Innovation and Clusters

Chapter One

Innovation and clusters

Why

We cannot force urban innovation districts into the same mould as other success stories: each must find its own route to prosperity. To do that, they should be able to encourage the successes they have developed and the new industries developing there.

The failing

By taking a holistic, joined-up approach to innovation across the UK, regionally and nationally, we can focus on connected collaborative eco-systems across urban and major campuses containing national research infrastructure.

Policy recommendations

I. To focus national R&D investment into more innovation centres and laboratories in urban centres.

II. To be socially inclusive and strengthen the links between secondary education and the innovation ecosystem; to give young entrepreneurs access to industry through more STEM work experience, apprenticeships and FE colleges within science parks.

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Encouraging innovation through clustering

The UK has a long heritage in innovation and today's ecosystem is sophisticated, extensive and world-leading. The Industrial Strategy sets out a clear national framework for investment to position the UK as a global leader in innovation. The target is to reach national R&D investment of 2.4% of GDP by 2027, injecting tens of billions of pounds into the UK knowledge economy.

Innovation is essential to the future economy: it brings new ideas, technologies, jobs and most importantly, growth.

The challenge is that research and design – the backbone of innovation - is not an immediately profitable part of any small business. It is time consuming, difficult and unpredictable.

Enabling that research function is critical, as it is the soul of technology companies and the knowledge economy. Alongside policy, education and private enterprise the built environment plays an important role in that.

While innovation cannot be forced, the right conditions can be created for a better chance of survival and growth, and the clustering of companies can stimulate innovation.

Innovation, and the formation of genuinely new ideas, demands going into unexpected and unknown places.

The fertile areas of innovation often exist at the juncture between sectors, be it space, healthtech, digital, energy or engineering. It also happens most where there is the collaboration between business, academic and public research organisations.

In short, innovation relies on diversity in clustering which can only be achieved through scale and taking this joined-up approach.

The 700 acre Harwell Campus is a perfect example of this. Businesses rub shoulders with UK government-backed agencies like the Science and Technology Facilities Council plus the European Space Agency, UK Space, Faraday Institute, Medical Research Council and 30 plus international universities at any time, all using the national research facilities like Diamond Light Source and RAL Space.

% GDP spent on Research and Development
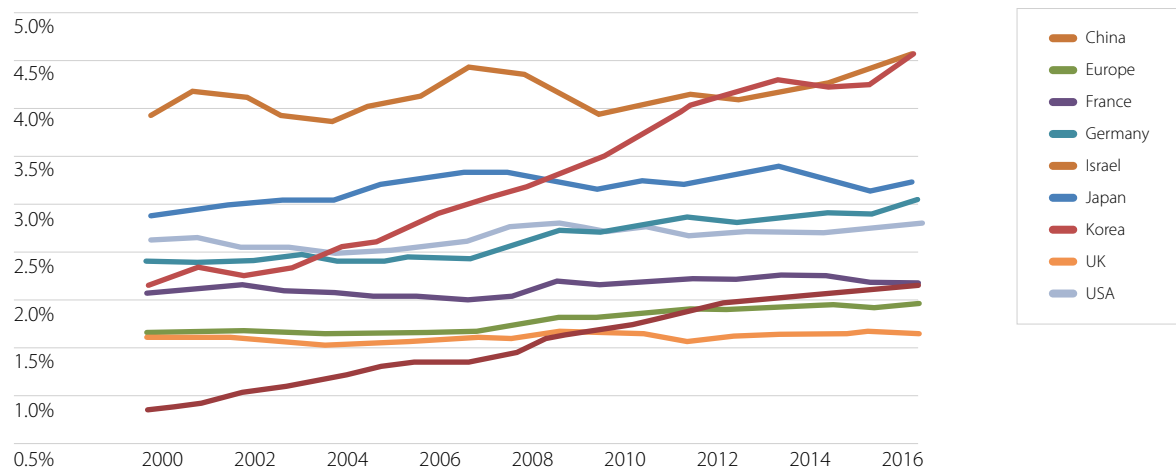
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
China	0.9	0.9	1.1	1.1	1.2	1.3	1.4	1.4	1.4	1.7	1.7	1.8	1.9	2.0	2.0	2.1	2.1	2.1
EU	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	1.9	2.0
France	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2
Germany	2.4	2.4	2.4	2.5	2.4	2.4	2.5	2.4	2.6	2.7	2.7	2.8	2.9	2.8	2.9	2.9	2.9	3.0
Israel	3.9	4.2	4.1	3.9	3.9	4.1	4.1	4.4	4.3	4.1	3.9	4.0	4.2	4.1	4.2	4.3	4.4	4.5
Japan	2.9	3.0	3.0	3.0	3.0	3.2	3.3	3.3	3.3	3.2	3.1	3.2	3.2	3.3	3.4	3.3	3.2	3.2
Korea	2.2	2.3	2.3	2.4	2.5	2.6	2.8	3.0	3.1	3.3	3.5	3.7	4.0	4.1	4.3	4.2	4.2	4.6
UK	1.6	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.6	1.6	1.7	1.7	1.7	1.7
USA	2.6	2.6	2.6	2.6	2.5	2.5	2.6	2.6	2.8	2.8	2.7	2.8	2.7	2.7	2.7	2.7	2.8	2.8

Source: OECD

Urban innovation areas are more constrained by area. Therefore, they need to follow a different path in form and function, typically centred around universities, hospitals or large research corporations.

Cities enable easy and quick communication alongside the places where people choose to live and work, many of whom often choose between cities on an international level. The universities of Oxford and Cambridge for example, have a high proportion of overseas students, consequently resulting in an international innovation eco-system. If the innovation clusters are to attract and most importantly retain these people, then they must be places where they want to be, both in terms of growing their business and to live.

Urban innovation areas need to accommodate incubation space, mixed between offices/R&D/laboratories. This space needs to be sufficient in size and flexible in order to allow for growth. As companies grow they tend to gain more independence and move to outlying campuses or other locations.

As one of the fastest growing global economies, Oxford is embarking on a major regeneration programme in the city centre to provide an innovation district and accommodate the fast-growing economy. This will add hundreds of thousands of square feet of new offices, laboratories and academic space, alongside more places to live.

Urban clusters and outlying campuses accommodating the more 'land hungry' infrastructure, work in conjunction in a 'hub and spoke' model.

This model is regional rather than local to any one city, and much is to be gained by communicating this collectively in an open platform, with a clear and simple identity. The Oxford-Cambridge Arc is anchored by Oxford and Cambridge, but accommodates 10 universities and over 35 science campuses and innovation districts, many with their own specialist research facilities.

This regional cluster model clearly relies upon efficient communication, both digitally and in person.

Whilst this chapter is focussed on innovation and clustering, it would be remiss not to consider how economic growth relies upon retaining these innovative organisations.

Very often these organisations have to move, thinking "what do we do now"? The economy relies on keeping and nurturing these organisations, which generate employment and contribute to GDP. Larger campuses work hard to provide this property 'lifecycle' of grow-on space but again, it is important to have this wider regional platform to make all options easily accessible.

Finally, a word for manufacturing. Whether it be life science, sensors, digital, engineering or electronics, the UK is the place for technology companies to manufacture. Take the space sector: within a matter of years there will be UK-built satellites, launched from UK-built rockets from a UK launch site.

Contributor

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What do you think of the idea that business rates income should be channelled towards providing housing and infrastructure within the Arc for a set period of time?

This already happens successfully in Oxfordshire and elsewhere in connection with infrastructure, via retained Business Rates income inside Enterprise Zones so this is an idea that certainly warrants further consideration.

How do you approach master planning for well-connected homes in the countryside?

Housing developments should be proportionate to the size of existing settlements and be located in tandem with current and planned supporting amenities and infrastructure. Homes should be located adjacent or close to jobs.

We should prioritise brownfield sites, respect site specifics and properly draw upon the local vernacular.

Our aim should be for beautiful homes that lift our spirits and which are built sustainably. Currently there is too much simple placement of standard house types and template layouts on a master plan and then site.

We must listen and talk in detail to local residents and potential future residents about what they value and want. They will have design thoughts and are also often extremely clear about what facilities are lacking inside their community.

What can we do to improve connectivity without relying on cars to get from A to B?

In the near term, say the next 10 years, we should focus on greater train use and the railway's current operational resilience plus have a good look at ticket pricing. Where we need to develop the railways, we should use former rail lines and other legacy infrastructure where practical.

We should also continue doing all the other usual green transport things such as developing sustainable working patterns and plans through flexible working hours, home working, cycling, walking, buses, car shares etc.

What is the one thing that could be done to cement the Arc's status as a leader in future industries?

We can improve its status by celebrating more explicitly and loudly its existing credentials, successes and strengths.

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What are the benefits of being based near a global top 10 university?

From discussions we have had with R&D businesses, the principle benefit is from access to a pool of highly qualified staff, endorsing the findings from the YouGov survey commissioned by Bidwells and Creative Places, which identified that retention and recruitment was the number one issue for these organisations.

Companies also benefit from the cluster effect – as business numbers grow in a cluster (often around a major university) they find more partners to work with, more staff to recruit and more access to capital to enable businesses to grow. This effect is amplified around top 10 universities.

There is also a brand benefit, with such universities having globally recognised brands for education and research that can be enhanced through academic board membership.

What do science parks need to do to support the growth of start-ups?

Start-ups face significant issues as they develop new technology and seek to grow markets.

They need premises that are fit for purpose and leases that provide sufficient flexibility to enable them to grow (or contract) quickly. Science parks typically provide a range of property from small suites on short-term arrangements to 'grow-on' space that helps enormously.

Such companies can benefit from help in recruitment, corporate structuring, marketing, IP protection, business plan creation etc and science parks often provide support to start ups through the events they run and programmes they implement. Such environments also enable start-ups to learn from each other, sharing problems and solutions which are often invaluable.

Could firms investing in start-ups and new technology have an exemption from business rates for a period of time?

The question is more whether the companies they invest in can have such exemption, as this reduces start-up costs.

For small start-ups, the exemptions for small businesses already provide some really important help. In other cases, enterprise zones extend this to larger businesses and again provide really important cost reductions to enable businesses to grow, alongside others and often alongside universities.

Could universities be tasked with divesting a proportion of land for homes in the Arc?

Universities are already working to provide new housing for their own staff and postgraduates (as well as undergraduates) in some instances.

Cambridge is a really good example where the new development at Eddington is enabling the university to offer cost effective accommodation to help attract postgrad students and where they have also created development opportunities on their land to increase the stock of private market housing.

They are also major contributors to infrastructure improvements through the planning contributions linked to planning permissions, which then facilitate the release of land in nearby locations.

What one single thing will help the Arc cement its status as a leading S&T or innovation cluster?

Both Oxford, and more so Cambridge, already have a number of bodies promoting their clusters as world leading.

For the ARC as a whole to raise its global profile, it needs to bring together in a single point, information on all the fantastic assets that exist across the region and compare this with other leading clusters across the world.

Innovation districts need to be identified and local authorities and metro mayors incentivised to act as champions for these areas, identifying their assets and strengths and building and branding on top of these. Civic leadership and digital connectivity, power and planning policies in line with innovation districts are fundamental to growth as is a long-term partnership view and these authority figures need to be empowered and motivated to drive these forwards.

Funding to support this endeavour is required from central government and consideration should be given to creating an ARC promotional organisation, rather like the Northern Powerhouse or Midlands Engine that can co-ordinate investment and effort.

Enterprise innovation activity 2014-2016 %

	% saying Innovation active	% saying innovation active businesses that introduced form of innovation	% saying Internal R&D activity
All	49	36	17.7

Size of enterprise			
0-49	47.3	35	16.1
50-99	53.8	39.9	23.2
100-249	58.9	40.4	26.5
250+	63.1	44.4	30

Region			
North East	42	29.5	13.7
North West	48.7	36	18.1
Yorkshire and The Humber	49.3	34.1	16.5
East Midlands	51.6	38.4	20.7
West Midlands	52	38.7	19.4
Eastern	51.6	38.8	16.8
London	46.9	36.8	16.5
South East	51.1	35.6	20.8
South West	52.5	37.3	18
Wales	46.5	35.8	17.9
Scotland	45	33.3	13.8
Northern Ireland	38.8	28.3	14.7

Source: ONS - UK Innovation Survey