Deputy Governor of the Bank of England, Andy Haldane, have argued that the problem lies with the UK’s “long tail” of less productive small firms which do not spend enough on R&D, technology, premises, export promotion, training and management development.

Whilst the causes of the productivity crisis are complex and subject to debate, what is clear is that innovation districts could provide part of the solution. They can provide a focus for increases in R&D, they can help accelerate rates of diffusion and commercialisation of innovation, they can attract and create more fast growth, research intensive, high export, scale-up firms. They can potentially help less productive firms access knowledge, expertise and support.



OXFORD ROAD CORRIDOR - MANCHESTER'S INNOVATION DISTRICT

Oxford Road Corridor is a unique strategic partnership overseeing Manchester's Innovation District. Co-located on the Corridor are two universities, five specialist hospitals, local government, entrepreneurs, global businesses, cultural assets and an Enterprise Zone. The Innovation District is underpinned by world-class research and has particular specialisms in advanced materials and health and life sciences. An ongoing series of transformational investments by partner institutions, guided by a Strategic Spatial Framework, has created an environment that has seen exceptional jobs and GVA growth. This pro-active approach to 'place-shaping' has supported the development of a wider mix of uses and has seen improved public realm and shared spaces; the introduction of 'Dutch cycle lanes' and traffic restrictions; development of new cultural facilities; and the integration of leading-edge smart city technologies. Targeted business interventions have focused on accelerating innovation, commercialisation and improved health pathways, recognising the important role the area will play in supporting the delivery of the Greater Manchester health and social care devolution agenda.

Left: Manchester's Oxford Road Corridor



GLASGOW - CLINICAL INNOVATION

The West End and Waterfront area of Glasgow is an ideal environment for innovation. It boasts one of the world's largest hospitals, a top 100 research-intensive university as well as cultural facilities on the banks of the River Clyde.

With the main partners - Glasgow City Council and Scottish Enterprise - and the support of the Scottish and UK Governments and the wider business community, Glasgow University is establishing an Innovation District that will help push Glasgow into the top rank of global innovative cities.

The Clinical Innovation Zone at the Queen Elizabeth University Hospital is at the forefront of developments in Precision Medicine. By using cutting-edge molecular technologies, clinicians can tailor treatments to patients individual needs - reducing costs and improving treatment outcomes across a wide range of conditions. Leading biomedical companies are already making use of the first 7T MRI scanner to be integrated within a clinical site in the UK.

Left: Centre of Excellence at Glasgow's Queen Elizabeth University Hospital



KNOWLEDGE QUARTER LONDON - CROSS THEMATIC COLLABORATION

One of the main advantages of innovation districts is their capability of producing new collaborations; particularly cross-thematically. In London's Knowledge Quarter, examples of cross-thematic collaborations include:

- A strategic partnership between the Public Collaboration Lab at Central Saint Martins and Camden Council. The lab explores the potential for, and value of, strategic collaboration between design education and local government and how design research and teaching can contribute to service, policy and social innovation in the local government context.
- Through the Digital Music Lab project, City, University of London's Machine Learning Group is working with UCL and the British Library, alongside Queen Mary University, to develop research methods and software infrastructure to explore and analyse large-scale music collections.
- London Metropolitan Archives worked with the London School of Hygiene and Tropical Medicine on an activity with school children about the spread of infectious diseases.

Left: Regent High School students debate the future of knowledge

Increasing productivity through inclusive growth

There is increasing interest in the concept of inclusive growth as a means of driving greater productivity. Not everyone has been benefiting from, or contributing to, economic growth to their full potential. This has affected living standards, creating personal and economic costs of poverty and holding back economic performance. Stagnant wage levels, job quality and security, and low pay are also significant problems.

Work to develop the concept of inclusive growth has been undertaken at international level by the OECD, UK thinktanks such as Joseph Rowntree Foundation and the RSA, the Scottish Government, and several cities. Whilst inclusive growth to some remains a fuzzy concept, it involves a rejection of trickle-down theories in favour of approaches to stimulating growth that address distributional issues. Piketty's arguments about increasing inequality and its impact emphasise a greater focus on human capital, innovation and enterprise as drivers of growth. Improving education and skills so that more people can contribute to and benefit from economic growth to their full potential is an important dimension of an inclusive growth approach.

Further growth is still needed to create and improve equal access to more and better jobs.

Innovation districts can have an important role in supporting economic growth which will create new and improved jobs. They can help cities replace the jobs that will be made obsolete by automation and technological change.

There is also the opportunity to build on the university-industry collaboration around innovation to strengthen partnerships between employers and universities, helping to address higher level skills gaps. These collaborations could also help change recruitment practices, diversifying talent pipelines.



Above: Lab technicians in the Accelerator, Liverpool and Lively debate shaping ideas, growth and places in Queen Elizabeth Olympic Park

The changing geography of the knowledge economy

Our cities have always been hotbeds of innovation. It was in Manchester that Charles Stuart Rolls met Henry Royce, where Dalton developed atomic theory and Rutherford split the atom, and where Kilburn and Williams built the first programmable computer. It was in the centre of Leeds where Le Prince created the first moving image, where Michael Marks went into business with Thomas Spencer, and where William Astbury's breakthroughs in structural molecular biology were the precursor to the discovery of DNA. Liverpool was home to the first red brick university and the Liverpool School of Tropical Medicine was the first of its kind in Britain. The city was also home to the world's first public baths and the world's first overhead railway. In Glasgow, Adam Smith drew on the experiences of merchants to develop economic theory, James Watt invented the steam engine, and Kelvin did his pioneering research on thermodynamics and electromagnetism. Plastic, colour dyes and paint were all invented in east London, at the site opposite Queen Elizabeth Olympic Park. And it was in the centre of London (in today's Knowledge Quarter) where the thermionic valve was invented, making modern electronics possible. Hormones, vitamins and the structure of DNA were all discovered here; whilst the world's leading thinkers, clinicians and scientists gathered at the library of the British Museum, the Royal College of Physicians and the Royal Veterinary College.

But in the 1970s and 80s the fastest growth of knowledge-intensive jobs in the UK was in suburban and car-borne areas such as the M4 corridor, the M25, the New Towns, and in the science parks in Oxford and Cambridge. This trend was driven by proximity to leading universities, defence research establishments, accessibility to the motorway network, "leafy" residential and working environments, and new business space in science and office parks. This clustering tended to be focused on specific industries such as IT or bio-science, in line with Marshall's theory of clustering and specialisation. Research and development tended to be in closed networks within firms or through narrow industry-academic collaborations.

Whilst some of these suburban locations remain highly competitive, a trend emerged in the 1990s, and has picked up pace recently, of knowledge-intensive jobs coming back into city centres and university districts within cities. Many commentators predicted that with electronic communications people would no longer need to meet in person. In fact, as the economy has become more specialised and knowledge-based, firms increasingly value the way in which city centres bring high densities of face-to-face contacts, exposure to ideas through formal and informal meetings, and access (via public transport) to a wide pool of skilled and creative workers. Occupiers and workers are valuing more highly the vibrancy of cities, particularly as the cultural, residential, retail and leisure offers, and the public spaces have improved.

"To find an innovative economy 20 years ago, a worker needed to drive to a secluded research park, work in isolation, and keep ideas secret. Today proximity is everything. Workers want to be in urban places that are walkable, bike-able, hyper-caffeinated, where they can bump into other workers and share ideas. Firms also want to be close to other firms, research labs and universities, in collaborative spaces"

Bruce Katz and Julie Wagner
The Brookings Institution



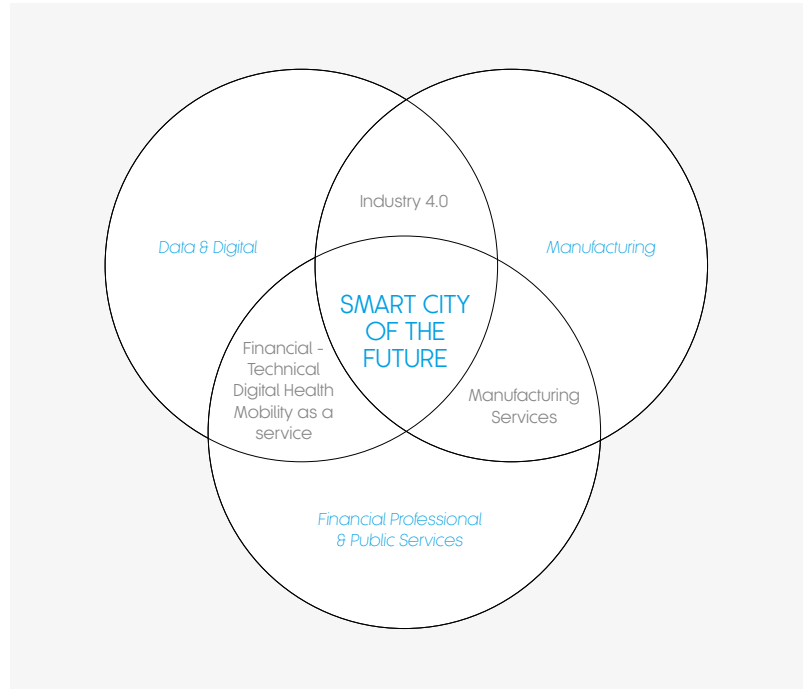
Above: The Metropolitan Cathedral at the end of Hope Street in Liverpool

Unlike the single-industry specialist clusters of the suburban science parks and motorway corridors, the clustering of knowledge-driven firms and skilled workers in cities has embraced a new trend of interconnected industries and stimulated the growth of city centres and urban quarters where universities are based. This is where different sectors come together, and increasingly innovation is found at the intersections of different sectors, as well as the result of an area or areas of world class research expertise. It is also based on open innovation and sharing of ideas between different firms, people and institutions.

"People... vastly underestimated the importance of face-to-face contact in work. What globalisation and new technologies do is radically increase the returns to being smart. We are a social species that gets smarter by being around other smart people, and that's why cities thrive."

Professor Ed Glaeser⁵
Harvard University

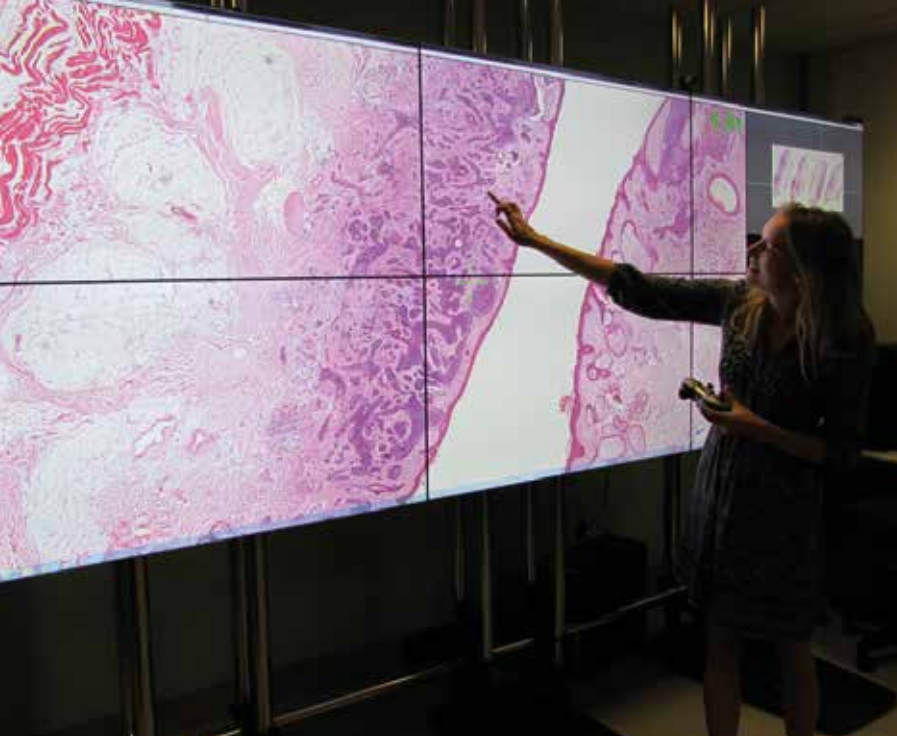
The trend has been accelerated and supported as a result of major capital investments. Universities, hospitals and cultural institutions continue to invest in new buildings, facilities and campuses as they modernise their estates. Significant investment in new transport hubs and connections, as well as public spaces are opening up new areas for growth and development. Enlightened developers, informed by far-sighted planning policies and masterplans, are capitalising on the opportunities, creating and curating buildings and spaces that support collaboration and vibrancy.



Interconnected Industries

Edge of city technology / science parks	Innovation Districts
Innovation takes place mainly within firms, labs, office buildings, and narrow, closed industry-university networks	People and firms share ideas in collaborative spaces within and between buildings, and through meet-ups and open innovation networks
Generally focused around a particular sector or specialism	Increasingly a wide mix of different sectors and activities, with competitive advantage coming from spillovers between them
Located on the edge of cities with good access by car to the strategic road network. Buildings surrounded by car parking.	Located in city centres and new urban quarters with good public transport access, as well as pedestrian and cycle links to nearby areas. Buildings within quality public realm.
Leafy, green environments, close to countryside	Vibrant, with good cafes, restaurants and retail, incorporating or close to city centre living, and cultural attractions.
The growing, productive economic zones of the 1980s and early 90s.	The economic powerhouses of the 21st century

How innovation districts differ from edge of city technology parks



LEEDS - A WORLD LEADER IN DIGITAL PATHOLOGY

Leeds is a globally leading centre for digital pathology innovation. It boasts the largest online pathology repository in the world, and has developed leadership over 15 years on evidence-based safe adoption of digital pathology for clinical use. The collaboration between Leeds Teaching Hospitals and the University of Leeds has created a number of novel spin out technologies and applications. Their strategic partnership with Leica Biosystems has led to full digitisation of their pathology lab and establishment as the Leica Global Centre of Excellence in Digital Pathology.

Digital Pathology provides significant opportunities to apply artificial intelligence and machine learning to increase the speed and consistency of cancer diagnosis. The Leeds Innovation District positions Leeds and collaborators at the forefront of these opportunities.

Left: The digital pathology Powerwall at Leeds Teaching Hospitals



LIVERPOOL - CENTRE OF EXCELLENCE IN INFECTIOUS DISEASE RESEARCH

Housed in Liverpool's £24m Life Sciences Incubator, Accelerator, The Centre of Excellence in Infectious Disease Research (CEIDR) was launched in 2017 by the University of Liverpool and the Liverpool School of Tropical Medicine and focuses on translational partnering in infectious diseases.

CEIDR provides a single point of access for the industry into a broad infectious disease expertise base in Liverpool for translational activity and helps to develop relationships with industries. It applies the technologies, expertise and resources of the University of Liverpool, the Liverpool School of Tropical Medicine, associated NHS Trusts and overseas partners in the rapid translation of infectious diseases research, with a primary focus to combat the threats of resistance to public health across the globe.

Left: Liverpool Life Sciences Accelerator, home to CEIDR



QUEEN ELIZABETH OLYMPIC PARK - INVESTING IN NETWORK ASSETS - ECHO

Echo is a place-based network that stimulates the exchange of skills, knowledge and opportunities, established in Queen Elizabeth Olympic Park and surrounding areas since 2014. Echo's open access digital platform (www.economyofhours.com) allows its members to self organise, build networks of unlikely allies and exchange skills and resources using a currency called Echoes, where everybody and everything is valued equally; 1 Echo for 1 hour. This provides a mechanism for local residents, independent businesses, freelancers and start-ups, as well as established businesses to connect and tap into the talent, innovation and entrepreneurial energy in east London.

Investment in Echo as a network asset is delivering social and economic impact (with 1 in 4 members reporting that they have gained commercial work as a direct result of trading with Echoes, 82% learning new skills and 47% starting a new business or project) - and its open-access, peer-to-peer model helps ensure this growth happens in an inclusive way.

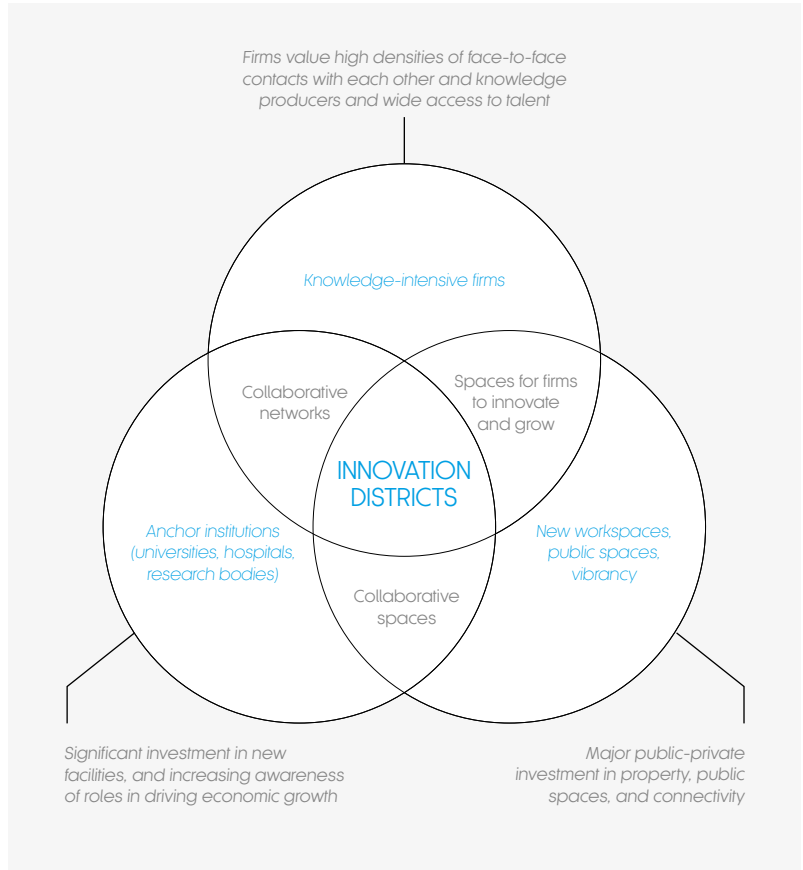
Left: Harnessing diverse talent at an Echo workshop on digital profile raising

The continuing growth in city living over recent decades is strengthening the economic dynamism of many historic city centres. Meanwhile, universities and businesses are energising adjacent urban districts, adding to their vibrancy.

Diversity of talent is also an increasingly important feature in the knowledge economy. Research by McKinsey⁴ has shown that firms in the top quartile for racial, ethnic and gender diversity are more likely to have financial returns above their national average. Diversity of talent is also important at a city level in an increasingly interconnected global economy where there are skills shortages in knowledge-intensive industries. Having a diversity of talent also increases the appeal of cities to global competitive markets, highlighting that workforces increasingly need to represent their globally diverse customer base.

Cities and city regions do not face a binary choice between city centre and edge of city growth. Some productive economic sectors, such as advanced manufacturing, have land and space requirements which make them unsuitable for city centre locations, and there are some highly successful innovation initiatives around where these firms locate. Many edge of centre office parks remain important centres of employment. However, as Centre for Cities have argued⁵, cities should recognise the economic importance of supporting concentrations of productive firms and uses in city centres.

It is possible to identify a typology of UK Innovation Districts (see table opposite).



Main components of innovation districts

Type of Innovation District	Examples
City centre expansion – the development of new urban quarters, or strengthened connections with 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 (in so far as the Kings Cross Central scheme has expanded a long-established knowledge quarter) The emerging Bristol Temple Quarter district next to Bristol Temple Meads Station Newcastle Science Central
New urban quarters – generally in inner urban areas based around major transport nodes, expanding campuses, and improved connections to city centres and surrounding developments and neighborhoods.	Queen Elizabeth Olympic Park, London Glasgow West End and Waterfront Innovation District Knowledge Quarter Gateway and the Paddington Village development within Knowledge Quarter Liverpool
Out of town technology parks – whilst not the subject of this report, some out of town technology parks are being repurposed and reinvented as innovation districts, with a wider mix of uses, and stronger links to nearby city-based innovation assets	Advanced Manufacturing Park, Sheffield Alderley Park, Cheshire Proposed University of Leeds Technology Park in Aire Valley Leeds National Manufacturing Institute for Scotland at Inchinnan, Renfrewshire

Towards a typology of UK Innovation Districts



LEEDS – A NEW STATE OF THE ART INNOVATION CENTRE

Opening in January 2019, Nexus is a new innovation centre at the University of Leeds that will provide access to world-leading research expertise, technology and facilities across the Innovation District. The £40m centre will feature state of the art services including offices, labs, collaboration and event spaces. It will be home to a growing, vibrant and dynamic community of start-ups, SMEs and corporate R&D teams with a focus on health, data, environment and engineering sectors.

Nexus marks a change in the way that Universities and business work together, creating effective partnerships that deliver commercial impact across the Leeds City Region. It provides an outstanding place for businesses to start up and grow, and offers an inspiring environment that has the potential to spark ideas and encourage a new generation of innovators.

Left: Artist's impression of the Nexus innovation centre, University of Leeds



LIVERPOOL – THE SPINE

As part of Liverpool City Council's Paddington Village development, The Spine will be the first speculatively built Grade A commercial office building to be developed in the city centre for over a decade.

At 160,000 sq ft, the building will be BREEAM Excellent Rated and also aspires to be one of the first in the UK designed to achieve a WELL standard accreditation – making it one of the best working environments for mental health and physical wellbeing.

Having successfully won the bid to attract the 500-year-old institution that is the Royal College of Physicians (RCP) to Liverpool, The Spine will be home to their new Northern Centre of Excellence, which will occupy more than half of the building's 14 floors.

Left: Artist's impression of The Spine, Paddington Village



QUEEN ELIZABETH OLYMPIC PARK – EXPLORING CLEANTECH GROWTH

Queen Elizabeth Olympic Park (QEOP), through its sustainable growth model, is a growing hub for emerging technologies, particularly CleanTech. Examples include:

1. Advanced Mobility: The Park has been established and funded by Innovate UK as a Smart Mobility Living Lab: a test bed for connected and autonomous vehicles and associated technology and services (insurance, ticketing, geofencing etc).

2. Smart grid / zero carbon communities: Working closely with partner organisations and local communities to consider the socio-economic and environmental benefits of local, small scale generation, storage and trading of electricity.

CleanTech involves multiple industries coming together (Energy, Advanced digital technology, Automotive, Logistics, Events) with proximity, shared infrastructure and common goals creating a systems change through collaborative innovation – with the potential to deliver significant social, economic and environmental return.

Left: Testing driverless busses at Queen Elizabeth Olympic Park

INDUSTRIAL STRATEGY

The National Industrial Strategy published in late 2017 sets out the Government's policies for raising productivity and boosting national growth. The Industrial Strategy identifies five cross-cutting foundations for improved productivity:

- ideas (innovation and R&D);
- people (better jobs, skills and earning power);
- infrastructure;
- business environment (particularly for starting and growing a business); and
- places (including agreeing local industrial strategies).

The strategy outlines the sector deals to form partnerships between government and industry to boost productivity, with the first wave of deals to be in life science, construction, artificial intelligence, and the automotive sector. Proposals are set out for four "Grand Challenges" to help place the UK at the forefront of emerging industries: Artificial Intelligence and the data economy; clean growth; the future of mobility; and ageing society.

The Industrial Strategy covers the entire UK, recognising the important role of the devolved administrations in Scotland, Wales and Northern Ireland, and the city deals in Scotland and Wales.

One of the criticisms made of the Industrial Strategy has been that it lacks a genuine place-based focus. Science and Innovation Audits have been commissioned for local areas to consider the evidence on their strengths in relation to research and innovation. These have been recently been linked to place-based innovation through the Strength in Places Fund led by UK Research and Innovation. Local Industrial Strategies are being developed for LEP areas; these are intended to set out how places will work within the framework of the national strategy, and bring together interventions to address the issues and opportunities for their local economies.

There is a clear opportunity here to position innovation districts as flagship projects that can help transform the economy. There is a strong alignment between the innovation districts and the main themes of the Industrial Strategy.

DEVOLUTION

One of the main arguments for greater devolution of powers and funding to cities and Combined Authorities is to support more productive economic growth. Local decision-makers understand the economies of their areas better than civil servants in Whitehall, and are best placed to invest and intervene in a proactive and integrated way to support growth. The devolution of funds and the limited fiscal devolution which has been secured in some areas is already being used to support the development of innovation districts. Manchester's Oxford Corridor's specialism in life sciences is closely aligned to meeting the challenge and opportunities associated with the City Region's devolved Health and Social Care system.

Initiatives such as City Deals, and devolution deals are already leveraging funding and investment to support the development of innovation districts. New funding streams such as the Strength in Places Funds and the National Productivity Investment Fund also have the potential to provide further support in the future. The case for public sector investment to support the growth of innovation districts is based on the economic and fiscal returns that will be created.



Above: Artist impression of Materials Innovation Factory, Knowledge Quarter Liverpool

CONCLUSION

The cities that will be successful in the modern economy are those that can harness and commercialise the knowledge, creativity, and ideas from their most innovative and diverse people and institutions. Through collaboration, universities - and other research-intensive organisations - hospitals, government functions, cultural institutions and knowledge-intensive firms can create new innovations, product processes and high growth firms to drive productive growth.

These functions are clustering in major UK cities where leading research-intensive universities are reconfiguring their estates and campuses and seeking closer relationships with businesses. Cities are investing in regeneration, new transport schemes are transforming connectivity, and enlightened developers bringing forward new mixed-use schemes. As a result, UK innovation districts are emerging as opportunities of huge significance. They are the science parks of the 21st century, and the flagship economic growth initiatives.

Innovation districts will be catalysts for productive and inclusive economic growth, at a time of increasing economic uncertainty, social inequality and austerity. In an era where automation is rendering many existing occupations obsolete, innovation districts can help our cities create new firms, products and processes to capitalise on technological change. They can support inclusive growth, expanding job and educational opportunities, delivering new homes and regenerated neighbourhoods, and inspiring people about opportunities in the modern economy. By bringing universities and education providers together, innovation districts can support wider initiatives to improve workforce skills. By creating a range of high quality jobs, diversifying the routes into them and helping people to maximise their contribution to economic growth, Innovation districts can help drive productivity.

Innovation districts are bringing together some of our cities' most creative and innovative institutions, businesses and people who thrive from proximity, enabling ideas and knowledge to be shared and developed. Businesses and people are demanding and expecting better choices of where to work, live and spend leisure time; they want walkable neighbourhoods with attractive spaces, jobs, space for research and learning, housing, and amenities. These people and places thrive on excellent connectivity by public transport, by bike, on foot, and through broadband and new generations of 5G and IoT technologies.

Innovation districts are helping our cities tackle weak productivity growth, and to deliver the Industrial Strategy. They are the mechanism for productive, sustainable and inclusive economic development. They are attracting and growing firms by enabling innovators and entrepreneurs to collaborate.



Above: The University of Bristol is building the Temple Quarter Enterprise Campus in Bristol City Centre, next to Bristol Temple Meads Railway station. The focus of the new campus will be on innovation, and the project will anchor the development of a new urban district on brownfield land. It will build on the success of the University's Engine Shed project, an accelerator for digital firms also located next to Temple Meads station. Engine Shed has attracted entrepreneurs, and supported over 70 innovative digital firms to scale-up.

UK Innovation Districts Group

3. Innovation Districts in the UK

This section sets out some of the common trends and issues relating to the six Innovation Districts which were researched for this project. A brief summary of the main features of the Innovation Districts is included at the end of this chapter.

Below: Manchester's Oxford Road Corridor by night



GENERAL APPROACHES

Innovation District projects are at different stages of development.

Some projects, such as Oxford Road Corridor and Knowledge Quarter Liverpool are well-established. In these cases, there are ambitious plans to build on the achievements to date. Other projects, such as Knowledge Quarter London and Queen Elizabeth Olympic Park, are building on the growing networks of knowledge-producers in their areas, with a focus on enhancing collaboration, securing investment and promoting their areas' strengths. Projects such as Glasgow's West End and Waterfront Innovation District and the Leeds Innovation District are at early stages of development with huge potential.

There are differing areas of focus across the Innovation Districts, but a common feature is an emphasis on genuinely world class capabilities.

The focus of the Knowledge Quarter London is on building networks of cooperation between organisations, as opposed to delivering one physical masterplan or direct delivery of new buildings and infrastructure. The growth of the Oxford Road Corridor is based on a clear vision and masterplan, with the partners leading the project also responsible for direct delivery of new research, healthcare and workspace buildings and supporting transport and digital infrastructure. Knowledge Quarter Liverpool is also focused on delivering a comprehensive masterplan and major new buildings which will accommodate knowledge-producing organisations. The focus on innovation at Queen Elizabeth Olympic Park is a natural progression from the Olympic legacy masterplan, the economic vision for the area and the success in attracting knowledge producing business to the area but with a clear emphasis on digital, design and making; as well as investing in forward-thinking firms, inclusive growth and network assets. The innovation district projects in Leeds, and Glasgow West End and Waterfront are focused on exploiting opportunities from new major healthcare facilities freeing up sites for redevelopment, and major new university campus investments acting as catalysts for economic growth. What is clear is that all Innovation Districts are seeking to harness and build on genuinely world class institutions and research capabilities.

Innovation Districts are building on their strengths across a mix of sectors.

Most Innovation Districts have assessed the evidence, including through Science and Innovation Audits, on their research and economic strengths. They have identified areas of expertise, which include:

- Healthcare and medical technologies;
- Materials science;
- Big data;
- Artificial intelligence and robotics;
- Transport technology and autonomous vehicles;
- Advanced urban services;
- Fin-tech;
- Infectious Diseases; and
- Creative and digital.

This sectoral approach is interesting. All Innovation Districts are seeking to build strengths and develop linkages across a range of different sectors, recognising the benefits of interaction between them. They have all succeeded in amplifying cross sectoral activity. This is based on an understanding of particular areas of expertise, informed by evidence (including Science and Innovation Audits). This approach combines a broad-based approach along with a focus on specific strengths, seeking to increase agglomeration and knowledge spillovers. There are also similarities and potential linkages between Innovation Districts, and the potential to build on collaborations between academic institutions. For example, five of the six Innovation Districts involved in this research include a partner of the Turing Institute for data science and artificial intelligence. Three of the districts have a partner in the Precision Medicine Catapult, and three have partners in the Sir Henry Royce Institute for materials science.

There are differences between Innovation Districts in the way in which they seek to support entrepreneurship.

Providing incubation and collaboration space and support is an important focus of most (but not all) of the projects. There are differences in the extent to and the way in which these spaces are curated by research-intensive organisations. In some cases, the approach to supporting business start-ups and scale-ups is integrated within wider approaches to business support in relevant cities and city regions. However, in other cases there is not a structured approach to attracting and growing firms within the Innovation District. There is a view amongst some of the stakeholders interviewed for this project that more could be done to build the wider ecosystems of support for commercial spin-outs, start-ups and scale-ups. Issues such as availability of affordable space, key account management, access to finance, incubation and accelerator programmes, and transitions to move-on space were all highlighted.

Cultural institutions and attractions are becoming increasingly important component of Innovation Districts.

Several Innovation Districts include, or are close to, significant cultural or visitor attractions, and they are securing new investment from cultural bodies which want to move into these areas or upgrade their existing facilities. Several also include arts and cultural academic institutions and departments. This adds to the offer of Innovation Districts. It provides an important area of academic research for some, one of which is relevant to the economic trend of increasing synergies between technology and the arts. Cultural institutions also create a buzz, vibrancy and activities in evenings and at weekends, helping to retain the student population post graduation.

Innovation Districts are seeking to develop and curate a vibrant mix of uses and animation.

Several interviewees for this project highlighted the challenge of creating a stronger sense of place and vibrancy in their Innovation Districts. The right type and mix of residential accommodation, cafes, restaurants, retail, events and animation are important components of what occupiers want, and additionally support interactions between people.

Innovation Districts are supporting inclusive growth.

Some Innovation Districts are involving partners and organisations in initiatives to forge links with schools and young people in the surrounding areas. This increases awareness of, and access to, the range of learning and career opportunities available to them, providing mentoring, advice and work experience. Innovation districts are creating new public spaces and amenities for residents of nearby areas, and through physical investments are linking these residential areas to education and employment opportunities.

INVESTMENT

Successful Innovation Districts require substantial capital investment in infrastructure and place shaping.

A feature of well-established, successful Innovation Districts has been large-scale capital investment in public realm and infrastructure. Queen Elizabeth Olympic Park has been created from the huge regeneration investment in the London 2012 site and legacy masterplan. The Knowledge Quarter London has been boosted by the significant investment in the interchanges at Kings Cross and St Pancras and the related regeneration by developers Argent of the former Kings Cross railway lands. The Manchester Oxford Road Corridor has been comprehensively remodelled creating more space for pedestrians and cyclists. The emerging masterplans for the Leeds Innovation District, and the Glasgow West End and Waterfront Innovation District include large-scale transformation of the quality of public realm and connectivity, in Glasgow's case funded via the City Deal. Several Innovation Districts are also securing investment in digital infrastructure, including IoT technologies, and enabling infrastructure for 5G. The Liverpool City Region Combined Authority Single Investment Fund gave significant capital investment for new digital and innovation hubs, including investment for the Centre of Excellence in Infectious Disease Research.

Digital infrastructure is an important ingredient for success.

Several Innovation Districts are developing strategies for investment in advanced digital infrastructure, including fibre to the premises, 5G, and sensors and Internet of Things systems, and are putting in place frameworks for exploiting the research and economic potential of the data that will be generated from this. They are becoming exemplars in the context of the smart cities agenda, and are creating new platforms for testing and developing advanced urban services.

A proactive and enlightened approach to development is required to build the right type of business space to attract and accommodate the right type of occupiers.

Developers Bruntwood are members of the Oxford Road Corridor Board, and majority shareholder in Manchester Science Partnerships (MSP), a joint venture company which includes Manchester City Council and the two Manchester Universities. MSP develop and manage science and innovation buildings. At Queen Elizabeth

Olympic Park the public sector legacy company is the master developer, working with commercial developers on specific projects. These include Lendlease and Delancy who have taken a creative and long-term approach to refurbishing and managing the Here East business hub. At Knowledge Quarter London, developers Argent and British Land have taken a long-term approach, seeking to attract a vibrant mix of high quality uses. In Glasgow, the campus development is being linked to other developments in the vicinity, including developments around the Queen Elizabeth University Hospital. In Leeds, the University of Leeds are developing directly the Nexus Innovation Centre. Knowledge Quarter Liverpool has also set up a development company, in partnership with University of Liverpool, Liverpool John Moores University and Liverpool City Council, to improve existing and develop new innovative spaces for businesses in science, health and tech.

We are seeing new approaches to campus developments.

Universities and other knowledge producing organisations are adopting new approaches to campus developments. Whereas previously buildings and spaces between them faced inwards, increasingly the design of new buildings and campuses are facing outwards. The aims are to attract people into these buildings and spaces, encourage and facilitate interaction between people and animation, and improve connectivity with other assets and areas.

"Academic institutions have a key role in facilitating the creation and diffusion of knowledge, not only within their premises but also across the wider urban context. University campuses placed strategically within urban environments help to activate districts, and create a socio-economic anchor for the sharing of ideas, skills and resources. Close proximity to the local business community can establish a collaborative space for testing innovative ideas and give life to new enterprises. For entrepreneurs, higher education is critical in nurturing talent and ideas."

Arup, Campus of the Future

LEADERSHIP AND COORDINATION

Strong, consistent senior leadership is essential to successful Innovation Districts.

A feature of all the projects considered for this research is that they are being championed and steered by the relevant university Vice Chancellors, NHS teaching hospital trust chairs and Chief Executives, and local authority/development corporation Leaders and Chief Executives. The successful projects have been prioritised for investment at a city or city region level. For example, Manchester Corridor has an Enterprise Zone focusing on life sciences; Knowledge Quarter Liverpool is a Mayoral Development Zone; Queen Elizabeth Olympic Park is managed by a London Mayoral Development Corporation; and the Glasgow West End and Waterfront Innovation District is within an area targeted for substantial infrastructure investment through the Glasgow City Deal, with the city and the university are co-ordinating their masterplans. The consistency of leadership over time, as well as the ability to take decisions based on creating long term economic and social value were highlighted as important by several interviewees.

The importance of a clear vision and plan, which can flex over time.

Many of those interviewed stressed the importance of setting a clear vision and masterplan, and embedding this in planning policy to provide a clear and consistent framework for development. Whilst it is important that this can flex over time, several interviewees identified the risk of allowing or bringing forward development that offers a short-term commercial gain, which may not be in the long-term best interest of the core mission of Innovation Districts.

Links between Innovation Districts and wider networks of economic assets within cities and city regions.

Several of those involved in the interviews and discussions through this research spoke about the importance of linkages between Innovation Districts and wider networks as economic assets in their cities and city regions. In Glasgow there are discussions on linking together Innovation Districts in different parts of the city region. In Leeds, work has been undertaken to consider how the Innovation District can link with other sites and locations suitable for technology-driven high growth firms, and which can provide grow-on space. The general view is that Innovation Districts can provide a useful focus for promoting innovation across the economy of a wider city or city region area.



Above: East bank – Stratford Waterfront 2025



GLASGOW - CULTURE AND INNOVATION

Cultural and creative economies can be a catalyst in bringing the best of global talent to the city and sparking innovation. Glasgow benefits from exceptional cultural vibrancy; its cultural collections receive more visitors than those of any other UK city outside London. Within the Innovation District, Kelvingrove Art Gallery & Museum and the Riverside Museum combined rank 10th in all UK visitor attractions. Glasgow also boasts one of the most successful music venues in the world – the SSE Hydro. The West End and Waterfront area also hosts the BBC, STV and other media companies, together with the University and its own significant art and museum collections. The redevelopment of the city's historic Kelvin Hall, believed to be the first place in the world to combine major collections with health and wellbeing linked to sport under one roof. Within the Innovation district, the University of Glasgow's £1 billion campus development will complement nearby cultural assets, boosting activity in the creative economy, while consolidating and enhancing Glasgow's competitive position as a dynamic and distinctive cultural hub.

Left: The iconic Kelvin Hall has been repurposed as a cultural/sporting hub



MANCHESTER - A GRAPHENE CITY

Graphene City[™] is an ambitious vision from The University of Manchester, that aims to create a thriving knowledge-based economy around Manchester's revolutionary 2D material and associated research in advanced materials.

Graphene's vast potential will be fully realised by creating a critical mass of scientists, manufacturers, engineers, innovators and industrialists in Manchester, the home of graphene.

This innovation ecosystem will have at its core the research-focused National Graphene Institute and the more commercially-facing Graphene Engineering Innovation Centre.

With world-leading community of experts and supporting facilities, combined with Manchester's ability to build and lead partnerships between academia and industry, it will be possible to take a graphene application from basic research to finished product.

Manchester was the world's first modern industrial city - now it wants to establish a Graphene City.

Left: The National Graphene Institute



KNOWLEDGE QUARTER LONDON - MACHINE LEARNING AND AI

Innovation districts often are at the nexus of new technologies and research. The Crabb Lab - located within the Knowledge Quarter at University of London and led by Professor David Crabb of the Division of Optometry and Visual Science - is using very large data sets to improve glaucoma treatments. Using machine learning and data science techniques, the Lab processes images from over 25 million data points to tailor treatment to the individual. This has been supported with a significant grant from the Wellcome Trust - itself a KQ institution - and from Novartis to explore the potential for the use of the Crabb Lab's techniques in improving treatments for age-related macular degeneration. On the industry side Benevolent AI based in Euston is one of the UK's leading artificial intelligence innovators applying AI to drug discovery. So far, Benevolent AI has developed a significant pipeline of drug candidate programmes ranging from early-stage discovery assets to Phase IIb clinical development assets and is working with major pharmaceutical groups to licence compounds and develop drugs. The company also works closely with charities and other funders, especially in rare disease areas.

Left: Local residents try their hand painting with Virtual Reality

UK Innovation Districts Group

4. Recommendations and Conclusion

This section sets out an agenda for action to maximise the potential of innovation districts in UK cities. Government, cities, local authorities and combined authorities, universities and other research institutions, developers and investors all have important roles to play.

Below: Students and workers relaxing in Granary Square, the canal side of King's Cross.



RECOMMENDATIONS

1. Government and cities and city regions should prioritise innovation districts to support the delivery of the Industrial Strategy.

National government should invest where it has the greatest return and impact on UK productivity growth. It should therefore support innovation districts as flagship initiatives which can help delivery of the Industrial Strategy. Cities and city regions should do likewise in the context of Local Industrial Strategies. This should reflect areas of genuine specialism and comparative advantage in innovation districts (linked to the Science and Innovation Audits) whilst also recognising their role in driving collaboration across sectors and different types of economic activity. Increasingly city and city region initiatives on trade and inward investment are showcasing the assets of innovation districts, and there is a need for national funding and activity on trade and investment to support this.

- a. Government, particularly BEIS, should support and prioritise innovation districts as the projects and places which can have the greatest impact in driving productivity growth, and in bringing together as part of a place-based approach the main themes and areas of intervention identified in the Industrial Strategy.
- b. Through local industrial strategies, LEPs and Combined Authorities should prioritise innovation districts for investment and intervention. This should be focused on building upon specialisms identified through evidence, including the Science and Innovation Audits, whilst recognising the benefits of a diverse mix of sectors in specific places.
- c. Innovation districts should consider how best they can support local and national growth, drawing on the available evidence.
- d. Government should consider the scope for initiatives such as catapults and Enterprise Zones to be aligned more closely with innovation districts, where they are genuinely world class.
- e. UK Research and Innovation (UKRI) should consider funding the development and activity of innovation districts given their role in driving innovation and economic growth including through the Strength In Places Fund.

Potential cause of slowdown in productivity growth	How innovation districts can provide part of the solution
Industrial structure – there are not enough knowledge-intensive, high exporting firms in some places	Helping create and scale up innovative, high growth businesses with potential to be major exporters
Insufficient spending on R&D	Innovation Districts offer good prospects for planned increases in R&D spend to be translated into productivity benefits
Slow rates of diffusion of innovation	Transferring and commercialising academic, healthcare and government research, expertise and innovation to business
Low skills levels, skills shortages and (outside London) concentrations of knowledge-based jobs that are not large enough.	Providing a focus for raising skills levels, including addressing shortages in higher level skills and technical skills. Creating larger concentrations of knowledge intensive jobs.
The “long tail” of less productive firms	There is potential for innovation districts to help enable firms across a wider geography access expertise and ideas from universities and other businesses

How innovation districts can provide part of the solution to the productivity crisis

- f. Government and UKRI should review their criteria and approach to funding innovation projects, which are currently structured around sector-specific initiatives and competitive bidding, to enable place-based, cross-cutting initiatives to be supported in innovation districts.

“ Places need to get under the skin of firm-level decisions and develop a more granular level understanding of sectors – and crucially where the assets and barriers to growth lie. Assets may include universities and other local institutions, local partnerships, specific expertise or concentrations of activity, while barriers may include skills shortages, lack of appropriate business space and lack of coordination between complementary businesses. These barriers may well be common across in different industries at the local level – and removing them can support growth across a range of sectors, encouraging the knowledge spillovers, innovation and new activity that the Industrial Strategy ultimately aims to achieve.”

Centre for Cities

2. Innovation districts should build on their existing work to help lead the way in increasing productivity through inclusive growth.

Innovation districts can increase productivity through inclusive growth. They have the potential to improve awareness of and access to jobs, education and training, and future careers for a wider range of people. Through their locations and good public transport accessibility, physical regeneration and development, innovation districts can help provide new homes, and can integrate successful economic hubs with surrounding neighbourhoods. The institutions that are collaborating in innovation districts also have the potential through innovation to help solve inclusive growth challenges such as: health inequalities (delivering health and social care in more efficient and tailored ways), air quality, fuel poverty, and access to services.

- a. Innovation districts should consider how best they can shape and support wider policies for increasing productivity through inclusive growth.
- b. Innovation districts should consider how they can widen the diversity of their research, business and talent base. Increasing diversity can boost productivity and global competitiveness in an increasingly interconnected world, future-proof businesses keeping them relevant to changing markets, and in developing, attracting and retaining talent.
- c. Innovation districts could provide a mechanism for university-employer collaboration around course and curriculum design, including through initiatives such as degree apprenticeships, building on existing university-industry collaborations.
- d. Innovation districts should work with partners to build on their existing work to expand their activity to connect with local schools and young people to increase awareness of learning and career opportunities, and to provide mentoring, networks, support and work experience.
- e. Innovation districts should consider how they can promote entrepreneurship by people who face barriers to starting their own businesses, building on initiatives such as the Business and Intellectual Property Centres which the British Library has created in partnership with local areas.
- f. Innovation districts should, where appropriate, help to develop and deliver physical regeneration proposals which improve linkages to surrounding residential areas, provide new community facilities, and they should consider the scope for stimulating affordable housing developments.
- g. Innovation districts should bring research institutes and business together to collaborate on tackling local inclusive growth grand challenges.

“The clustering of innovation and creativity and knowledge is two-sided. On the one side, the clustering of urban activity drives innovation, drives economic growth, and is the main source of productivity. But on the other side, it also creates the divides in our society.”

Richard Florida
University of Toronto

“I want things that look like entrepreneurship zones in areas that are not subsidized, but that offer one-stop permitting to entrepreneurs who want to get started. We need to recognize that there’s a way in which we can engage in making cities more inclusive... You have to do something that grows the pie, and permits more lower-end entrepreneurship to flourish.”

Ed Glaeser ⁶
Harvard University



LIVERPOOL - SENSOR CITY

Sensor City, a joint venture between Liverpool John Moores University and the University of Liverpool, is a brand-new £12m building offering both existing companies and entrepreneurs the technical expertise, business support and international platform needed to collaborate, fund and promote sensor solutions to a global market.

The building was designed to encourage collaboration and flexible working, and the high specification office and lab suites are inter-mixed with the very latest tech laboratories, hot desking suites, meeting rooms, breakout areas and events space.

Liverpool is leading the world in sensor technologies and Sensor City was recently awarded a £3.5m grant to investigate the opportunities of 5G community Wi-Fi in health and social care.

Left: Sensor City, Knowledge Quarter Liverpool



QUEEN ELIZABETH OLYMPIC PARK - FLIPSIDE

East Works is LLDC's socio-economic programme which enables like-minded businesses to collaborate and connect with university, education and skills providers. It pilots new approaches that build talent pipelines from education into employment and connects employers to people from the diverse communities around the Park. By adopting an agile approach to socio-economic programming and focusing on untapped talent, potential and diversity, not deprivation and disadvantage, East Works is responding to forward-thinking employers who see the business benefits of a diverse and dynamic workforce. For example, East Works facilitated the co-creation of Flipside in response to industry-led research which concluded that a bespoke approach was needed to connect digital businesses with diverse talent pools. Flipside is an immersive digital product design training programme co-designed and co-delivered by Ada National College of Digital Skills, LLDC, A New Direction, Made by Many, ustwo, Beyond, Sennep and supported by Hobs Studio, Reading Room and other industry professions. Flipside as a model will be rolled out over the next 2 years, scaling activity and enabling new creative digital employers on Queen Elizabeth Olympic Park and further afield to connect with diverse talent.

Left: Training workshop in action at Queen Elizabeth Olympic Park



KNOWLEDGE QUARTER LONDON - PRIMARY CAREERS CONFERENCE

In partnership with Netley primary school, the Knowledge Quarter delivered a one-day aspiration-raising conference to showcase the breadth of industries and career opportunities available from Knowledge Quarter partners to local school children. The conference targeted over 200 students in year 5 (age 9-10) and in particular young people from vulnerable groups. The participants were from over 20 schools within Camden and Islington.

Children attended sessions by London Metropolitan Archives, House of Illustration, Crafts Council, and the Royal Veterinary College. An auditorium was transformed into a crime scene by the Francis Crick Institute with the aim of introducing children to the concepts of microscopy, the technical field of using microscopes - which is key in the Crick undertakes. Children became forensic detectives, complete with lab coats, gloves and goggles, to get to the bottom of several crimes; reading notes that could only be seen under UV light and microscopes. After the conference each child was appointed as a careers champion and provided with a toolkit which they could use to arrange their own school-specific careers event, reaching even more children.

Left: Local children view a performance by the Place at Central Saint Martins

3. Innovation districts should work together more closely as a national network.

There are significant synergies between innovation districts in terms of their aims, specialisms, and networks and collaborations between institutions in different areas. The UK economy, individual firms, and business to business links are organised in national as well as international networks. There is increasing awareness of the benefits of London and other major UK cities working together. This research has shown that innovation districts can be a catalyst for promoting inclusive growth, have a role in diversifying and simplifying access to capital assets and capital flows, and can help deliver the Industrial Strategy. The impact of innovation districts can be maximised by them working more closely together.

There will be scope in the future to expand the Innovation Districts and Knowledge Quarters Network to include new innovation districts that emerge which have world class capabilities, a focus on driving business growth, as well as significant capital investment. For example, in Bristol the new University of Bristol Temple Quarter development next to Bristol Temple Meads has the potential to anchor a new Innovation District. There are also existing initiatives such as Newcastle Science Central, and the Sheffield-Rotherham Advanced Manufacturing Innovation District where innovation and significant university investment is driving inward investment and business growth.

- a. Government, particularly BEIS and the Cities and Local Growth Unit, should support the national network of innovation districts, and work with them in relation to delivery of the industrial strategy, enhancing access to business finance, and on inward investment.
- b. Innovation Districts should work together to identify complementary areas of specialism and expertise, and consider how they can work closely together in these areas on a national basis.
- c. The UK Innovation Districts and Knowledge Quarters Group should consider widening its membership to incorporate other or emerging innovation districts with genuine world class capabilities and a focus on driving business growth, setting clear criteria accordingly.

4. Cities, city regions and innovation districts should continue to secure capital investment in public spaces, physical and digital infrastructure, and new buildings.

The most successful innovation district projects have seen big investments to create new development opportunities, in place-shaping, and in creating the right commercial and collaboration space for business. In some instances, there is an opportunity to create clearer and more ambitious capital investment proposals, and there is a need to make hard decisions about prioritising investment in place-shaping.

Some innovation districts benefit from status of being Mayoral Development Zones, or Enterprise Zones. This signifies and helps ensure that investment and action is prioritised in innovation districts, and provides a framework for clear political leadership. These spatial designations are particularly helpful where they are combined with devolved powers, including fiscal mechanisms to capture local increases in development values and local taxes (such as business rates), providing a revenue stream to reinvest in infrastructure and growth within the innovation district.

There are also opportunities that will be created through transformational transport investments such as HS2, and the role of existing innovation districts in relation to major transport hubs will need to be considered; alongside the scope for new innovation districts and knowledge quarters to emerge as areas are unlocked for development.

Innovation districts provide a good opportunity to be exemplars and test beds for digital infrastructure which, if combined with suitable data-sharing and governance, can enable and support innovation in advanced urban

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services. This could include Internet of Things sensors, the small cell communication networks which can enable the application of 5G systems to be tested, and smart information and mobility solutions. Several innovation districts are putting in place the infrastructure and the supporting governance to enable this.

- a. Emerging innovation districts should be supported / encouraged to secure or leverage major capital investments in transport, infrastructure and public realm, and cities should prioritise innovation districts for transport investment recognising their role in creating jobs and driving growth.
- b. Cities and city regions should consider designating innovation districts as priority zones for investment, growth and development, building on existing examples. Government should support proposals for greater local fiscal powers to enable the fiscal benefits of growth in innovation districts to be captured and reinvested locally to support their future success.
- c. Major transport projects, such as HS2, have the potential to support and expand existing innovation districts, but need to be developed and linked to them in the right way. Cities and developers should consider how existing innovation districts can be linked to, or new innovation districts developed around, major transport hubs.
- d. There is an opportunity to create new public-private sector partnership development models and attract patient capital to fund long-term investment in innovation districts. Cities and universities and property owners should work with institutional investors to develop long-term financing mechanisms.
- e. As innovation districts become successful they need to consider how best to avoid development which is not in line with the core objectives, and to mitigate pricing out of start-ups.
- f. Innovation districts and cities should build on progress to date, to identify further investments and initiatives. This will enhance their role as exemplars and test beds for digital infrastructure, which, combined with suitable data sharing and governance, will enable and support innovation in advanced urban services.

5. Government, LEPs and Combined Authorities, and cities should invest in developing the networks to support business growth in innovation districts.

The ambitious physical plans for innovation districts need to go alongside support for building the wider ecosystem of innovation. This could include initiatives to support collaborations, to mentor start-up and scale-up businesses, to connect firms with angel investment and appropriate finance, to provide support for firms needing grow-on space, to link with inward investment and key account management initiatives. There is a need for greater investment in this activity. This should be linked to, and embedded within, wider networks of economic and innovation assets at city and city region level.

- a. Innovation districts and cities should consider how best to widen access to venture capital or angel investment finance for entrepreneurs, including creating co-investment funds, and platforms to connect start-ups and scale-ups with angel investors.
- b. Innovation districts should work with LEPs, growth companies and chambers of commerce to ensure there are structured approaches to liaising with and supporting businesses in innovation districts, and for assisting firms with finding grow-on space when they transition out of innovation districts.
- c. Innovation districts should build on existing work to develop more structured events programmes to support collaboration between researchers and businesses, and business to business links.
- d. Innovation districts should consider how they can help firms seeking to improve productivity which are located outside the district, through creating initiatives and spaces to enable them to collaborate with researchers and other firms.
- e. Government, LEPs and Combined Authorities, and cities should consider how best to provide greater financial support to enable innovation districts to enhance their capacity and capability for building networks between businesses, researchers, entrepreneurs and investors.

CONCLUSION

Government should prioritise support for economic growth in the places and initiatives where it has the greatest chance of a return on its investment. Innovation districts are enabling our cities to create the new products, processes, technologies, and high growth firms that will drive productivity growth. They are supporting the creation of new, high quality jobs in accessible locations, regenerating parts of our cities, and supporting inclusive growth.

The main conclusion from this research is that government should prioritise place-based investment in innovation districts to boost productivity, support inclusive growth, and to deliver the Industrial Strategy.

Innovation Districts and Knowledge Quarters are emerging as transformational projects which are driving economic growth. Knowledge-intensive jobs and firms are increasingly clustering in or near city centres where innovators, entrepreneurs and R&D intensive businesses can benefit from access to a wide pool of skilled people, university researchers, healthcare clinicians, and knowledge spillovers. This is a result of people and organisations collaborating, comparing and competing across different sectors. Cities, universities, teaching hospitals, cultural and professional institutions are supporting and capitalising on this trend through significant investments in new buildings, campuses, workspace, and public realm which are creating new urban districts and engines of more productive growth.

These projects are at different stages of development in different locations, and there are a range of approaches and areas of focus. Generally, the focus on innovation has emerged in response to a physical regeneration opportunity and reflecting how new infrastructure and place-shaping has attracted innovative organisations into areas.

Universities, hospitals and cultural institutions are recognising their role as anchor institutions for economic growth. Cities are recognising the need to support initiatives to boost productivity and to attract and grow the firms that will create the new products and processes to create, and sustain, wealth in the future. And enlightened developers are recognising the opportunity to support new patterns of working, living and leisure in urban areas.

The full potential of innovation districts will only be realised if there is stronger support from different tiers of government, and if all cities and innovation district projects ensure there is a clear focus and sufficient resources (both in developing and delivering these projects), and by working more closely together. Through a renewed focus on support for innovation districts, the UK and devolved governments and cities can help deliver against the aims of the Industrial Strategy, secure accelerated productivity, support inclusive growth, continue to reshape and regenerate our city centres, and build the networks of collaboration to create the firms, products and processes to drive forward our city economies.



PRODUCED BY ARUP IN COLLABORATION
WITH THE UK INNOVATION DISTRICT GROUP

ARUP



Oxford
Road
Corridor



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- 6 <https://www.citylab.com/equity/2017/04/two-takes-on-the-fate-of-future-cities/521907/>

