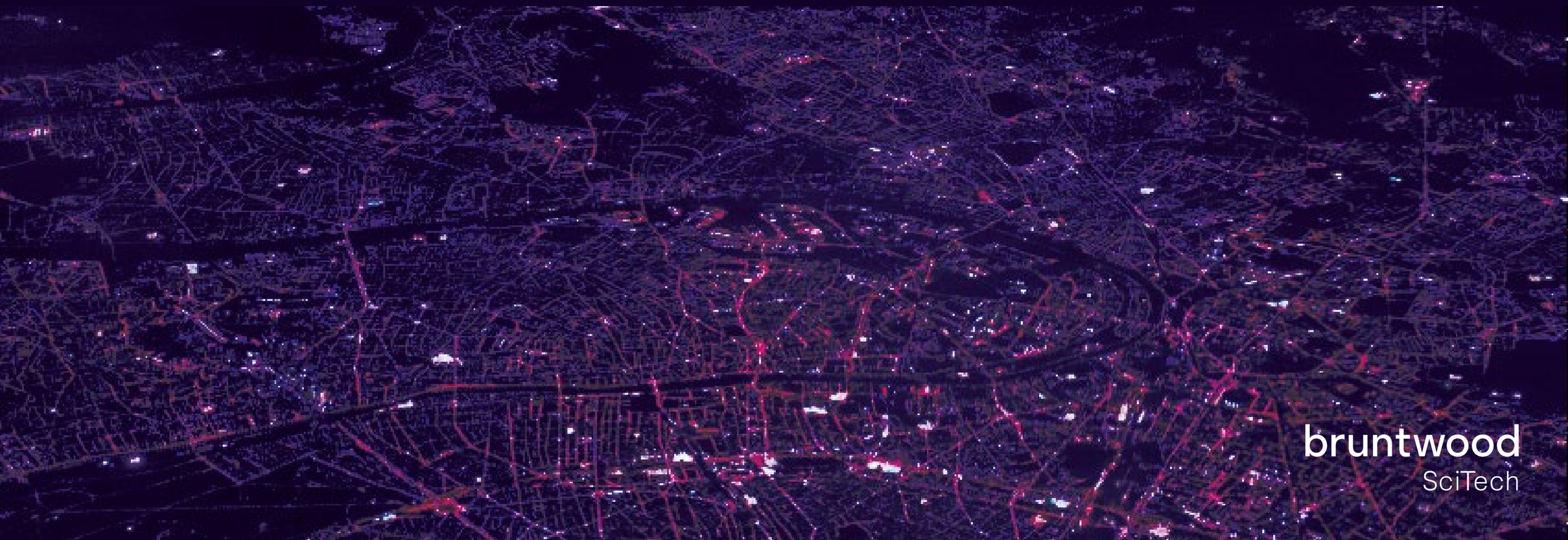
PLACE MATTERS

Innovation & growth in the UK

Summary



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INTRODUCTION

We commissioned this report at a crucial moment for the UK. With a new Government and Prime Minister, and as we exited the EU, we knew this was the right time to focus on innovation in our economy. Over the last decade, productivity growth in the UK has lagged behind other countries, and the gap between our cities and the innovation hubs of the rest of the world has grown. This report argues this is due to a failure to balance innovative activity across the country, even as our science base has remained globally leading. Many of our cities led the global economy's first modern leap in productivity – they should participate in the next. It is a timely diagnosis of where innovation is flourishing, where it is being held back, and presents the beginnings of a plan to unleash it.

This report is fundamentally about place. We believe that many of our cities and towns have or have had a key role in the creation of the innovation-based global knowledge economy. Some places are already innovation rich and others have the potential to drive the innovation which is now essential to the future well-being of the British economy. The purpose of this report is to help more cities understand the importance of innovation activity to drive their economies forward and close the productivity gap.

The report has been written not for innovation experts, but for civic leaders, partners in Local Enterprise Partnerships and their like across the country. It has been written at an important moment in our country's history, as COVID-19 has taken its toll, claiming the lives of thousands of Britons, virtually closing our economy and, in so doing, changing all of our lives in ways we cannot yet fully understand. This is a period of change in other ways too. The global pandemic took hold shortly after the election of a new British Government, committed perhaps more volubly than any before it to the objective of levelling up the economic fortunes of different parts of our country.

The world has changed a lot in the last few months. The country is facing an unprecedented threat to life and livelihood, and the emergency social distancing measures enacted to prevent the spread of COVID-19 have suspended the economy. If innovation, in plain terms, is the successful adaptation to changing circumstances, then this crisis has made it even more important than it was three months ago. Businesses across the country must innovate simply to return to work – the economic challenge has grown. We are convinced that we can emerge stronger from this crisis but not without creative thinking and bold action. It is a fine example of how corporate Britain can, and has, reacted to a global crisis. This innovative response to COVID-19 perhaps shines a light on how we as a country could respond to the longer-term challenge of climate change.

THE RELATIONSHIP BETWEEN PRODUCTIVITY AND INNOVATION

Raising productivity relies, in part, on the ability to innovate. Innovation can comprise of building on existing capabilities, establishing new, smarter ways of doing the same task, or it can be the creation of new tasks and processes altogether. It is these processes which fuel productivity growth: learning to do the same work but more efficiently and with fewer resources, or building new, more valuable products. Whatever the process, with UK productivity levels as they stand, innovation is more important than ever and must be central to government economic policy.

Britain has a productivity problem, an innovation problem and a pattern of regional knowledge intensive growth that is highly skewed. Sectoral analyses of the economy show that the UK productivity slowdown may indeed have been caused by a relative decline in the ability to produce more value from existing materials, leading to these lower levels of innovation. The UK has also seen high employment growth in low productivity services as opposed to high productivity manufacturing, with more of a focus of more total jobs rather than high quality employment.

As other countries accelerate, the general trend of R&D expenditure has been one of decline. The UK Government has recognised this and has pledged to increase R&D expenditure so that it reaches 2.4% of GDP by 2027, meeting the current OECD average. This is a welcome acknowledgement that the UK's R&D performance has slipped and must be reversed.

But we must consider not just what the UK's R&D expenditure target should be, but how and where it is deployed. Since the 1980s, the UK public policy focus has been placed centrally on pure research. As fundamental as this is, the wider question of how it is applied through innovation can and should matter more, particularly if R&D is to play a role in the Government's ambition for growth and levelling up the lower performing areas of the country.

INNOVATION, PLACE AND ABSORPTIVE CAPACITY

Cities in the UK do not follow the pattern common to many in Europe, namely larger size equates to higher economic productivity. Instead, with the exception of London, our largest cities tend to underperform economically. We need more innovative activity from the places where it is already happening, increasing knowledge spillovers while also supporting the areas that have innovative potential, deepening their absorptive capacity for investment.

Supporting a place to become innovative is not simply a question of redistributing existing funds towards research and development, nor is it pursuing the same investment strategy as somewhere else. Places need to map out their own economic conditions, assets and institutions, understanding the local opportunities and challenges as a prerequisite for writing an innovation strategy. A place's absorptive capacity depends on the attitudes of its businesses and investors and whether they see the necessity in backing new ideas with investment. The places that are most innovative in the UK – London and the South East – are those with the most capacity. Those places which lack capacity, without a body of innovative businesses or institutions with the research pedigree to successfully commercialise ideas, will not see their innovation performance improve through funding alone.

Understanding absorptive capacity can help assess whether places and firms can use investment effectively to scale. In places with low absorptive capacity, companies will struggle to turn financial backing into meaningful growth, SMEs without this knowledge will forever remain the same, meaning places will stagnate. The key indicators of absorptive capacity include levels of R&D expenditure; education and skill levels of employees; adoption of new management practices within firms; collaboration between firms, whether regional, national or international; and the natural markets within which firms compete. [1]

This makes it essential to consider the existing strengths and capabilities of a place when focusing investment. Some cities already have high-functioning innovation economies, for instance Oxford and Cambridge, where factors combine to power an innovation ecosystem which benefits their whole economy. Other cities have potential to become centres of innovation. Many have good research-intensive institutions and complex knowledge-based economies but are missing one or more of the building blocks necessary for innovation success and need help to succeed.

More places need to be supported in mobilising their innovation assets. As Richard Jones argues, there must be a greater focus in the UK on the support networks which enable innovation to take root in places, establishing research institutions as the source of new ideas and connecting businesses. Such an approach works well in knowledge economies such as Cambridge and could work elsewhere if support is applied to the places with potential. [2]

[1] *Absorptive Capacity and Regional Patterns of Innovation*. Maria Abreu, Vadim Grinevich, Michael Kitson and Maria Savona. Centre for Business Research (CBR), University of Cambridge, 2008.
[2] *A Resurgence of the Regions: rebuilding innovation capacity across the whole UK*, Richard Jones, 2019.

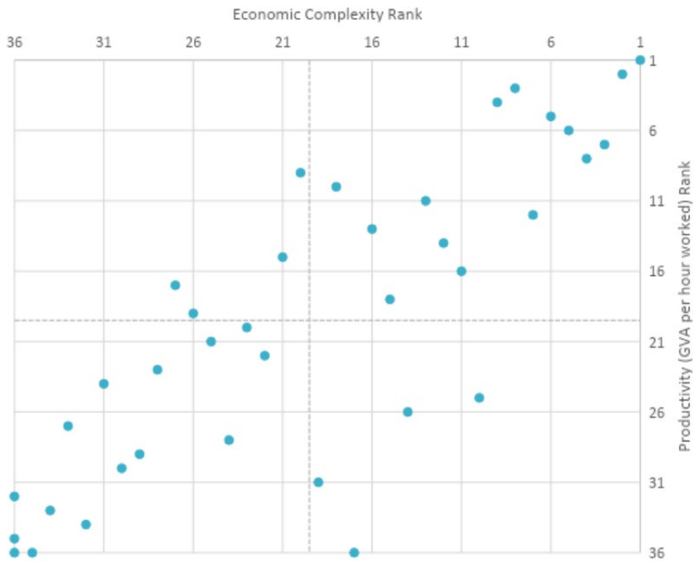
ECONOMIC COMPLEXITY AND INNOVATION IN THE UK

Identifying the places which have potential to develop successful innovation economies is not straightforward, there is no one metric which can act as a proxy indicator for success. We can however analyse the innovative potential of a place by measuring its economic complexity. The Economic Complexity Index (ECI) is a cutting-edge measure, developed in the last couple of years to help us understand how much productive knowledge is contained within an economy.

The ECI works by analysing a matrix of economic specialisms – by connecting places to the products they specialise in as nodes in a network. Specialisms are defined as when a place has a concentration of employment in a particular industry greater than the national average in that industry. Combining those specialisms with a measure of how unique these specialisms are and the diversity of them in a particular place gives us a measure of economic complexity.

The ECI does not give any information about the output of different sectors or places, but its findings align very closely with various measures of economic success, particularly productivity. The most economically complex places tend to also be the most productive. This strongly suggests that economic complexity is a driving factor in determining productivity. Following this, the more economically complex a city is, the more innovation, and innovation potential that place will have. We can use the ECI as an indicator for where innovation can grow if conditions are right.

FIGURE 1. ECONOMIC COMPLEXITY MODEL



Source: Metro Dynamics analysis of ONS BRES and Regional GVA (Balanced) (2017)

In the UK, the most economically complex places tend to be close to London. Many of these, such as Oxford and Cambridge, are internationally renowned for their knowledge economies, others, such as Milton Keynes, less so. Wherever they are in the country, urban districts also have higher levels of complexity. Manchester, Birmingham, Coventry, Nottingham all are more economically complex than their wider region, likely a result of the agglomeration of varied economic activity in city centres and the interaction that this proximity facilitates.

The Government intends to level up underperforming areas of the economy outside of the South East but faces a challenge in using innovation policy to do this. Increases of innovative activity tend to occur in places that are exhibiting it already, meaning the already prosperous places in the South East will continue to grow while the rest of the country is left behind. The ECI starts to give us an indication of areas with the most innovation potential and where to embed innovation outside of the South East.

PLACE AND POLICY, NATIONAL AND LOCAL

Productivity matters in economic growth and innovation matters in place. The history of innovation here and around the world shows that change, significant change, can happen. The UK needs to maintain its global excellence but catalyse growth in its cities and towns which have potential to become innovative economies. Until now, the concentration of research and development support in specific areas has contributed to a lack of resilience in the UK economy. Over decades, UK policy has tried to distribute innovation across regions but with patchy results: in an economy like ours with comparatively laissez faire attitudes, change is not easy. This is because policymakers have misunderstood how innovation works and perhaps more important, the role of place in creating successful innovation ecosystem.

If anything, innovation policy has resulted in more concentrations of innovation activity in only a few places, to the exclusion of most. The UK is ranked 17th out of 37 OECD countries in terms of R&D expenditure and 52% of that goes to London, the East, and the South East of England, while the North-West, North-East and Yorkshire and Humber combined equate to only 16%. [3] We do not spend enough on R&D nationally, and we don't spend it in a way that generates growth across the country.

Using innovation to spark economic growth has a relatively long history. Throughout the twentieth century, UK science and innovation policy broadly followed the Haldane principle. In the UK, this has been enshrined in the idea that decisions for funding scientific and technological research should be taken by research councils made up of experts, not by Government ministers.[4] This has had a spatial implication, confining much of the spending of the research councils to places where scientific research is strong –the South East and London, the so-called Golden Triangle. This view came to underpin British Government policy from the 1980s onward. Innovation policy became a blend of two principles. First, that public funding should reward excellence, with no consideration for spatial factors such as regional imbalance. Second that the private sector could and should bear more of the cost of innovation related investment. [5]

In the late 1990s, UK Government changed tack in an attempt to address imbalances. It aligned a new cluster policy with the establishment of the Regional Development Agencies (RDAs) with the intention of promoting economic growth across the regions. Building on academic Michael Porter's theories, by identifying areas of sectoral strength in the UK's regions, policymakers could target specific funding and support to developing sectoral specialisms in specific places, helping them to emerge as specialist areas of excellence. Reviews of various Governments' approaches to regional economic development have shown that attempts to support the clusters have often been counterproductive, boosting short term activity but having limited long-term effect on regional innovation or productivity growth. [6]

This was followed in the 2010s by the Catapult programme, established to connect research and the market with new networks of technology and innovation centres to bridge the gap between research findings and their development into commercial propositions. [7] However, the Catapult programme has not yet had the expected level of impact on innovation or economic growth.

There are large variations in performance between the different Catapults, and many examples of success, but, ultimately, there have not been enough links between Catapults and the knowledge engine of a place, which has meant that neither have fully benefited from the other. When put into the international context, the problem becomes clearer: Catapults themselves are based on the German Fraunhofer model, which was first opened in 1948. [8] [1] This programme operates 74 institutes across Germany with an annual budget of £2.8 billion, with its success largely down to sustained government funding. [9] In the UK, despite the Government announcing more than £1.1bn investment in the Catapult Network over five years, the UKRI 2018-2019 annual report states that Institutes, centres, facilities & catapults were given only £567,362,000 in funding across 9 catapults. [10] Their commercial output remains significantly behind the Fraunhofer model. [11] If we want to get serious about Catapults, they need a radical uplift in investment.

Innovation and research are currently funded through the non-departmental public body, UK Research and Innovation (UKRI), which operates across the whole of the UK with a combined budget of more than £8 billion. UKRI and InnovateUK do not have a regional policy, nor consider rebalancing R&D funding as part of their remit, instead funding projects on an individual basis.

[3] Eurostat Intramural R&D expenditure (GERD) by NUTS 2 regions (2017)
[4] *"House of Commons Hansard Ministerial Statements for 20 Dec 2010 (pt 0001)".* publications.parliament.uk, 2010.

[5] *Science Policy under Thatcher,* Jon Agar, 2019.
[6] *The demography of clusters - findings from the cluster meta-study,* Van Der Linde, 2003.
[7] *Catapult Programme: A Framework for Evaluating Impact,* Department for Business, Energy and Industrial Strategy & InnovateUK, 2017.
[8] *UK reviews its innovation strategy: of Catapults and Fraunhofers,* Michael Kenward, 2014.
[9] *Fraunhofer Facts and Figures, Fraunhofer-Gesellschaft,* January 2020.
[10] *UK Research and Innovation Annual Report and Accounts,* 2018-2019.
[11] *UK Research and Innovation Annual Report and Accounts,* 2018-2019.

This ‘place-blind approach’ has accentuated the regional disparities of R&D activity in the UK, concentrating of science and innovation in London and the South East. his ‘place-blind’ approach concentrates funding in these places. [12]

Those places which have the potential to grow, but have not yet demonstrated the research excellence, will fail to access funding through such an approach leaving their businesses empty handed. While funding flows to higher education institutions, the crucial element of translational research and business support is missing. There is an opportunity to develop multiple innovation ecosystems which convert new ideas into commercial applications, but without the appropriate, targeted funding stream this cannot yet happen.

The UK’s innovation policy approach has consequences. In the last 20 years, 16 other OECD countries have achieved an equivalent or greater increase in R&D intensity compared to the UK. [13] The approach taken towards clusters and catapults have failed to embed innovation in place and the cycle of ‘excellence rewarding excellence’ continues. Whilst we are clear that the innovation hotspots in the UK are to be celebrated and supported, it is hard to avoid the conclusion that innovation policy has not been effective when swathes of the country and its businesses are missing out.

Where there is a concentration of knowledge within a place, there is a greater incentive and likelihood of attracting private sector investment. There is the need for more effective translational infrastructure with Catapults or their successors focused on securing the adoption of innovative practice as a high priority. [14] Policy needs to look at increasing the absorptive capacity of these areas, stimulating innovation in local areas through research institutions and accessible funding routes, supplementing and complementing the private sector efforts.

IMPLEMENTING THE 2.4% TARGET

In the 2020 Budget, the Government announced its commitment to investing in infrastructure, innovation and skills to level-up regional economies. Though many of its other measures will have an impact on innovation, the Government’s flagship approach is to increase public R&D investment to £22 billion per year by 2024-25. This is the largest expansion of support towards researchers and innovative businesses, taking funding for R&D to 2.4% of GDP.

Ministers must look to increase, broaden, and deepen innovative policy and funding if the aim is to achieve economic prosperity. The pattern up until now shows the UK failing to do two things: firstly, to produce world-class translational research institutions; and secondly to understand the absorptive capacity of places, the regional differences across the UK or how to properly facilitate innovation in fundamentally different areas.

This is an ambitious agenda and a clear recognition from Government that the UK needs to make up ground after years of undervaluing the importance of innovation to the economy. Much of this investment will and should go on fundamental, theoretical, and otherwise blue-sky research, but it is a golden opportunity to build strength in depth beyond the Golden Triangle too. The 2.4% target, allied to the commitment of levelling up the economy and supporting regional economies outside of the South, is an opportunity to correct the disparity in innovation infrastructure and performance across the UK.

We will need more than just increasing research and development funding to the 2.4% target in order to rebalance the economy. This expenditure will need to be accompanied by other measures backed by an unprecedented level of policy intent. Part of this will involve reforming the way Government allocates funding, revising the Green Book investment appraisal methodologies to recognise the potential gains of economic rebalancing rather than only awarding funding to existing, evidenced growth. [15] Some cities are beginning to make the reforms and investments necessary to develop their own innovation assets, but these places need support. What this suggests is that we need to do far more as a country to expand and embed innovation in places, investing not only in physical infrastructure but in the ecosystem which sits around it.

Translational research is a crucial element in the diffusion of good ideas to the wider economy in a place, allowing businesses to take ideas and find clear applications for them. This has been neglected. With the right understanding of the conditions for success, and the capacity of individual places to succeed, it can boost the productivity performance of places that have lagged. It is vital therefore that the new research and development funding is used to create much more effective translational research infrastructure. Similarly to when the Government asked Hermann Hauser to review the issue leading to the creation of what we now know as the Catapult network, renewed effort in resourcing and a revised approach is needed to make these institutions suitable for modern day requirements. In our view there is a case for asking Professor Hauser to update his thinking, perhaps working with the recently departed CEO of Siemens UK Jürgen Maier. His experience of continental and US innovation policy allied to the former’s deep knowledge of the Cambridge phenomenon would be ideally placed to design a new and well-informed approach.

[12] *A Resurgence of the Regions: rebuilding innovation capacity across the whole UK*, Richard Jones, 2019.
[13] *Research & Development spending Briefing Paper, House of Commons Library, 2020.*
[14] *A Resurgence of the Regions: rebuilding innovation capacity across the whole UK*, Richard Jones, 2019.

[15] L*evelling Up: Making Investment Appraisal Fit for Purpose, Metro Dynamics for Peel and* North West Business Leadership Team, 2020.

THE CONDITIONS NEEDED FOR INNOVATION TO THRIVE IN OUR CITIES

We have discussed the role that innovation can play in levelling up the UK economy and kickstarting productivity growth, but not the local factors that need to be in place to achieve this. These are not a set of static requirements, but rather a consideration of three interlinking sets of factors that define innovative places: Districts, Ecosystems and the Places themselves.

FIGURE 2. THE POWER OF THREE MODEL

Innovation can happen anywhere, given the right conditions are in place. It often occurs in an innovation district, a physical space which facilitates the clustering and the curation of innovative activity, aiding the commercialisation of research. Quite often, these are SMEs collaborating across industry or with academia. In many places the endeavour is led by business, building new ideas by utilising new or emerging technologies.

An innovation district is the environment in which businesses and entrepreneurs come together, an urban area that consists of co-working spaces, catapults, and research institutes. But an innovation district can only thrive when it is supported by a wider innovation ecosystem.

An innovation ecosystem refers to the wider elements which support innovation, rather than the physical infrastructure within a district itself. Whether it is local leadership driving forward innovation through policy, a solid talent pool to underpin business growth or access to capital, investment and real estate, a successful innovation ecosystem directly correlates to a district's success. [16]

But having a successful innovation district and a supporting innovation ecosystem is not enough. **The wider place ecosystem** is the final element that determines the success of innovation within a city. This is about making a place attractive, where people want to live and work, that provides a leisure and cultural offering with the physical and social infrastructure that attracts and retains workers.

This is not easy. Creating an innovation rich place with the right institutions, networks and business takes time, leadership, investment and commitment from public and private sectors to one vision. Understanding place is an essential part of this but curating an innovation ecosystem to support a complex innovation district is equally important. Each of these elements is a cornerstone of innovation; places must consider all three if the levelling up agenda proposed by the Government is to be achieved.

How a place functions, its connectivity, heritage and local skills base must be central in any innovation agenda. Before creating any type of innovation district, there must be an understanding of a place's characteristics and its industry. Places that understand their existing strengths have paved the way for successful innovation ecosystems.

"What is your world class institution? Who are your leading businesses? What are you really good at?" These are questions inherent in most academic calls for funding, commercial sales pitches and the recent Science and Innovation Audits. They nearly always elicit a chorus of replies from researchers, yet in many cases these responses are unlikely to be relevant. The question should help academic, industry and civic leaders to consider what knowledge there is within an area that either does, or plausibly could, form part of the core strengths for commercial exploitation. Getting to a group of often cognate, corporate and academic strengths is the first important step, but it takes further quantitative research and hard-headed judgement to arrive at a viable answer.

[16] *Building the Innovation Economy: City-Level Strategies for Planning, Placemaking and Promotion,* Peek, Gert-Joost & Clark, Greg & Moonen, Tim, 2016.

INNOVATION AND INCLUSIVE GROWTH

Whilst the place ecosystem creates the right conditions for innovation to thrive, this cannot and should not be a one-way transaction. Innovation can be marshalled to help address local challenges. We have yet to find a successful innovation ecosystem in the UK which has managed to transfer the benefits of innovation to deliver inclusive growth, but there are some examples that places can build from. The societal challenge-based approach of the Industrial Strategy Grand Challenges and missions. There are accelerator programmes which focus on societal challenges. In Auckland, the innovation precinct in Wynyard Quarter have been increasing their efforts to leverage investment to support the wider inclusive growth agenda, including an innovation challenge to encourage the growth of Māori tech entrepreneurs. [17] And there are cities, such as Chicago, who have opened their data to encourage creative solutions to public service transformation.

We recognise that innovation ecosystems risk sitting in a bubble within their place, characterised by highly skilled people who work and socialise together. This can mean that there is relatively little involvement with the people outside of their institution, start-up, or social group. High value businesses do generate jobs for those on lower incomes, but these may be lower skilled, paid or without clear career pathways which require higher level STEM qualifications. There is a great opportunity for the levelling agenda to influence local skills and talent – diversity is good for growth and innovation ecosystems must have one eye on an inclusive approach.

Creating a successful innovation district is as much about place-making in a more holistic sense as it is about creating a successful innovation ecosystem. It can deliver jobs at every level of the economy and reset local opportunities for all. Our suggestion to places who are considering their innovation path is to consider how to make this inclusive from the outset. Impact is frequently measured in terms of jobs added, but who is getting these jobs? Are they benefiting local communities and residents? Innovation, as we've shown in this report, is a major factor in productive growth, increasing the number of quality jobs and wages within an area. We also believe this can be inclusive, productive growth.

[17] *Innovation and inclusive Growth — an imperative for cities,* Martin Jenkins, 2019.

SUMMARY OF THE RECOMMENDATIONS

Our new Government has made it clear that its priority is the levelling up of all parts of our economy: this will be impossible without a better distribution of innovation and empowering our research institutions and businesses to innovate. The threat of COVID-19 provides an example of how Britain has reacted to a global crisis, the frenetic search for solutions to the pandemic has mobilised legions of the world's finest researchers and technologists, while industry leaders have adapted their companies to produce much needed resources for healthcare services. While achieving sustainable innovation is hard and not everywhere has the absorptive capacity to do so, this pandemic has shown that it is not impossible.

If we repeat what we have done in the past, the potential of our places will remain unexploited, business as usual is not good enough. We can do things differently, but we need the courage to start and the conviction to realise it.

The Government must begin by reviewing our innovation infrastructure, returning to experts to investigate the border between research and commerce. We need to understand how research is translated into products and services in closer detail, learning from other countries to build a truly national innovation infrastructure.

We advocate the development of innovation districts throughout the country and issue a plea that these must be genuinely based on the strengths and potential of each place, nurtured within an innovation ecosystem. Innovation must be seen in the context of place-based development – the place ecosystem being key. We must be realistic about each place; future innovation potential is highly likely to be based on its economic foundation, not on an externally imposed vision however well-funded it is.

This analysis has shown that the UK must reform innovation policies if it is to remain a world leader in science and innovation. To this end, we propose that any reform should make a demonstrable contribution to achieving the following outcomes:

1. Add to the UK's world leading excellence in fundamental science research with a more robust programme of translational research. This should improve our national performance in the commercial application of ideas, with a real impact on productivity performance.

2. Address the reluctance of too many UK firms to take on innovation activities by encouraging reform of business models and processes.

3. Ensure the distribution of scientific research and innovation activity more accurately reflects the distribution of potential around the country, providing towns and with the tools to deliver it.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