Industrial revolutions: capturing the growth potential

Contents

The UK's 31
biggest clusters
contain 8% of the
UK's businesses
but contribute
20% of the
nation's GVA

Foreword

Much has been said in recent years about the importance of "clusters" – complex, economically significant ecosystems in which people can meet, exchange ideas, develop innovations, and create businesses together. Clusters are regarded as exciting, vibrant places where "something in the air" draws together world-class talent and delivers fresh products and innovations to the marketplace. They contribute disproportionately to economic growth and helping to create high-skill jobs that are part of the UK's thriving knowledge economy.

Such clusters cannot be created by design. Their origins are largely accidental, and they often evolve to fill market niches that are difficult for governments to anticipate. Typically, their strength lies in the physical co-location and interplay of talented individuals, nimble small businesses, heavyweight corporations, world-class academic centres, willing investors, appropriate infrastructure and supportive local and national government agencies.

As they grow, these delicate ecosystems invariably face challenges – for instance, talent shortages and patchy infrastructure. Yet, given their inherent complexity, it is often difficult for clusters to organise to address such challenges head-on and thereby achieve their full potential for growth.

To better understand the strengths of the UK's clusters and how to address the barriers to their growth, The Gatsby Foundation commissioned Centre for Cities to work in partnership with McKinsey & Company to identify the most economically significant clusters in the United Kingdom, detail the challenges they face, and propose a series of recommendations for how these can be overcome.

Some recommendations can be carried out by a cluster in isolation, but many point to the need for a national approach with a clear champion (ideally in the form of a ministerial position), that recognises clusters' needs and advocates on their behalf. I thank Centre for Cities for all their efforts in contributing to this initiative and McKinsey for their commitment to developing data-driven understanding of the UK's clusters.

Our UK clusters perform on a fast-moving global stage, facing constant international competition for talent and innovation. If we are serious about boosting UK growth, the recommendations outlined here need to be implemented in full. Doing so will unlock the growth potential of the nation's clusters, secure high-skill jobs, and ultimately bring significant benefits to our wider economy.

Lord David Sainsbury, FRS
July 2014

Executive summary

Clusters have long been part of the British industrial landscape. During the 19th century, Manchester was the epicentre of the international cotton and textile trade; by 1871, the city and its Lancashire satellite towns (that collectively became known as "Cottonopolis") accounted for 32% of global cotton production. More recently, the wider area surrounding Silverstone Circuit in Northamptonshire has been dubbed "Motorsport Valley". Home to a concentration of Formula 1 motor racing teams and thousands of specialist motorsport suppliers, in 2012 it generated revenue of £9 billion and employed 41,000 people, including much of the world's high-performance engineering talent. For some businesses, there are clear benefits to locating near one another.

This report aims to create a snapshot of the most economically significant clusters in the United Kingdom in 2012 (the year for which we have the most recent GVA data), to review the barriers to growth that they face, and, most importantly, to set out actions to overcome these barriers. These recommendations stem from extensive conversations with business leaders across several leading UK clusters. Based on these discussions, we believe that failure to act on these recommendations risks significantly hampering the growth potential of the UK's clusters, impacting their contribution to the UK economy and the UK's global competitive position.

WHY FOCUS ON CLUSTERS?

Clusters are just one part of the story of economic growth in the UK. A sustainable recovery will be built on high-performing firms in all sectors across the country, whether these are co-located in a cluster or distributed more diffusely. However, this report focuses in detail on economically significant clusters for three principal reasons:

1. **Clusters are a major contributor to growth.** The 31 economically significant clusters identified in this report contain 8% of the UK's businesses, but generate 20% of UK output (gross value added).

2. **Clusters are important sources of well-paid jobs.** The United Kingdom's top 31 economically significant clusters together employ four million people – one in seven of the working population – and they offer average salaries that are typically higher than those in the surrounding region.

3. **Clusters bring business advantages that cannot easily be replicated.** Economically significant clusters are ecosystems buzzing with soft knowledge across a myriad of networks and connections that not only promote a better understanding of what customers want, but also support emerging innovations. As a consequence they attract investment and talent. This virtuous circle is difficult to create by design – accordingly, such clusters can represent a defensible competitive advantage for the UK.
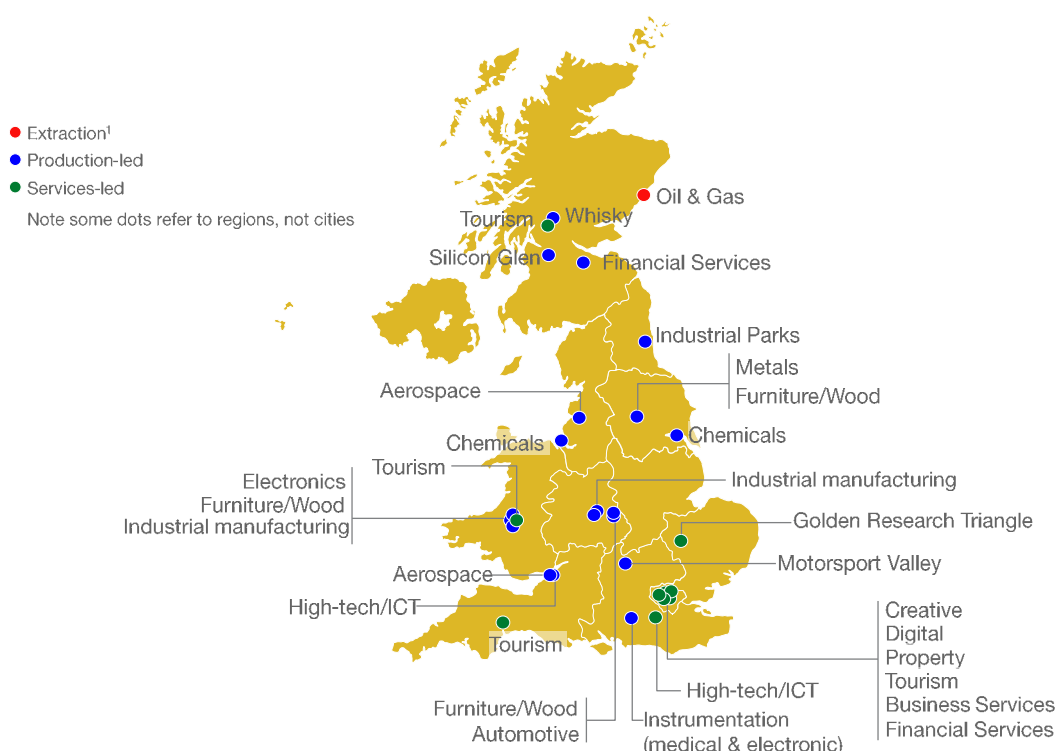
IN 2012 THERE WERE 31 ECONOMICALLY SIGNIFICANT CLUSTERS IN THE UK

This report applied a rigorous methodology to identify the UK's most economically significant clusters informed by the most recent GVA data (from 2012).

Clusters identified range from financial services in London to the chemicals industry around Hull. Some are well-known, for example the Midlands automotive cluster, while others are less celebrated but nevertheless significant – for instance, the high-tech industry centred in Bristol and Bath. Some are long-established, such as the Golden Triangle or Scottish Whisky. Others, such as the creative and high-tech clusters, are far newer and evolving, to the point that they may not have been big enough to be included in the list above even 5 years ago.

The evolving and dynamic nature of clusters matters. By definition this report is a snapshot, focusing on the clusters already at a certain size and scale and not on nascent or smaller high-growth clusters that may, in a few years' time, be highly economically significant. This is recognised in our more general recommendations about how to support all firms to grow, as well as in our recommendation that this analysis be repeated at regular intervals to ensure the UK is up-to-date on where its most dynamic clusters are and how they are faring.

Exhibit 1: The UK's 31 economically significant clusters

- Extraction[1]
- Production-led
- Services-led

Note some dots refer to regions, not cities

Oil & Gas
Tourism Whisky
Silicon Glen Financial Services
Industrial Parks
Metals
Aerospace Furniture/Wood
Chemicals Chemicals
Tourism
Electronics Industrial manufacturing
Furniture/Wood Golden Research Triangle
Industrial manufacturing
Aerospace Motorsport Valley
High-tech/ICT Creative
Digital
Property
Tourism Tourism
Business Services
Financial Services
High-tech/ICT
Furniture/Wood Instrumentation
Automotive (medical & electronic)

1 Included in manufacturing for future categorisation purposes

SOURCE: BRES ONS data, IHS Global Insight, World Industry Service

FIVE PRINCIPAL BARRIERS TO THE GROWTH OF CLUSTERS

The majority of firms face barriers to growth that centre around skills, finance, management, regulation and infrastructure. Firms in clusters are no different; across all the clusters we reviewed and the five case studies we looked at in detail, these were common themes. Accordingly, national policies (such as an education and skills system more responsive to local employer needs, or the recommendations in the Witty Review of Universities and Growth) will benefit the clusters we have studied and also help nascent clusters and general high-growth firms to flourish. These are necessary, urgent actions needed to help the UK economy, including its clusters, to thrive.

However, our case studies illustrate the importance of taking action to support individual clusters that is based on a greater understanding of those individual clusters and their distinctive strengths and weaknesses. A notable aspect of our work is that all five of our case studies were experiencing five principal barriers to future growth, but the way in which these played out was quite different in each one, requiring locally-based, rather than nationally determined 'one-size-fits-all' actions. The five common barriers to growth identified across the five case studies we reviewed were:

1. The brand identity of key clusters is weak, impacting investment, talent, and demand

Few of the United Kingdom's economically significant clusters have the global (or indeed national) brand recognition of "Silicon Valley" within their own industry. People outside (and indeed sometimes inside) a cluster are often unaware that it exists, making it harder to attract inward investment, find new customers, or bring top talent to the region. Less well-known clusters struggle to be heard by local and national government.

To address this, two things need to change:
- Brands and messaging should be developed for each cluster, at local and at national levels
- Clusters need to be better promoted, both domestically and globally

2. Cluster networks are failing to connect people within and outside the cluster systematically

Narrow networks constrain growth because they limit the exchange of ideas, innovation, and talent that help the cluster develop and maintain its competitive advantage.

To address this, two things need to change:
- Cluster networks should be broadened to ensure that they reach the full range of stakeholders, cover the requisite geographic area, and include players in relevant adjacent industries
- Cluster networks should deepen the level of engagement of the stakeholders within them, facilitating more opportunities to exchange business ideas, shape innovations, and mentor young talent

3. Clusters are not fulfilling their potential to foster innovation

Clusters are home to many of the world's most innovative institutions, whether companies or universities. UK clusters have been less successful than some of their global peers in tapping into these sources of innovation to keep the cluster at the cutting edge. This has blunted the competitive advantage of business within the cluster, making it less attractive to investors and talent.

To address this, two things need to change:
- Universities need to strengthen their contribution to their local businesses through commercialising their research more proactively, and need to be further incentivised to do so
- Additional actions should be taken at a cluster level to promote idea sharing, especially by increasing interaction between businesses and academia, and by providing specialist facilities to support the iterative refinement of innovations

4. Education and skills systems are not producing the concentration of specialist skills that clusters need

Significant shortages across the UK economy of vocationally-trained individuals (in skills ranging from lamination to computer programming), high-quality graduates in STEM subjects (particularly engineering), and those with suitable managerial skills, limit many firms' ability to grow and have a particular impact on many of the United Kingdom's economically significant clusters which seek to compete on a global stage. Firms are unable to expand because they cannot recruit the staff they need to fulfil orders, or they lose competitiveness because they have to increase salaries to retain scarce skilled staff. For firms considering locating in the cluster, the availability of a skilled workforce is a significant, and potentially deal-breaking, factor.

Two things need to change:
- Education and skills providers (particularly those connected to a cluster) should work directly with leading cluster employers to offer courses that equip the right number of people with skills that are in demand
- More people should be encouraged to take courses (both at the national level in areas such as STEM subjects and also locally in vocational skills such as machining) that equip them with the skills the cluster needs – and then further encouraged to choose a career in the cluster that uses those skills

5. Every cluster has specific infrastructure challenges holding back growth

Each of the five case study clusters we have examined in detail suffers from infrastructure issues, be they transport (road, rail, or air links), broadband, housing, or energy. Poor infrastructure damages a cluster's global competitiveness by increasing the costs of facilities, of getting goods to market, of labour (principally because of the high cost of housing), or of other key inputs such as energy. Moreover, inadequate transport links make it harder to build connections, both within the cluster, or with other centres of expertise.

To address this, two things need to change:
- Clusters should identify their top infrastructure challenges and develop a detailed understanding of why these have not been implemented
- Clusters should identify solutions for how their top infrastructure challenges can be addressed and how local beneficiaries could help fund them (supplementing any available national or local government support)

Clearly, it will take the efforts of a number of stakeholders to make these changes happen. Some actions need to be the responsibility of the clusters themselves while others require the support of local and national government. To enable this, many of the business leaders we spoke with suggested the establishment of cluster leadership teams in each of the UK's leading clusters, following the model of the Tech City Investment Organisation. Their sole objective would be to promote the growth of the businesses in their cluster by fostering connections and galvanising stakeholders to act. We propose, below, a suite of actions for cluster leadership teams. These should not be new (potentially bureaucratic) government-led bodies in each cluster, but rather should "piggy-back" on existing networks and organisations – with each cluster forming a consortium that meets their needs with a lean, agile, senior executive team underneath them. Central government can explore how best to faciliate their formation. For example, modest funding could be diverted from money currently allocated to the Regional Growth Fund.

There was also support in the clusters for the creation of a national cluster champion to be nominated to speak on behalf of the UK's clusters on both a national and global stage, to advocate for clusters at the level of national government, to work with UKTI, international governments and agencies, and to share best practices among the UK's clusters. There are a number of options for where such a national cluster champion might sit. The role could be within government (for example as a Minister for Clusters, housed within BIS). Alternatively, the role could sit outside government, provided that it was empowered to work closely with the relevant government departments to ensure that the needs of clusters are taken in the policy formation process. The champion's first task would be to work with local clusters to help them identify leadership teams, drawing on the organisations and individuals already active in each.
Our recommendations are informed by our five case studies and designed to address the five barriers to growth outlined above. (More detail on these, including relevant case examples and details on proposed ownership and funding, can be found in Chapters 4–8.)

RECOMMENDATIONS: 19 ACTIONS TO SUPPORT THE UNITED KINGDOM'S ECONOMICALLY SIGNIFICANT CLUSTERS

Barrier	Recommendations
The brand identity of key clusters is weak, impacting investment, talent, and demand	1. Establish a single point of access for people looking to trade with or invest in the cluster 2. Develop a distinctive name, brand, and story for each of the leading UK clusters, replicating Tech City's efforts 3. Package cluster insights into externally usable materials conveying a "UK Plc" narrative that tells the overarching story of Britain's clusters 4. Promote the top clusters domestically and globally
Cluster networks are failing to connect people within and outside the cluster systematically	5. Scale up engaging face-to-face events to encourage idea sharing, investor partnerships, and business ventures to strengthen cluster networks 6. Organise mentorship programmes where executives of successful businesses can be brought together with the leaders of high-growth businesses 7. Establish and foster relationships with global peer clusters to exchange insights across continents 8. Host an annual conference of UK cluster leadership teams and their main stakeholders to foster links between them and share best practice
Clusters are not fulfilling their potential to foster innovation	9. Incentivise universities to increase their focus on commercialising their researchers' innovations and share their best practices with others 10. Broker joint appointments between academia and industry 11. Provide shared "maker spaces" that help start-ups to access the technical facilities that they need to grow 12. Run pitch days judged by investors to enable aspiring entrepreneurs to gain access to advice, mentors and capital

Education and skills systems are not producing the concentration of specialist skills that clusters need	13. Convene cluster employers to develop a "workforce plan" of future skills requirements and effectively incentivise vocational training providers to ensure sufficient places are offered
	14. Design curriculums jointly between cluster businesses and educational institutions
	15. Expand University Technical Colleges and apprentice academies so that each of the top 31 clusters has at least three UTCs or academies
	16. Create transparent, user-friendly data on employment rates and earnings for the courses people are considering
	17. Promote careers in cluster industries in schools through collaborations with local firms
Every cluster has specific infrastructure challenges holding back growth	18. Develop business cases for the cluster's top three infrastructure priorities, including a clear view of benefits and costs, as well as how sources of local opposition can be brought on side
	19. Secure funding from local sources to address local infrastructure needs, potentially to be supplemented by funds from central government

We recognise that implementing these recommendations will be challenging, particularly as all five barriers need to be addressed to ultimately impact cluster growth. However, we believe that these recommendations represent a real opportunity to optimise regional growth funding to unlock the growth potential of our top UK clusters, ultimately delivering jobs and growth for the whole UK economy.

Introduction

From the high-tech firms of Silicon Valley to the City of London's financial players, successful businesses selling to one another often cluster together, finding strength in numbers. Clusters can also be highly productive. This research shows that, on average, businesses in the United Kingdom's top 31 clusters in 2012 generated disproportionate economic activity (in terms of gross value added per employee) compared with other parts of the economy: generating 20% of the UK's GVA, despite having only 8% of the businesses.

Once formed, clusters are often difficult to replicate. They have complex or contingent origins and can take time to take root. Individual companies cannot establish them on their own, while historically governments across the world have tried and failed to conjure effective clusters from nothing. Therefore, where they exist, clusters are valuable because they represent defensible advantage in a competitive, globalising world.

However, clusters can also be fragile because they are delicate, interwoven ecosystems; it is precisely because they depend on their connectivity that they can be vulnerable. Therefore all actors within a cluster – large corporations, small and medium-sized enterprises (SMEs), universities, further education colleges, investors and associations – can benefit from finding ways to work together to foster the success of the cluster.

It is also why local and central government bodies can gain advantage from nurturing any clusters they are fortunate enough to have within their boundaries, whether already significant and identified in this report, or nascent but with significant future potential, by taking care to ensure that these valuable economic assets are not damaged or hamstrung by wider policies. Some of this nurturing of clusters is likely to be in the form of general business support, but if there is something particular about clusters that enables them to be more productive, then it is also worth asking whether there are particular barriers that might prevent them from growing and realising their full potential. That is what this report sets out to do.

FOUR KEY QUESTIONS ABOUT CLUSTERS IN THE UNITED KINGDOM

This report addresses four questions:

1. Where are the United Kingdom's most economically significant clusters?
2. What are the barriers to their further growth?
3. What actions could be taken to overcome these barriers over the next decade?
4. How can we ensure these recommendations are enacted?

As a first step, a working definition of an "economically significant cluster" was developed with input from Professor Jonathan Haskell of Imperial College London, Professor Henry Overman of the London School of Economics, and the McKinsey Global Institute (MGI), who together drew on extensive prior literature. Applying this definition in the United Kingdom yielded 31 clusters across the country and across a wide range of industries. However, outside-in data can only provide a limited understanding of how clusters operate, partly because industrial classifications are so limited and partly since so much of the success of clusters depends on interactions between individuals and institutions. We therefore decided to examine five of these clusters in more detail by conducting a series of interviews and roundtables with a diverse range of individuals drawn from large corporations, SMEs, academia, the investor community, and local government in each. From these and a review of reports written on other UK clusters, we homed in on the most significant barriers that our five case study clusters face, and which we believe are challenges faced by most UK clusters to varying extents. We then developed a series of recommendations detailing what can be done by stakeholders to address these barriers, informed by examples of national and global best practice and further discussions with academic experts, the MGI, and business leaders from our five clusters.

We hope that this report is valuable to business leaders, local government, national government, UKTI, investors, academics and others keen to understand the "ecology" of the United Kingdom's economically significant clusters, and what can be done in practice to sustain and grow their contribution to the national economy.

01

Understanding the United Kingdom's cluster landscape

The UK's top 10 clusters contribute ~£200bn in GVA to the UK economy p.a.

WHY FOCUS ON CLUSTERS?

Clusters are just one part of the story of economic growth in the UK and a sustainable recovery will be built on high-performing firms in all sectors across the country, whether co-located or more diffuse. However, this report focuses in detail on economically significant clusters for three principal reasons:

- **Clusters are a major contributor to growth.** The 31 economically significant clusters identified in this report contain 8% of the UK's businesses, but generate 20 % of UK output (gross value added).

- **Clusters are important sources of well-paid jobs.** The United Kingdom's top 31 economically significant clusters together employ four million people – one in seven of the working population – and they offer average salaries that are typically higher than those in the surrounding region.

- **Clusters bring business advantages that cannot easily be replicated.** Economically significant clusters are ecosystems buzzing with soft knowledge across a myriad of networks and connections that not only promote a better understanding of what customers want but also support emerging innovations. As a consequence, they are good at attracting investment and talent. This virtuous circle is difficult to replicate by design – accordingly, such clusters can represent a defensible competitive advantage on a global stage.

When studying clusters in greater detail, our aim was to understand whether some of the approaches that will support clusters are simply policies that respond to the distinctive needs of local firms, or whether clusters (both those that are already economically significant and those that are nascent or growing quickly – this report focuses on the former in order to manage the scope of the work) could benefit from any specific interventions to make the most of their current and future potential.

WHAT IS A CLUSTER?

There is no universally agreed definition of a cluster. Certainly, a cluster is a geographic density of a particular industry and the services that surround it, but some argue it is more than that and that the strength of a cluster flows from the "alchemy" of institutions, facilities, culture, formal and informal networks, people, and place, cutting across traditional ideas of sectors. The great economist Alfred Marshall noted in 1890:

"When an industry has thus chosen a locality for itself, it is likely to stay there long: so great are the advantages which people following the same skilled trade get from near neighbourhood to one another. The mysteries of the trade become no mysteries; but are as it were in the air, and children learn many of them unconsciously."[1]

---

[1] Marshall, Alfred (1920). Book IV, Chapter X: A Concentration of Specialised Industries in Particular Localities, Principles of Economics (Revised Edition ed.). London: Macmillan; reprinted by Prometheus Books. ISBN 1-57392-140-8.

Harvard Business School's Michael Porter highlights the geographical and industry dimensions. He defines clusters as:

"Geographical concentrations of interconnected companies and institutions in a particular field…. They include, for example, suppliers of specialised inputs such as components, machinery, and services, and providers of specialised infrastructure. Clusters also extend downstream to channels and customers, and laterally to manufacturers of complementary products, and to companies in industries related by skills, technologies or common inputs. Finally, many clusters include government institutions – such as universities, standards-setting agencies, think-tanks, vocational training providers and trade associations – that provide specialised training, education, information, research and technical support."[2]

Developing an understanding of whether there are measures that policymakers and industry could take that would make the most of their potential to generate innovation and jobs is a critical first step in supporting the future economic growth of these clusters.

DEFINING THE UK'S MOST ECONOMICALLY SIGNIFICANT CLUSTERS
For the purpose of this report, we have sought to create a statistical definition that captures Marshall's "something in the air", distinguishing between areas that host a mere concentration of a certain industry and those where the combination of factors makes a diverse and strong cluster. We also filtered out

clusters that are – at least currently – too small or economically weak to be economically significant. This means that our analysis did not capture the smaller, nascent, high-growth clusters of the future. As a result, we recognise that some sectors or cities may be surprised that their growing clusters of firms, for example healthcare in Leeds or graphene in Manchester, are not included in the top 31 clusters listed below. This is primarily because these are not yet of sufficient scale to meet the criteria below.

It is important for national and local policymakers alike to note that this was not, and cannot be, designed to be a definitive list of clusters for all time. By definition this is a snapshot that provides enormously valuable information about which clusters are currently generating the most jobs or GVA, but cannot predict which clusters will be included or excluded in 5 years' time. This is a fast-moving policy area because successful clusters have to evolve in the face of global and local competition, often rapidly, even when they are long-established and, as we note later, both national and local policy needs to recognise this.

To meet our definition, economically significant clusters had to fulfil four criteria:

1. Be geographically concentrated
The minimum standard we have adopted is a location quotient of at least 1.5 for the lead set of industries associated with a cluster. (Location quotient is used to assess the extent to which businesses of a particular industry are concentrated in an area relative to the average UK distribution – a fuller methodology is included in the online appendix.)
2. Represent a network of interconnected firms
We have defined the minimum standard as the presence of firms covering a substantial part of the

---

value chain leading to the creation of a final product or service. Taking the metals industry as an example, to be defined as a cluster an area would not need to include everything from mining to final use, but might well include melt-shop production, coating, finishing, packaging, sales, transportation, and processing into secondary products such as wire or construction components.

3. Be of a minimum economic scale

We have defined a cluster as:

- Contributing to an industry that represents at least 1% of the British economy [3]
- Contributing to an industry in which the UK "punches above its weight"[4]

4. Have sufficient data to be analysed

We note that some clusters may exist but, given the limitations of how Standard Industrial Classification (SIC) codes are defined, may be difficult to decode from the data, particularly for emerging technologies. Further work to include Northern Ireland could be conducted using the Business Register and Employment Survey (BRES) data for this region.

Our first two tests generated a list of 130 potentially significant clusters. Applying the third and fourth tests narrowed that field to 55. Many of these sectoral clusters were so heavily interlinked that they operated in effect as one – for instance, advertising, music production, broadcasting, photography, film production and graphic design in London. Therefore, we consolidated these 55 into 31 true clusters that made sense.

These 31 cover the country and reflect many different industries. They include the clusters that are widely documented in the United Kingdom (for example,

---

[3] That is to say that the economic sector of which this cluster forms part has GVA that is greater than £10 billion across the UK (~1% of UK GVA).

[4] That is to say that either (1) the economic sector of which this cluster forms part has a share of global exports that is higher than the UK average for all industries; or (2) the economic sector of which this cluster forms part has a share of global gross value-add that is higher than the UK average for all industries.

financial services in London and "Whisky Scotland") but also some hidden gems such as "Welsh Electronics". By region, they are:

London

Creative London
A cluster which encompasses a wide range of related creative industries, including publishing & printing, advertising, TV, film & radio, photography and music and is distributed across the capital

Digital London
A cluster which encompasses software consulting and supply, computer services, technology entrepreneurship, data processing and telecoms services and which has TechCity as its nexus, but stretches across the London area

Business services London
A cluster which is closely inter-related with the financial services sector and includes law, accountancy and consultancy firms across the London area and parts of the South East (e.g. Reading and Slough)

Financial Services London
A globally leading cluster which includes all aspects of banking and financial services concentrated in the City of London and the Canary Wharf areas of London

Property London
A cluster which is dominated by real estate management, development and selling of real estate, and letting of property, but also includes architectural services and facilities support

Tourism London
A cluster which meets the needs of national and international tourists (through hotels, restaurants, entertainment, museums etc.) as well as business travelers (e.g. through conference centres

Midlands

Motorsport Valley
A cluster which is the world leader in motorsport, hosting the majority of the Formula One teams and dominating the design and

manufacture of components for high-end motor racing

Automotive Midlands
A cluster which consists of industries that supply parts for a range of automobiles (from cars to tractors), and other industries that subsequently service the automobiles and parts

Industrial Manufacturing Midlands
A cluster which consists of industries connected within the metal working supply chain, including the manufacture of industrial equipment and domestic appliances

Furniture/Wood Midlands
A relatively small cluster, focused on upholstered seating with close ties to the automotive industry of which it is a strong supplier

North East

Industrial parks Sunderland & Teesside
A cluster which encompasses a broad range of manufacturing and engineering-related industries – Automotives, Plastics, Electrical Industrial Equipment, Chemicals and Furniture, with strong supply chain connections between these industries

North West

Aerospace North West
An aerospace cluster with a strength in aero-structures, often to meet defense contract needs, concentrated in Preston and the surrounding area

Chemicals Liverpool & Preston
A cluster focused on the manufacture of basic chemicals, soaps and detergents, and also supplies inputs to the plastics and rubber industries, and pharmaceutical and textile industries

Scotland

Financial Services Edinburgh
A financial centre in the heart of Edinburgh with strengths in fund management, insurance, banking and monetary intermediation

Silicon Glen

A hardware focused Electronics and ICT cluster stretching across the central lowlands of Scotland

Oil & Gas Aberdeen

A cluster which includes a wide range of services related to oil & gas extraction and the production supply chain, and is geographically concentrated in Aberdeen and Grampian

Tourism Scotland

A cluster which covers the length of the tourism value chain including hotels, attractions, activities and cultural centres, with a geographic focus in Edinburgh

Whisky Scotland

A cluster concentrated in the West of Scotland which is globally renowned for its production of whisky (with supporting bottling and wholesaling), which acts as a significant source of exports

South East

High-tech and ICT South East

A cluster dominated by leading global electronic companies (e.g. IBM, Panasonic, Sony, Hitachi) and focused on computers, electronic components and electrical equipment

Instrumentation (medical and electronic) South East

A cluster which focusses on the specialist instrumentation design and manufacturing including medical/surgical devices, process controls and lenses and stretches from Sussex to Kent

Golden Triangle

A cluster focused on cutting-edge pharmaceuticals and biotechnology which benefits from the research links between its hubs in Cambridge, Oxford and London

South West

Tourism South West

A cluster that supports the holiday industry in Devon and Cornwall, providing tourists with accommodation, dining options and leisure activities (e.g. watersports)

Aerospace South West

A cluster that is concentrated in Bristol, South Gloucestershire and Taunton and Dean and benefits from the local presence of BAE, Dowty, Rolls-Royce, Cobham Engineering and GKN and deliver aircraft components for defense and civil aviation

High-tech and ICT South West

A cluster focused in the Bristol and Bath area which benefits from the presence of a range of companies along the ICT and hi-tech value chain (from hardware and semiconductor manufacture to eCommerce retailers and creative industries)

Wales

Tourism Wales

A cluster which encompasses tour guides , camping sites, holiday villages and other forms of accommodation across the region

Electronics Wales

A two-hub cluster with opto-electronics concentrated in NE Wales, with strong links to consumer electronics concentration in SE Wales

Industrial manufacturing Wales

A cluster which includes the production of engines, generators, turbines and industrial machinery, as well as coal mining and the process/manufacturing of iron, steel and aluminium

Furniture/Wood in Wales

A cluster focused on the processing of softwood with constituent industries including forestry, saw milling, and the manufacture of wood, paper and furniture

Yorkshire & Humber

Metals Yorkshire

A cluster which includes a range of industries supporting the production of steel and titanium, including the use of these to make high-end products drawing on significant mechanical engineering expertise

Furniture Yorkshire

A cluster around Leeds and Bradford which encompasses the manufacture of both household

and office furniture, and is dominated by the manufacture of kitchen furniture

Chemicals Saltend

A cluster centred around BP Chemicals Park with companies involved in all stages of the chemical and renewable energy supply chain, which benefit from good access to docks and railways

REFLECTIONS ON THE UK CLUSTER LANDSCAPE

1. The UK's most economically significant clusters in 2012 made a disproportionately large contribution to the UK economy.

These 31 clusters we have identified as being the biggest UK clusters in 2012 are estimated to contain 8% of the UK's businesses and yet deliver 20% of the national GVA, thereby significantly "punching above their weight" (Exhibit 2).

Exhibit 2: The UK's economically significant clusters make a disproportionately large contribution to the UK economy

Legend:
- Top 31 UK clusters
- Non cluster

Businesses in UK economy	UK GVA
2.8 million	~£1,550 bn
8%	20%
92%	80%
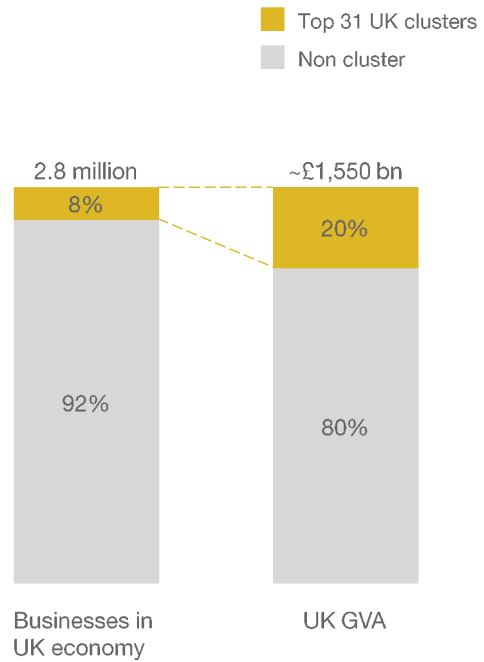
1 Defined as having an LQ of 1.5 or above at the regional level and fulfilling at least one of three criteria listed later in this document

SOURCE: ABS 2013, Oxford Economics "The Contribution of Financial and Professional Business Services to the City of London, Greater London and UK Economies"

2. From an industry perspective, manufacturing dominates. From an output perspective, services dominate.

Of our top 31 clusters, only 10 are services led (with the focus being on financial services and tourism). However, these ten clusters deliver 70% of the total GVA produced by these 31 clusters (Exhibit 3). Interestingly, within these 10 service-led clusters, less than 0.1% of their activity was manufacturing related.

Within the production-led clusters, there is a greater blurring between services and production. For instance, activities usually considered to be services within an organisation, such as research and development, account for 10 to 30% of company spend in the UK motorsports and aerospace industries although their firms – and their clusters – are classified as production-led. Service activity such as repair and maintenance of computer equipment and wholesale retail of ICT equipment also takes place within production-led clusters such as electronics and telecommunications.

This indicates that, from an industry perspective, manufacturing dominates the cluster landscape as 21 of the clusters are production-led, but services accounts for a greater proportion of output, and is also important to many production-led clusters. This means that policymakers seeking to support clusters, whether service- or production-led, should consider how to make the most of the UK's strengths in services.

Exhibit 3: Services led clusters deliver 70% of the GVA of the UK's economically significant clusters

Services led
Manufacturing led

31

£252bn

21

30%

10

70%

Economically significant clusters

GVA
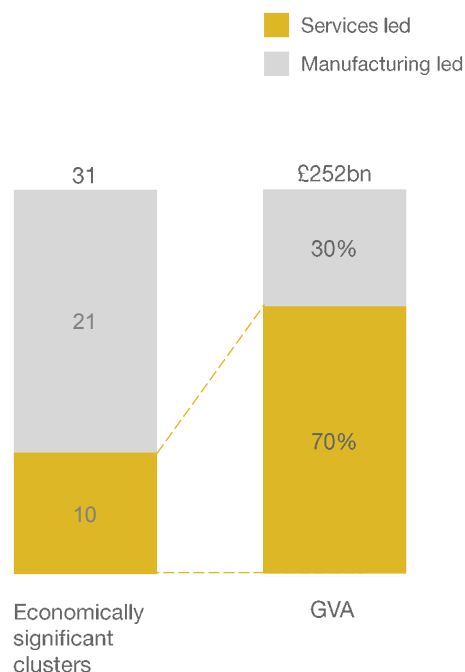
Source: McKinsey

Exhibit 4: The UK's 31 economically significant clusters are geographically widespread

- Extraction[1]
- Production-led
- Services-led

Note some dots refer to regions, not cities

Oil & Gas

Tourism Whisky

Silicon Glen Financial Services

Industrial Parks

Metals

Furniture/Wood

Aerospace

Chemicals Chemicals

Tourism

Electronics Industrial manufacturing

Furniture/Wood

Industrial manufacturing Golden Research Triangle

Aerospace Motorsport Valley

High-tech/ICT

Tourism Creative
Digital
Property
Tourism
Business Services
Financial Services

Furniture/Wood High-tech/ICT

Automotive Instrumentation
(medical & electronic)

1 Included in manufacturing for future categorisation purposes

SOURCE: BRES ONS data, IHS Global Insight, World Industry Service

**3. From a geographic perspective, the clusters
are fairly evenly spread across the country.**
The 31 economically significant clusters are
distributed across the United Kingdom, in rural
areas as well as urban, in England, Scotland and
Wales (Exhibit 4). Outside of London, 82% of the
GVA attributable to the "economically significant
clusters" is attributable to production-led clusters.
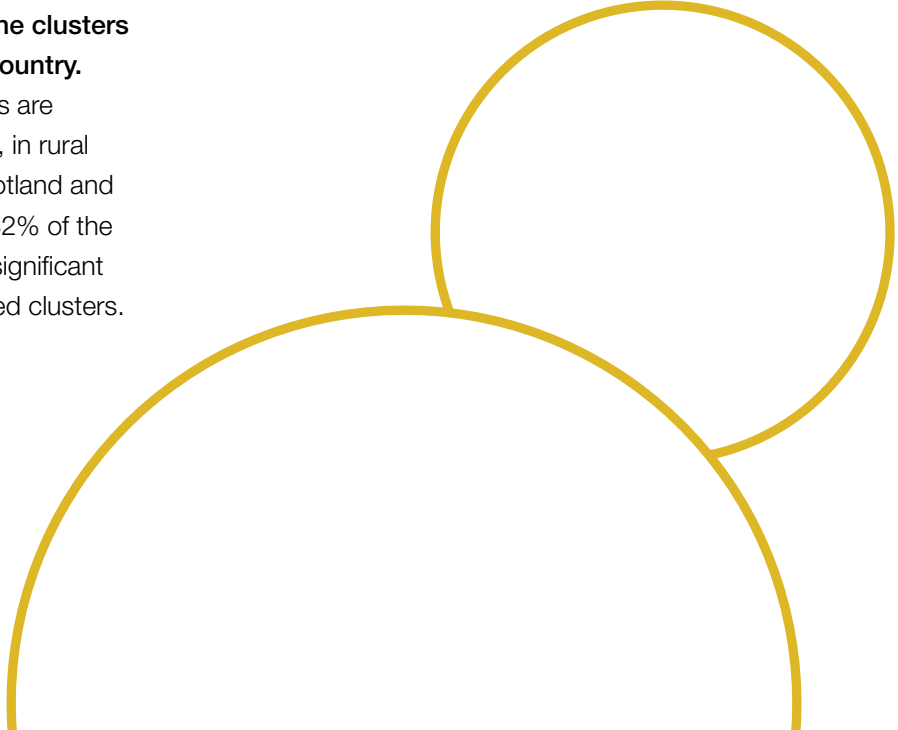
Exhibit 5: London and the South East account for ~67% of the GVA of the UK's top 31 clusters

Top 31 clusters by GVA, GBP billions

London and the South East
Other regions of the UK

Cluster	GVA
Financial services London	44.9
Digital London	30.7
Business services London	25.1
Tourism London	19.7
Creative London	18.9
Manufacturing Midlands	14.2
Property London	13.1
Financial services Edinburgh	11.4
Automotive Midlands	10.9
Electronics and IOT South-east	9.4
Golden research triangle	7.0
Motorsport valley	6.0
Light industrial Teeside	5.2
High tech and IOT South-west	4.8
Oil and Gas Aberdeen	3.8
Tourism South-west	3.1
Tourism Scotland	3.0
Industrial manufacturing Wales	2.7
Chemicals Liverpool & Preston	2.6
Metals Yorkshire	2.5
Aerospace South West	1.9
Furniture/Wood Midlands	1.9
Aerospace North West	1.6
Whisky Scotland	1.6
Medical/Electronic Instruments South East	1.6
Furniture/Wood Yorkshire	1.5
Chemicals Saltend (Hull)	1.4
Electronics Wales	0.9
Silicon Glen (Scotland)	0.8
Furniture/Wood Wales	0.6
Tourism Wales	0.6

SOURCE: BRES ONS data, IHS Global Insight, World Industry Service

4. London and the South East play a critical role.
The top five clusters in the UK by GVA are in London and these alone delivered ~£140 billion in GVA in 2012 (55% of the GVA of the top 31 clusters) (Exhibit 5). All the clusters in London and the South East combined contributed ~£170 billion in GVA output in 2012, employing a total of ~2.4m people across the region. London's financial services cluster alone accounts for 32% of the total GVA of the top 31 economically significant clusters.

5. Britain has global strength.
As Exhibit 6 (next page) indicates, 17 of the most economically significant clusters are not just nationally significant but are global centres of their industry. They are the UK's major clusters in those industries where the UK is globally leading in output relative to our size. Twelve of these clusters are experiencing recent employment growth, supporting growth through the last downturn.

Exhibit 6: The UK has 17 globally significant clusters, of which 12 are growing

Employment growth
2009–12 CAGR, %

Size = 2012 total employment in cluster

Globally significant, high growth clusters

Globally significant, low growth clusters

National clusters

Fast growth, nationally significant

Fast growth, globally significant

Tourism London

Business Services London

Creative London

Furniture/Wood Yorkshire

Furniture/Wood Midlands

High tech & ICT South West

Aerospace South West

Automotive Midlands

Chemical Saltend (Hull)

Property London

Motorsport Valley

Digital London

Golden Research Triangle

Metals Yorkshire

O&G Aberdeen

Tourism Wales

Tourism South West

Tourism Scotland

Manufacturing Midlands

Silicon Glen (Scotland)

Furniture/Wood Wales
Whisky Scotland
Industrial manufacturing Wales

Chemicals Liverpool & Preston

Electronics & ICT South East

Financial Services London

Industrial parks Sunderland & Teeside

Financial Services Edinburgh

Electronics Wales

Medical/Electronic Instruments South East

Low growth, nationally significant

Aerospace North West

Low growth, globally significant

UK Employment growth

Global/National
Cluster industry vs. global industry

Baseline for global/national comparison is UK GVA as a proportion of global GVA. The UK industry GVA as a proportion of global industry GVA is then compared to this i.e., 1 means that proportions are the same

70% of the
UK's 31 biggest
clusters are
services led

02

Identifying cluster strengths and the barriers to future growth

APPROACH TAKEN TO UNDERSTAND CLUSTER DYNAMICS IN GREATER DEPTH

Clusters are not simply about concentrations of firms, they are about "something in the air" and the interactions between firms. Therefore, in order to understand the challenges faced by the United Kingdom's most economically significant clusters, and how they might be overcome, we have adopted a case study approach to gain a deeper understanding of what it takes to make clusters successful. We focused on five clusters to gain a snapshot of their dynamics and to understand what can be done to ensure their continued success. These selected clusters represent a wide range of industries (both service- and production-led) and cover the geographic breadth of the UK. We combined the learnings from this sample with prior research on a further dozen clusters and tested the findings with our academic and McKinsey Global Institute advisors to generate a richer set of insights on what "makes these clusters tick".

The five clusters we selected were:

- **"Motorsport Valley"**
  In an area stretching from Banbury in the north to Woking in the south lies the centre of world motorsport. Eight of the eleven Formula 1 teams are based here, within 80 minutes' driving time of the Silverstone racetrack, and with them a supply chain of tens of thousands of high-performance engineering businesses.

- **The South Yorkshire metals industry**
  Sheffield is the city that invented stainless steel, and though it is no longer the centre of world metal production, the area around Sheffield and Rotherham is still a global centre for the production of specialist steels, alloys and blades, sustained by exemplary collaboration with the local universities.

- **The high-tech industry around Bristol, Bath and Swindon**
  A diverse combination of electronics manufacturers, animation and computer graphics firms, digital start-ups, and university spin-outs sustains this well-established but not well-known cluster.

- **The 'Golden Triangle' of advanced research between Oxford, Cambridge and London**
  Powered by cutting-edge research from four of the world's top 25 universities, this area is a leading biomedical, medical and technology cluster of global significance.

- **Tourism in Scotland**
  Scottish tourism is extensive and diverse. Edinburgh's historic sites and cultural festivals are the main draw, but many tourists stay to visit the lochs, isles, and mountains of the centre and west of the country or specialist attractions in golf and whisky tourism.

To understand the dynamics of each of these five clusters, we interviewed over one hundred individuals leading across them. These included key figures from five groups: cluster businesses, large and small; academics and college principals; investors; trade bodies and government agencies.

A full list of the interviewees is included in the online appendix. In each interview we strove to understand three central questions:

- What are the strengths of the cluster today?
- What barriers to future growth does the cluster face?
- What can be done to help overcome those barriers, and by whom?

Cluster framework used to identify barriers to growth

Conditions needed to achieve each attribute:

1 Presence
- Active promotion and outreach
- Market stimulation
- Competitive infrastructure

2 Connectivity
- Accessible internal business and social networks
- External collaborations
- Global links – to other markets and other clusters

3 Capability
- Distinctive pipeline of talent
- Practical, applied business and management training

4 Support
- Accessible financing
- Favourable policy/ regulation

In discussing the strengths of each cluster and the barriers they face, we made use of our experience reviewing international best practice examples of successful clusters. This research suggests that there are four attributes that together help clusters thrive:

- **Presence**: "A reputation as a world-leading cluster and the physical infrastructure and shared technology to support this"
- **Connectivity**: "The right people networks linking the enterprise community"
- **Capability**: "World-class skills and the ability to acquire them locally"
- **Support**: "Financial, regulatory, and professional support designed around the needs of local enterprise"

We therefore used this framing when conducting our interviews to ensure that we understood the extent to which each of these attributes was present in our clusters.

STRENGTHS OF UK CLUSTERS

Clusters make a significant contribution to our economy. Indeed, the 31 most economically significant clusters identified delivered £262 billion in GVA in 2012, representing 20% of the UK economy. Furthermore, this represented an annual growth in GVA of 1.7% between 2009-2012, against a backdrop of slow growth in the overall economy. Together these clusters employed approximately four million people in 2012, typically in relatively high-skill, high-wage jobs. These clusters also have spillover effects on the wider economy as the region provides the services this workforce needs.

Successive multinationals, investors, and governments have recognised the value of the individual economically significant clusters in the UK and have also each played a role in shaping the UK into an attractive environment in which to do business. Our conversations with members of these five economically significant clusters highlighted each cluster's individual strengths, and also some of the national policies which they benefit from and strongly support, along each of the four attributes:

Presence

- Each of the five clusters we studied in depth benefited to varying degrees from the "brand" they have built up over the years, particularly for Cambridge, Oxford and London which clearly benefit from their strong academic association, and Motorsport Valley which is world-renowned as the industry-leading location globally.

- Some of the five clusters also profit from world-class physical infrastructure. In particular, the clusters located in London and the South East benefit from excellent international connections via Heathrow Airport – an important draw for several of the multinational companies to which we have spoken.

- Several multinational businesses commented favourably on the general state of the country's roads, ports, and power supply. Though not world leading, these compare favourably with the emerging markets against which UK clusters increasingly find themselves competing.

"Oxford and Cambridge have a brand cache of tangible value"

Robert Trezona,
Golden Triangle

"This is the Mecca of motorsport"

Bobby Issazadhe,
Motorsport Valley

Connectivity

- All of the five clusters benefit from multiple networks, both formal and informal. These range from ancient organisations with officers and rulebooks – the Company of Cutlers in Hallamshire dates from 1624 – to informal groups that meet in coffee shops or pubs, such as BathSPARK, which brings together people in Bath working in tech. They are vital to the success of their clusters. Many of the people we have spoken to talk enthusiastically about how these links have helped to build businesses and foster innovation within their cluster.

"The Cutlers Company network is of real benefit… I have been to visit the businesses of people I met there, getting access to ideas and expertise that I could not otherwise get"

Oliver Baker,
South Yorkshire metals cluster

"There are lots of organised events such as the start-up weekend, hackathon, digital festival, pitching, demoing, and first Fridays to meet people and get funding"

David Maher Roberts,
South-West electronics and IT cluster

Capability

- For many businesses we spoke to in the five clusters, the broad skills-base in the UK is a core part of the "reason to stay". In particular, the large numbers of high-quality graduates and post-graduates produced by UK universities form the backbone of most high-growth businesses within clusters. Many of the business leaders also spoke favourably of recent government efforts to improve vocational education, particularly increases in funding for apprenticeships.

- Interviewees noted that the quality of life offered by all five UK clusters gives them a competitive advantage in attracting talent, whether the vibrancy of London or the combination of affordable living costs and a pleasant lifestyle offered, for example, by the Bath and Bristol tech cluster.

"People chose to live here rather than in Central London because of the spirit of the place; there is a really intellectual thing going on combined with a great quality of life – it's hard to categorise in bars and tables"

Paul Wilson,
South-West electronics and IT cluster

Support

- The UK is recognised as a growth-friendly business environment, reflected in its position within the top 10 nations globally in the World Bank's "Ease of doing business" index in 2014. This benefits the nation's clusters: many national economic attributes were consistently praised by leaders in the five clusters we studied, including the flexibility of labour laws, a supportive tax regime, and London's large pool of capital.

- In addition, several financing policies were identified as particularly valuable to clusters at the forefront of innovation (such as the Golden Triangle and the South-West electronics and IT cluster), including R&D tax credits, the "Patent Box", the Enterprise Investment Scheme, the Seed Enterprise Investment Scheme, and direct public support for research through bodies such as the Technology Strategy Board.

"Pretty impressive tax regime in the UK for the private investor"

Alan Barrell,
Golden Triangle

FIVE IDENTIFIED BARRIERS TO CLUSTER GROWTH

Across our five case studies, and in some of the more general interviews we conducted, we consistently heard that there are five barriers that hold back cluster growth:

Presence:
- Brand identity of key clusters is weak, impacting investment, talent and demand
- Infrastructure challenges, which vary by cluster, hold back growth

Connectivity:
- Cluster networks are failing to connect people within and outside the cluster systematically
- Clusters are not fulfilling their potential in fostering innovation

Capabilities:
- The education and skills systems are not producing the concentration of specialist skills that clusters need

It is important to note that these barriers to growth were identified as the challenges that limit the United Kingdom's economically significant clusters outperforming their global peers today. Business leaders, academics, investors and local government agencies we spoke to highlighted that there are examples in each of the five clusters we studied in detail, as well as in some other clusters, where these challenges have been overcome. However, in all five we studied in detail, interviewees stressed that these five barriers remain the thorniest problems their cluster faces – which they believe hold back the growth of their cluster.

South West

The main hubs of the South West high-tech cluster are the vibrant cities of Bristol and Bath, which have a melting pot of companies from larger players such as Aardman Animation, HP and Toshiba to small 3D printing and robotics technology start ups. The West of England LEP has recently begun promoting "Bristol+Bath", focusing on the creative, environmental, micro-electronics, aerospace, advanced engineering and financial strengths of the region. There have been significant infrastructure investments from the shared computing test-bed and state-of-the-art robotics lab to the Engine Shed, Watershed and Bristol and Bath Science Park, homes for new businesses.

Linkages with co-located aerospace and animation firms provide further technology, ideas and opportunities for innovation. Indeed, this is facilitated through strong internal networks and events, such as "First Fridays" at the Watershed, where a variety of individuals across industry and sector come together to network socially and discuss ideas. There are also good links with the local universities, for both access to talent and professorial knowledge such as in the Toshiba Telecommunications laboratory. David May, for example, is Professor of Computer Science at Bristol University, but is also the founder of the spinout XMOS, and is on the advisory boards of many semi-conductor companies. Together, our interviewees agreed that this provides a strong environment for fostering start-ups and innovation.

Case study: Hi-tech and ICT in the South West

THE LOWDOWN

A vibrant and innovative cluster, the South West's tech industry is producing animated films, the latest breakthroughs in analysing 'big data' and drones the size of honey bees. Infrastructure varies from joint projects with industry in the Toshiba Telecommunications Lab to the creative Watershed, where every first Friday, over 100 entrepreneurs gather over beer to meet and network.

KEY ACTIVITIES

The South West cluster is home to a variety of related industries, from hi-tech hardware to creative and digital. It boasts strong links with the nearby aerospace cluster, with fluid dynamic research being used in film animation.
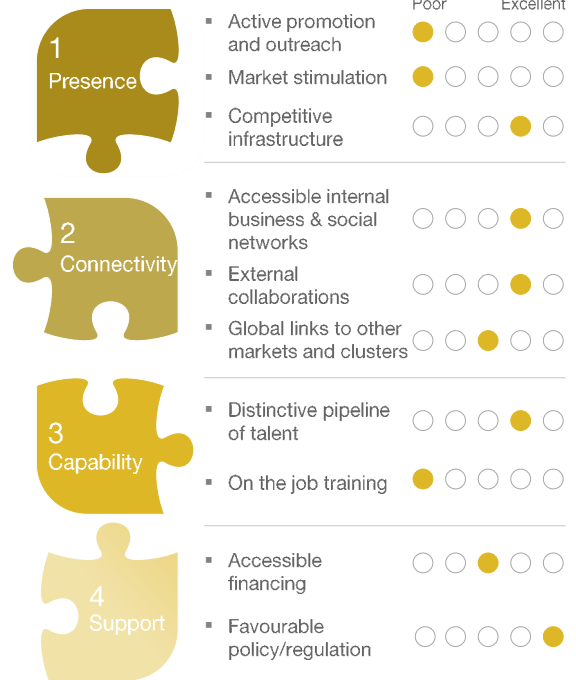
ANCHOR EMPLOYERS

HP Labs, Toshiba, Intel, IMDb, Aardman Animation
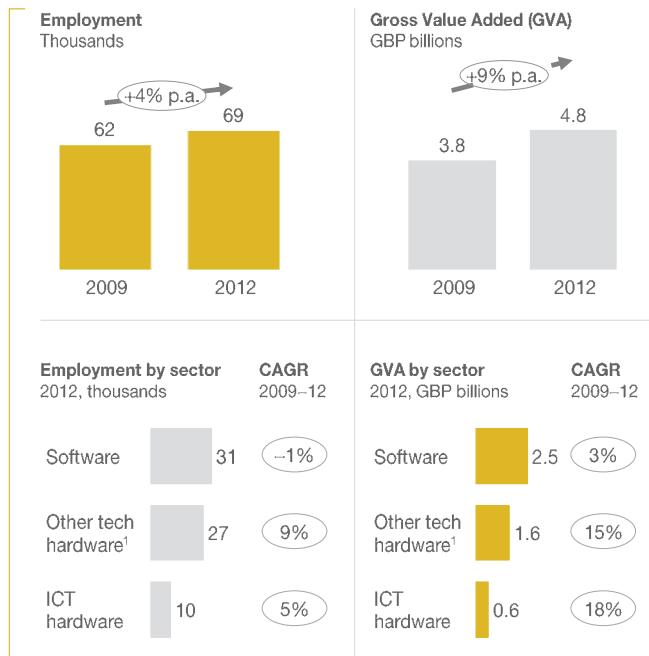
MAJOR COORDINATING AND UMBRELLA BODIES

SETsquared, Engine Shed, Watershed

Synthesis of the cluster's strengths and weaknesses

Characteristics of a successful cluster

		Poor — Excellent
1 Presence	Active promotion and outreach	● ○ ○ ○ ○
	Market stimulation	● ○ ○ ○ ○
	Competitive infrastructure	○ ○ ○ ● ○
2 Connectivity	Accessible internal business & social networks	○ ○ ○ ● ○
	External collaborations	○ ○ ○ ● ○
	Global links to other markets and clusters	○ ○ ● ○ ○
3 Capability	Distinctive pipeline of talent	○ ○ ○ ● ○
	On the job training	● ○ ○ ○ ○
4 Support	Accessible financing	○ ○ ● ○ ○
	Favourable policy/regulation	○ ○ ○ ○ ●

Source: Interviews, team analysis

Employment
Thousands

+4% p.a.

2009	2012
62	69

Gross Value Added (GVA)
GBP billions

+9% p.a.

2009	2012
3.8	4.8

Employment by sector 2012, thousands		CAGR 2009–12
Software	31	–1%
Other tech hardware[1]	27	9%
ICT hardware	10	5%

GVA by sector 2012, GBP billions		CAGR 2009–12
Software	2.5	3%
Other tech hardware[1]	1.6	15%
ICT hardware	0.6	18%

1 Includes lighting equipment, metal products and electric apparatus
Source: Team research, BRES

Mean salary for full-time workers £35,060

Compared to mean regional salary 37% higher

"Bristol is good at socialising ideas"

Henry Nurser,
Co-Founder and CEO of
Blu Wireless Technology

"Abroad, most people do not know where Bristol is but ask 'How far is it from London?'"

Charles Grimsdale,
Investor and Co-Founder of Eden Ventures

"It is difficult for SMEs to interact with academics at the university"

Nick Sturge,
Director at Engine Shed

"A lack of business skills is the biggest gap to start ups in Bristol"

Glenn Smith,
Co-Founder and CEO of Maplebird

Golden Triangle

The university cities of Oxford, Cambridge and London are some of the most prestigious in the world, providing a valuable brand name that has been in development for over 700 years. This provides a 'seal of quality' for many products, as well as a strong pool of highly-qualified talent available for businesses in the region. Moreover, there are strong internal networks – for example the Cambridge Angels, Cambridge Network, One Nucleus and the Oxford Biotechnology Network – enabling the sharing of ideas and investment opportunities. However, the Golden Triangle stretches over a relatively broad geographic area, making close interaction between the players in this cluster difficult. This is also made more challenging by the absence of rapid transport links between Cambridge and Oxford. Recently, there has been some progress towards unifying the clusters in 'Med City', a new brand designed to draw investment and promote the successes of London and the Greater South East in this area. This includes the development of new bioscience centres – the Francis Crick Institute and a Cell Therapy Catapult – further augmenting the portfolio of ground-breaking scientific infrastructure in the region (which already includes the MRC Laboratory of Molecular Biology, the Wellcome Trust Sanger Institute, the MRC Functional Genomics Unit and multiple academic health science centres). Investors we spoke to highlighted that this nucleus of world-class science is central to their interest in the region, but also stressed that the government's Enterprise Investment Scheme and Seed Enterprise Investment Scheme both nurture the booming angel investment community and enable a steady flow of entrepreneurial enterprises that build on the backbone of innovation in the region.

Case study: Golden Triangle

THE LOWDOWN

The three 'points' of the Golden Triangle are the university cities of Oxford and Cambridge, along with the capital. University research has spun out many biotechnology companies, while other start-ups – such as Frontier Games – were created in university halls. Whilst there are some large formal networks, lots of sharing and meeting happen informally through a culture of dinners. Both Oxford and Cambridge are reasonably well connected to London but they are poorly networked to one another

KEY ACTIVITIES

R&D intensive industries, particularly biotechnology and tech.

ANCHOR EMPLOYERS

GSK, Astra Zeneca, Microsoft Research, ARM, Wellcome Trust

MAJOR COORDINATING AND UMBRELLA BODIES

MedCity, Cambridge Network, One Nucleus, Oxford Biotechnology Network, Cambridge Angels

Employment
Thousands

+2% p.a.

2009	2012
111	117

Gross Value Added (GVA)
GBP billions

+3% p.a.

2009	2012
6.4	7.0

Employment by sector
2012, thousands

CAGR
2009–12

Research	72	5%
Biotech	24	3%
Support	22	−1%

GVA by sector
2012, GBP billions

CAGR
2009–12

Research	3.3	5%
Biotech	2.8	2%
Support	1.0	−7%
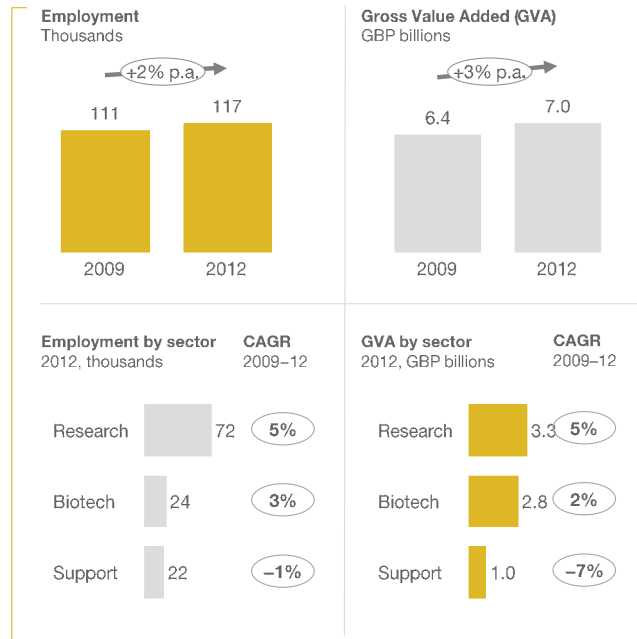
Source: BRES, team research

Mean salary for full-time workers £44,205

Compared to mean regional salary 40% higher

"This is a piecemeal network – companies are there but not close enough to have watercooler moments"
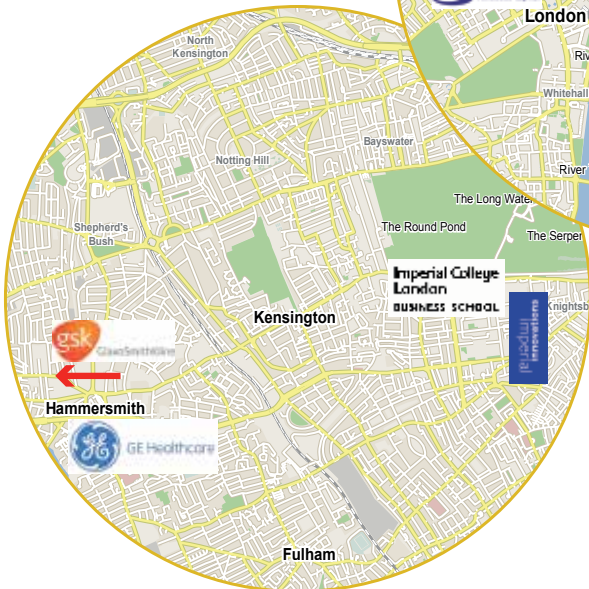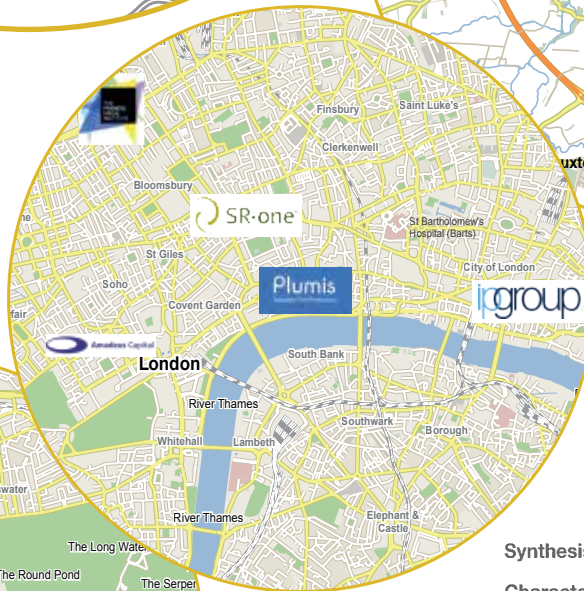
John Beadle,
CEO of Psioxus

"Here in Cambridge we feel very poorly served by transport links other than to London"

Trevor Perrior,
Director of Research of Domainex

Oxford
Oxford Business Park

Cambridge

ARM

"Oxford and Cambridge have a brand cache of tangible value"

Robert Trezona,
Investor at IP Group

London

"The gap is the culture. In Boston people are looking for their next venture and are keeping their finger on the pulse"

Matthew Foy,
Partner of SROne

Synthesis of the cluster's strengths and weaknesses

Characteristics of a successful cluster

		Poor ○○○○○ Excellent
1 Presence	Active promotion and outreach	○○●○○
	Market stimulation	○●○○○
	Competitive infrastructure	○●○○○
2 Connectivity	Accessible internal business & social networks	○●○○○
	External collaborations	○○○●○
	Global links to other markets and clusters	○○●○○
3 Capability	Distinctive pipeline of talent	○○○●○
	On the job training	●○○○○
4 Support	Accessible financing	○○○●○
	Favourable policy/regulation	○○○○●

Source: Interviews, team analysis

Metals Yorkshire

In the Metals Yorkshire cluster, leaders of regional businesses gather at Cutler's Hall in Sheffield, an ancient livery company with a collegiate atmosphere that now provides opportunities for mentorship, visits to other member's factories, sharing of ideas and export opportunities. The global giants TATA Steel, Outokumpu and Sheffield Forgemasters are well-linked to many other clusters and markets globally. There are also excellent linkages with local universities, particularly in Yorkshire's Advanced Manufacturing Research Centre (AMRC).

AMRC is a member of the High Value Manufacturing Catapult (a network of seven centres across key manufacturing processes, which benefit from a total of over £140 million of government investment planned over a 6-year period with this investment matched by private industry) which focuses on complex manufacturing (including machining). It is underpinned by a strong collaboration between the University of Sheffield and global aerospace giant Boeing. One key example is their work with Shaped Metal Deposition, where they reduced the cost of manufacturing by 40% and waste to almost zero. The centre also provides apprenticeships and an Industrial Doctorate with much hands-on experience.

However, interviewees noted that the cluster still suffers due to a lack of young blood entering the industry, with Andrew Nettleton commenting that "a lot of engineering companies here are conscious that they have an ageing workforce". Other members of the cluster believe that more could be done to strengthen the cluster's branding, potentially building on the "Made in Sheffield" brand, to strengthen the cluster's reputation with potential employees (as well as with customers).

There is also an opportunity to strengthen the region's physical infrastructure to support further growth. Leaders of the cluster shared their concerns about road connections between factories and the port at Hull, and interruptible energy supply contracts as a means to mitigate expensive energy costs. The latter helps them to remain globally competitive, but means that some factories have to turn off their power supplies midway through production.

Case study: Metals Yorkshire

THE LOWDOWN

At 150 years old, the Yorkshire metals industry is one of Britain's longest lasting clusters. Sheffield remains one of the world's centres of steel. Whilst commodity steel production has gone to China, specialist businesses have survived in Sheffield by exporting aggressively and investing heavily in R&D, often in collaboration with the two universities. One of the cluster's key networks is the Company of Cutlers in Hallamshire, incorporated by Act of Parliament in 1624.

KEY ACTIVITIES

Production of steels and alloys; coatings; metal products; tools; recycling; and R&D; with links to O&G, aerospace and advanced engineering.

ANCHOR EMPLOYERS

Sheffield Forgemasters, Tata Steel, Outokumpu

MAJOR COORDINATING AND UMBRELLA BODIES

Company of Cutlers in Hallamshire, Advanced Manufacturing Research Centre, Sheffield City Region LEP

Synthesis of the cluster's strengths and weaknesses

Characteristics of a successful cluster

		Poor → Excellent
1 Presence	Active promotion and outreach	○ ● ○ ○ ○
	Market stimulation	● ○ ○ ○ ○
	Competitive infrastructure	○ ● ○ ○ ○
2 Connectivity	Accessible internal business & social networks	○ ○ ○ ● ○
	External collaborations	○ ○ ○ ● ○
	Global links to other markets and clusters	○ ○ ● ○ ○
3 Capability	Distinctive pipeline of talent	● ○ ○ ○ ○
	On the job training	○ ○ ○ ● ○
4 Support	Accessible financing	○ ○ ○ ● ○
	Favourable policy/regulation	○ ○ ○ ● ○

Source: Interviews, team analysis

Employment
Thousands

+1% p.a.

2009	2012
49	51

Gross Value Added (GVA)
GBP billions

+10% p.a.

2009	2012
1.9	2.5
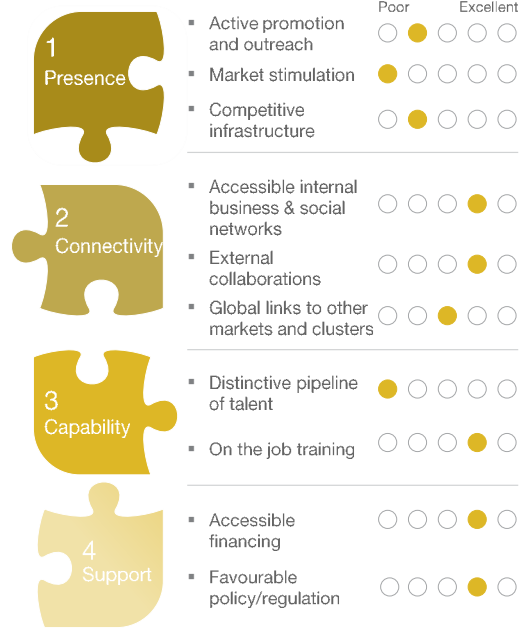
Employment by sector 2012, thousands		CAGR 2009–12
Basic metals	31	−1%
Products	27	1%
Materials	10	18%
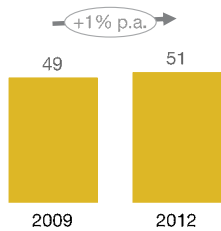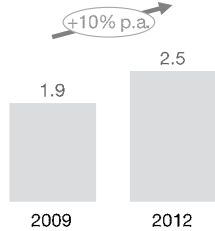
GVA by sector 2012, GBP billions		CAGR 2009–12
Basic metals	1.1	20%
Products	1.0	7%
Materials	0.4	27%
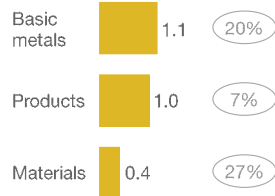
Source: Team research, BRES

Mean salary for full-time workers £28,763

Compared to mean regional salary 14% higher

"The unprofitable businesses went… The businesses that survived were the ones who got clever without government support"

Peter Hoy,
CEO of Macalloy

Preston

Kingston
upon Hull

Wakefield

Barnsley

Manchester

Liverpool

Chester

Lincoln

Nottingham

Stafford

Shrewsbury

Leicester

"Being in Sheffield you get all the
upside of having competitors near
you, in terms of talent, knowledge
and facilities, and none of
the downsides of any greater
competition"

David Grey,
Incoming Master Cutler

"It does not matter which engineering
company you speak to round here,
they are all waking up to the fact that
their work force is 50 years old and
they have done nothing about it"

Andrew Nettleton,
Economic Development Manager of Rotherham Council

"We stay here because of
the hard wired and soft
wired infrastructure that is
embedded in this area"

David Grey,
Incoming Master Cutler

Motorsport Valley

Motorsport Valley is the hub of global motorsport, acting as the home of many of the F1 teams and their suppliers. The Motorsport Industry Association (MIA) acts as the epicentre, promoting the sector internationally and running networking events, but also working with universities to develop tailored courses and advocating to the UK government to create a motorsport unit. Moreover, beyond formal networking events, weekly race meets allow constant interaction – everybody knows everyone. The area has great infrastructure including the world-famous racetracks Rockingham and Silverstone, wind tunnels and good transport links. The glamorous appeal of F1 attracts some of the best graduates across the UK, although there are problems in filling skilled positions such as machinists and laminators. Locally, the Silverstone University Technical College (UTC) provides high-performance engineering and business events training, both geared towards the local industry.

Case study: Motorsport Valley

THE LOWDOWN

The heart of world motorsport, Motorsport Valley is a tightly-knitted world where everybody knows each other. The world's top teams, engineers, and suppliers are all here. Beyond the glamour of F1 there are armies of semi-professional and weekend engineers and racers, and increasingly Asian, Arab and Russian millionaires lured by the iconic history of circuits like Silverstone.

KEY ACTIVITIES

The full motorsport supply chain, from design to manufacture to racing, plus facilities management, R&D, training, academia, and business support. Growing links to defence, aerospace, marine and mainstream automotive sectors

ANCHOR EMPLOYERS

8 of the world's 11 Formula 1 teams, plus teams in every other race category

MAJOR COORDINATING AND UMBRELLA BODIES

Motorsport Industry Association, Northamptonshire LEP, Silverstone

Synthesis of the cluster's strengths and weaknesses

Characteristics of a successful cluster


Source: Interviews, team analysis

"It would take an almighty shift to break the cluster"

Craig Wilson,
Managing Director of
Williams Advanced Engineering

"Make motorsport a genuine R&D wing for the transport industry, then you are into winning big"

Andy Cowell,
MD of Mercedes HPP AMG

Employment
Thousands

Gross Value Added (GVA)
GBP billions

Revenue
2012, GBP billions

		Breakdown of revenue	Breakdown of businesses
Formula 1	2.1	23%	0.2%
High-performance engineering	3.2	36%	45%
Engineering and services	2.2	24%	24%
Non-engineering services	1.5	17%	31%

Note: All data on this page is drawn from the Motorsport Industry Association and includes all of the UK's motorsport industry, which is heavily concentrated in the Motorsport Valley cluster but extends beyond its geographical reach

Source: Team research, MIA

Nottingham

—ford

Leicester

Worcester

Northampton

Cambridge

Warwick

Bedford

Gloucester

Oxford

London

Bristol

Reading

Kingston

Silverstone

"Even NASCAR comes to Motorsport Valley for the really sexy and innovative stuff"

Pim van Baarsen,
CEO of CMA Silverstone

"In the cluster you get a supply chain that understands what you need… This is the Silicon Valley of racing"

Ella Barrington,
Sales Director of Base Performance Simulators

Scottish Tourism

VisitScotland promotes the wild glens and vibrant attractions of Edinburgh globally, advertising with both print and the moving image. There are a number of membership organisations (e.g., the Edinburgh Tourism Action Group and the Scottish Tourism Alliance) that bring people together in regular meetings and networking events whilst providing a platform for input into government consultations. The government has been a notable stimulus for the sector, for example providing funding for Scottish Enterprise. Local businesses report few problems in attracting suitable talent, and many Scottish universities such as Strathclyde and Edinburgh Napier offer tourism qualifications, while organisations such as the Hospitality Industry Trust Scotland offer scholarships to world-leading academies such as Ecole hôtelière de Lausanne. Perhaps the biggest problems cited by interviewees are with the transport infrastructure, particularly dangerous road conditions, such as on the A9, and poor international flight connections. Recent announcements of potential flights from Dubai and New York are seen as a welcome progress towards strengthening this infrastructure and widening the potential market.

Case study: Tourism Scotland

THE LOWDOWN

Although dispersed across a huge geographical area, Scottish tourism businesses know that their fortunes are tightly interwoven. Millions flock to the Royal Mile and Festival in Edinburgh, but outside the capital long distances, patchy accommodation and poor infrastructure hold back further growth

KEY ACTIVITIES

Although dispersed across a huge geographical area, Scottish tourism businesses know that their fortunes are tightly interwoven. Millions flock to the Royal Mile and Festival in Edinburgh, but outside the capital long distances, patchy accommodation and poor infrastructure hold back further growth

ANCHOR EMPLOYERS

Edinburgh dominates, but Glasgow, the highlands and islands, Loch Lomond and Speyside are among the other highlights

MAJOR COORDINATING AND UMBRELLA BODIES

Scottish Tourism Alliance, Visit Scotland, Scottish Enterprise, Association of Scottish Visitor Attractions

Synthesis of the cluster's strengths and weaknesses

Characteristics of a successful cluster

		Poor				Excellent
1 Presence	Active promotion and outreach	○	○	○	●	○
	Market stimulation	●	○	○	○	○
	Competitive infrastructure	○	●	○	○	○
2 Connectivity	Accessible internal business & social networks	○	○	○	●	○
	External collaborations	○	●	○	○	○
	Global links to other markets and clusters	○	●	○	○	○
3 Capability	Distinctive pipeline of talent	○	○	●	○	○
	On the job training	○	●	○	○	○
4 Support	Accessible financing	○	○	●	○	○
	Favourable policy/regulation	○	○	○	●	○

Source: Interviews, team analysis

Employment
Thousands

+1% p.a.

111   116

2009   2012

Gross Value Added (GVA)
GBP billions

+5% p.a.

2.6   3.0

2009   2012

Employment by sector 2012, thousands		CAGR 2009–12
Accomodation	58	1%
Activities	52	2%
Travel agency	6	−3%

GVA by sector 2012, GBP billions		CAGR 2009–12
Accomodation	1.5	2%
Activities	0.8	−2%
Travel agency	0.5	12%

Source: Team research, BRES

Mean salary for full-time workers £17,921

Compared to mean regional salary 33% lower

"Visit Scotland is good at marketing campaigns, but is it not good at setting a cohesive strategy"

David Frost,
CEO of the Scottish Whisky Association

"It is well known that international operators make decisions not to go to certain parts of Scotland because they cannot get the quality and value of accommodation"

Robert Kidd,
Managing Director of McKinley Kidd
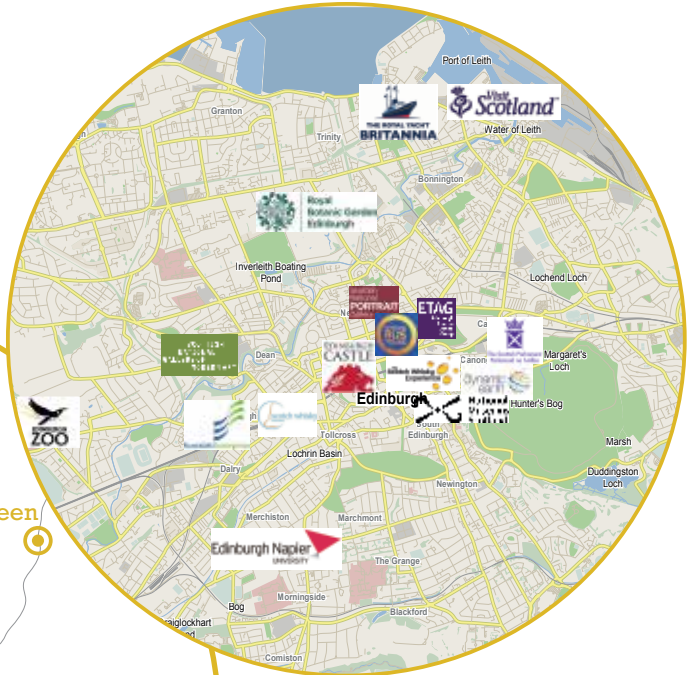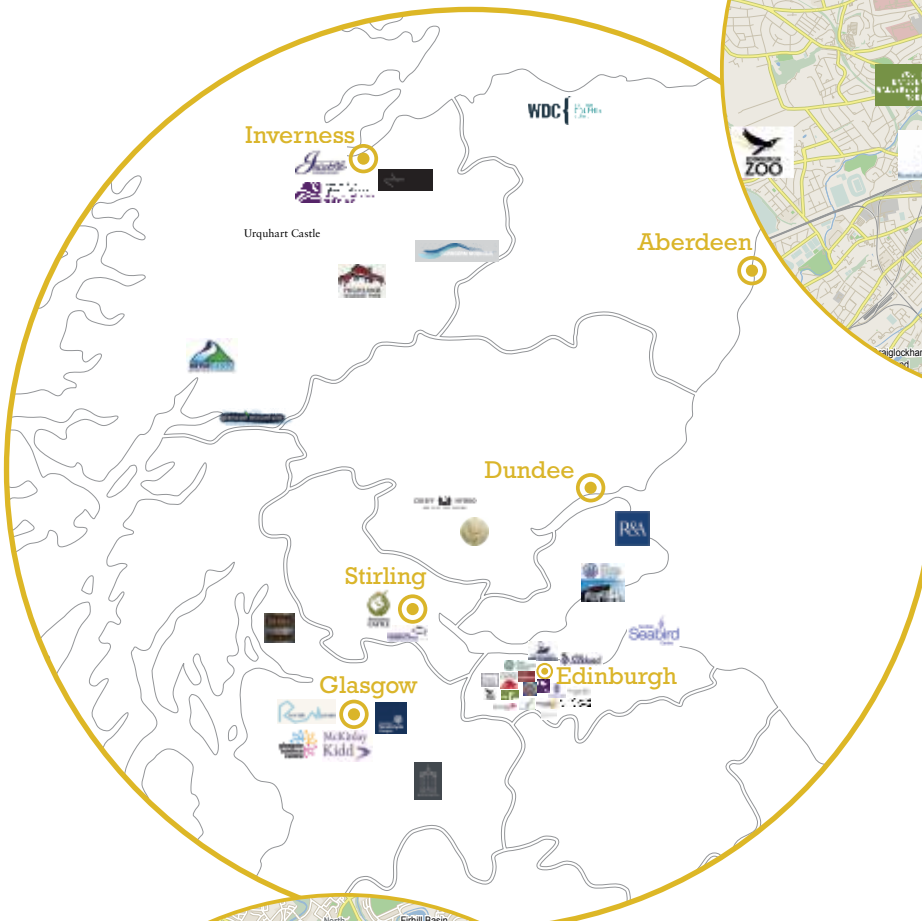
"There is quite a developed infrastructure here for the exchange of ideas. We have quite a lot of vehicles for interaction, but it is up to individuals to participate"

Stephen Carter OBE,
Cameron House Resort
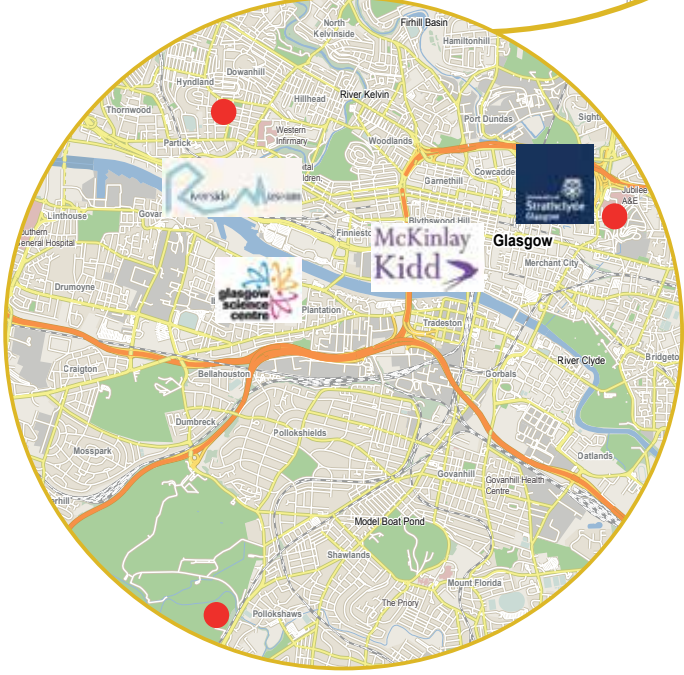
"There is no point in being a 5* tourist destination if the rest of the offer is not right… if accommodation is poor, if transport does not work, then people will not come back… So the industry realises we have to work together"

Nick Finnigan,
Manager of Edinburgh Castle

03

Introducing our recommendations to address the barriers to growth

One in seven people work in one of UK's 31 biggest clusters

DETAIL ON RECOMMENDATIONS

The majority of firms face barriers to growth that centre around skills, finance, management, regulation and infrastructure. Firms in clusters are no different – across all the clusters we reviewed, and the five case studies we examined in detail, these were common themes. However, our case studies illustrate the importance of taking action to support individual clusters based on a greater understanding of those individual clusters and their distinctive strengths and weaknesses. Most notable is that while each of the five case studies was experiencing five principal barriers to future growth, the way in which these played out was quite different in each one, requiring locally-based rather than nationally determined, 'one-size-fits-all' actions. The five common barriers to growth identified across the five case studies we reviewed were:

- Brand identity of key clusters is weak, impacting investment, talent, and demand
- Cluster networks are failing to connect people within and outside the cluster systematically
- Clusters are not fulfilling their potential in fostering innovation
- The education and skills systems are not producing the concentration of specialist skills that clusters need
- Every cluster has specific infrastructure challenges holding back growth

We consistently heard from interviewees in the five case studies that there is a lack of financing available to support early stage businesses in these clusters as they invest in innovations or capital-intensive machinery. The root cause of this issue is complex, with some arguing that the issue is a shortage of well-prepared and communicated business cases and others taking the view that there is a lower risk appetite among investors in Europe (versus the United States). We have taken the view that if the five barriers above are addressed in our five case study clusters, greater access to financing will follow as a consequence since investors will be keen to tap into these hubs of talent and innovation, so we have not included it as a discrete barrier here.

Interviews and reports also highlighted other challenges much more specific to individual clusters. For example, in the London financial services cluster, one of the challenges faced is the way in which EU bonus rules are affecting the City of London. This highlights the importance of understanding not only general barriers to cluster growth, but of working at a local level, in partnership with businesses and local government, to understand whether these apply to individual clusters and to identify the much more specific issues likely to be hindering growth.

For each of the five barriers identified across the five case studies, we have sought to develop clear recommendations that:

- Tackle the root cause of the problem (see the "What needs to change" sections below)
- Detail an approach to address the problem
- Draw on national and international best practice as a source of inspiration
- Include a proposal on who needs to drive the change

As highlighted above, our research also underlines that many of the barriers facing firms in clusters could be addressed through recommendations which would be beneficial to all businesses. For example, long-debated reforms to the education and skills system that incentivise greater responsiveness of courses to local employer need, or the series of recommendations made in Sir Andrew Witty's Review of Universities and Growth.

Many of the actions that will benefit clusters are the general actions that improve the 'wider business environment' such as improvements to transport, housing and skills, meaning that if local authorities are taking these actions with full knowledge of the businesses in the local area, tweaking work to specific business need where appropriate, clusters are likely to do better. These actions will also support nascent clusters not yet large enough to feature in our list of 31 economically significant clusters. Therefore we regard investing in and improving the wider business environment at national and local level through improving transport, skills and business support as urgent, necessary, but not sufficient policies to support the growth of the UK economy in general and its clusters in particular. The more detailed recommendations in this report reflect the need to also consider where clusters may have particular requirements that can be responded to within this more general improvement of the business environment.

Not all the recommendations made here have financial implications for government, but some do. We are highly conscious of the cost-constrained environment within which the UK government currently operates and have tried to be mindful of this in developing recommendations, placing the responsibility for funding on local businesses and investors where appropriate. However, several of the recommendations below do involve modest government spending, as would the running of the operating model itself. One option could be to divert a small portion of the £3.2 billion currently allocated to the Regional Growth Fund to this effort. Alternatively, the recently developed City Deals, now Growth Deals, may provide a model for accessing national funding. We appreciate that this is challenging,

but given the substantial contribution that economically significant clusters already make to UK prosperity and the potential for them (and future clusters, still nascent) to contribute even more, we believe that even in difficult fiscal circumstances there is robust economic logic to investing in a growth strategy that includes a strong clusters component.

Finally, we would like to stress that our interviewees suggested that individually these recommendations would not have a significant impact on the growth of their cluster, but rather that if recommendations were implemented in concert, together these could "move the needle" in terms of cluster growth.

A PROPOSED "OPERATING MODEL" TO SUPPORT THE RECOMMENDATIONS

Overcoming these barriers to growth requires economically significant clusters to own the delivery of many of the recommendations set out below. It also requires clusters to have a clear and accountable owner within central government, which could provide support not only for currently economically significant clusters but also help to nurture nascent clusters where appropriate. In short, an operating model is required for clusters at the local and national levels. While existing bodies provide some of the required institutional capacity, they are currently failing to deliver fully on behalf of clusters.

At the local level, few bodies have the geographical and industry focus required to drive the growth of a given cluster – the Tech City Investment Organisation is a rare exception. More often, organisations have too wide a geographical scope (nationwide industry bodies), too wide an industry

scope (for instance, Local Enterprise Partnerships) or too narrow a membership (for example, cluster business networks) to champion specific clusters. As a result, they rarely have the focus or the clout to be effective in growing their cluster. Many clusters do contain networks of important local players, yet these usually lack the funding and authority to address strategic issues such as planning. Local Economic Partnerships can – and sometimes do – fulfil this role, but their boundaries seldom match those of clusters, either in sectoral or geographic terms.

To tackle these challenges, many of those interviewed suggested the establishment of cluster leadership teams in each of the UK's economically significant clusters. Their sole objective would be to promote the growth of the businesses in their cluster by fostering connections and galvanising stakeholders to act. We envisage two to four existing organisations in a given cluster – for example, industry associations, LEPs, and business networks – forming a consortium with a lean, agile executive team underneath them. Central government could faciliate their formation (without being prescriptive on who should be involved or how this team should work). The Regional Growth Fund could be explored as a source of funding to support the establishment of these teams.

It is not only at the local level, however, that the UK's clusters lack effective leadership. At the national level, their interests are rarely taken into consideration, their concerns infrequently addressed, and their successes rarely celebrated, inevitably limiting growth.

To address this deficit, the research identified the need for a national cluster champion is needed to:

- Work with the 31 most economically significant clusters to designate leadership teams, drawing on the organisations and individuals already active in each
- Advocate on behalf of the United Kingdom's economically significant clusters on a national and a global stage (with potential customers, business partners and government bodies) to drive growth
- Coordinate actions at the cluster level, sharing best practices and successes wherever possible
- Provide a national coordination point for 'nascent' clusters to engage with and make a case for additional government support to grow more quickly, providing a route to speed up the growth of newer clusters.

There are a number of options for where such a national cluster champion might sit. The role could be within government (for example as a Minister for Cluster Growth, housed within BIS). Alternatively, the role could sit outside government, provided that they were empowered to work closely with the relevant government departments to ensure that the needs of clusters were factored in at an early stage in the policy design process. We believe that in either setting it is important for the position to have weight, longevity and the support of the business community. As such, we would suggest that the position be filled by someone with significant business experience and that they have a small advisory group of senior respected business leaders to tap into.

This leader at the national level would:

- Identify the local cluster leadership with which to work for each of the economically significant clusters they were responsible for (e.g., the top 31 clusters by gross value added)
- Work with the cluster leads to identify the major gaps faced by each individual cluster along the dimensions of "presence", "connectivity", "capability" and "support"
- Agree cluster contracts for shared actions linked to funding e.g., redirected from the Regional Growth Fund
- Convene cluster leaders to facilitate the exchange of ideas on how to close these gaps
- Advocate to government on behalf of the clusters to help ensure that national policy (e.g., on infrastructure and skills) supports the growth of clusters
- Engage actively with potential customers and collaboration partners of the clusters (both in the UK and overseas, leveraging UKTI where appropriate) to strengthen the brand and networks of these top clusters
- Establish an effective mechanism to make detailed data on cluster performance available and to track the performance of the UK's clusters in a "league table" on a regular basis so that emerging clusters have the opportunity to tap into greater resources once they have achieved the necessary scale
- Be the coordination point for nascent clusters wishing to engage with government, either to highlight their work, bid for additional support, or engage with UKTI to promote themselves more effectively.

In conjunction with this operating model, we have also put forward specific recommendations designed to address the five principal barriers to growth that we have identified on the basis of the five case studies. The following sections explore each of these five barriers in detail, define what needs to change for each one, and set out recommendations.
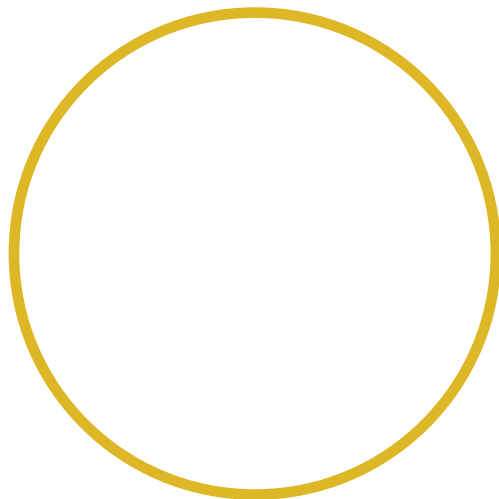
04

Improving brand recognition
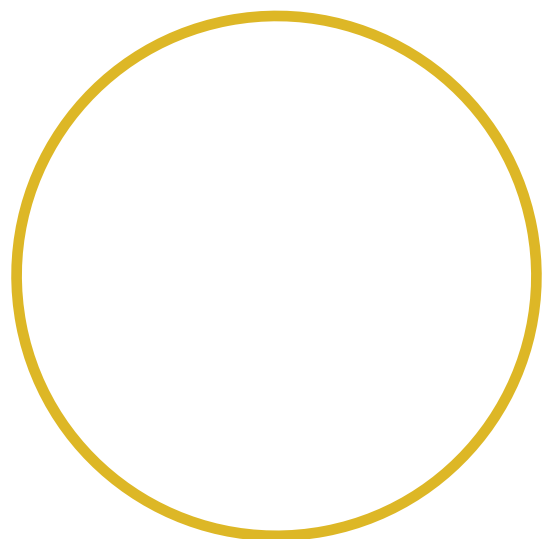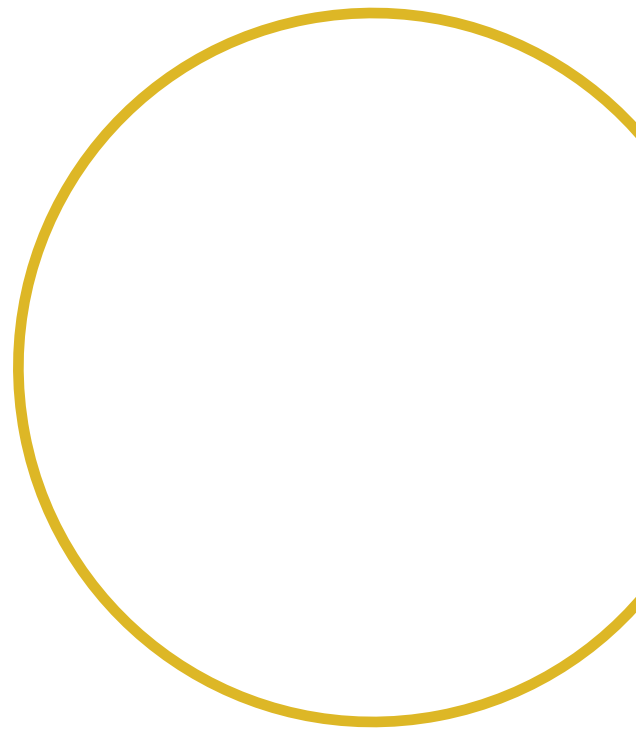
THE PROBLEM: BRAND IDENTITY OF KEY CLUSTERS IS WEAK, IMPACTING INVESTMENT, TALENT, AND DEMAND

Interviewees from all five clusters we spoke to highlighted that their cluster is not well recognised on a global stage and that there would be benefits from more coordinated marketing.

Our literature review and previous work show that a strong brand matters to the health of the cluster. If people outside a cluster do not know that it exists, it is harder to attract inward investment, find new customers, or bring top talent to the region. Clearly this varies by cluster, with lesser-known clusters struggling more to be heard by national and local government: it is more of an issue for the South West ICT and High-Tech cluster than for the Golden Triangle, for example. While promotion by branding alone cannot conjure a cluster from nothing, good marketing can help a cluster to capitalise on its fundamental strengths.

"The idea of the Golden Triangle is great – and needs to be pushed"

Graham Richards,
Golden Triangle,
Director of Chemistry,
Oxford University

WHAT NEEDS TO CHANGE: COMMUNICATE CLUSTERS' STRENGTHS

Based on the feedback from the five case studies and our review of the literature, we suggest that all 31 clusters could benefit from implementing the following recommendations:

- Brands and messaging should be developed for each cluster
- Exporters and government need a clear, consistent story to tell about the United Kingdom as a whole
- The key UK clusters should be promoted, both domestically and globally

"Big the cluster up! Champion the fact it is here. Make it something everyone is aware of, so your friends and family are proud of you for working in it"

Andy Cowell,
Motorsport Valley

"People need the ability to talk about what is going on here. No-one knows their billboard of what they need to shout about"

Bill Castell,
Golden Triangle,
Chairman,
Wellcome Trust

Recommendations

Recommendation 1: Establish a single point of access for people looking to trade with or invest in the cluster

Potential owner: Cluster leadership team (drawing on local digital and trade promotion expertise)

UK cluster leadership teams should follow the model of MassBio to create an online presence containing information on:
- The advantages of being located within the cluster
- Which companies and institutions are part of the cluster
- How to invest in the cluster
- How to partner with cluster companies
- How to set up a business in the cluster
- How to pursue careers in the cluster
- The events to attend and places to go to meet cluster businesses

"Companies don't know which door to knock on - they need a single clear point of contact"

Robert Trezona,
Golden Triangle,
Investor,
IP Group

The Massachusetts Biotechnology Council (MassBio), a 600-member organisation representing biotech companies and academics, is the unrivalled point of access for the biotechnology industry in the US state of Massachusetts. As well as representing the cluster at trade promotion events around the world, it maintains an excellent website that acts as a "way in" to the region's biotech cluster. Through the website, MassBio serves every key group.
- Companies already in the cluster can access details of upcoming events and learn about the services MassBio offers, including: "Pharma Days" designed to link companies with investors; advice on accessing state and federal funding; information on engaging with policymakers; help on expanding in the region; and an active jobs board
- Companies interested in relocating or expanding into the cluster have access to promotional material, real estate and property links, plus contact details for the MassBio team that offers bespoke guidance on moving a business to Massachusetts
- Those looking to invest in the cluster can find information on upcoming events where they can meet companies with investment potential, as well as news on new discoveries and company developments
- Those interested in careers in the cluster can search thousands of job opportunities
- Policymakers and researchers can call up information on the cluster's evolution and its policy priorities, as well as links for finding data on the cluster

Recommendation 2: Develop a distinctive name, brand, and story for each of the leading UK clusters, replicating Tech City's efforts

Potential owner: Cluster leadership team

The name, brand, and story should convey the cluster's greatest strengths, aiming to further its positioning as a world leader within its niche(s). The name should be distinctive and recognisable, accompanied by a logo and corporate identity. Managing a brand development process offers a newly designated cluster leadership team the chance to establish itself at the head of its cluster and an opportunity to engage businesses and institutions from across the cluster.

"Marketing of a cluster is as important as the quality of organisations within it. If the government was to put real oomph behind the promotion of key clusters, it would have significant economic impact"

Julia Schuhmacher,
Northamptonshire LEP High
Performance Tech Department

New Zealand has created a single national story to external visitors, investors and export customers. This began in the 1990s with the launch of the "100% Pure" campaign. Initially a tourist message, the brand soon grew to support New Zealand's other principal export – agricultural products. A leading producer of milk and meat, the country's clean, green image designed for tourists also helped exporters sell to Asian and European customers looking for a reliable, high-quality product.

The government of New Zealand works actively with businesses to help them tell this distinctive national story. In 2013, the New Zealand Story was launched – a toolkit of videos, brochures, logos, downloads, and websites for businesses to use "to help define external perceptions of New Zealand". The slogan of the campaign – "Open Spaces, Open Hearts, Open Minds" – links natural beauty and hospitality to innovation.

The story was developed in conjunction with 40 organisations in the primary sector, manufacturing, government, services, export, education, and M ori, and was tested in six important overseas markets.

This branding is backed up by "NZ Inc." strategies: unified, cross-government action plans for how the New Zealand government as a whole can help businesses break into a particular country. The first NZ Inc. strategies target China and India.

Recommendation 3: Package cluster insights into externally usable materials conveying a "UK Plc" narrative that tells the overarching story of Britain's clusters

Potential owner: UKTI, national cluster champion

The narrative should build on the strengths that are common across British clusters, notably excellence in research, innovation and business environment, together with profiles of the UK's top clusters. The concrete output would be a range of websites, images, videos, and printed material for use by government or businesses on the model of The New Zealand Story. The narrative should include profiles of the top UK clusters, focusing on their areas of world-leading strength and highlighting appropriate points of access for potential trade or investment partners.

Recommendation 4: Promote the top UK clusters domestically and globally

Potential owner: UKTI, national cluster champion

UKTI and the national cluster champion are best placed to promote the strengths of the top 31 UK clusters, overcoming the perception that Tech City and the City of London are the only UK clusters promoted abroad. This message should be disseminated though all appropriate promotional channels, including media advertising, embassies and consulates, trade missions, bilateral meetings with companies, and conference attendance. The definition of the "top" clusters should be reviewed by the national cluster champion every 3 years and material revised accordingly.

"Visibility is key… there has to be a sustained investment in marketing to ensure we are visible in a very crowded market place"

Linda McPherson,
Scottish tourism sector

"The government needs to raise the profile of other areas instead of just focussing on Tech City"

Charles Cotton,
Golden Triangle,
Chairman of Cambridge Phenomenon
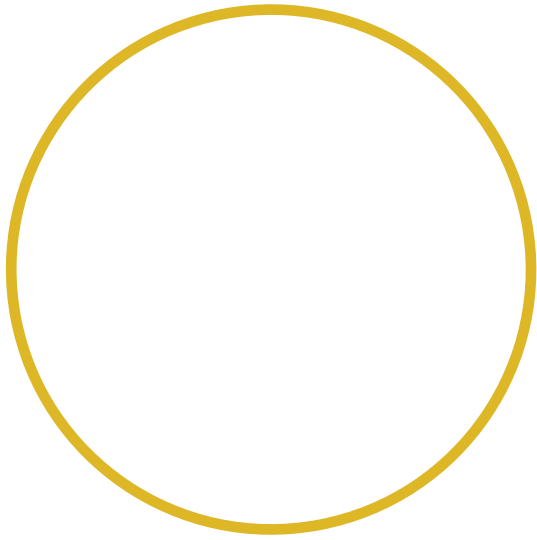
05

Broadening and deepening cluster networks
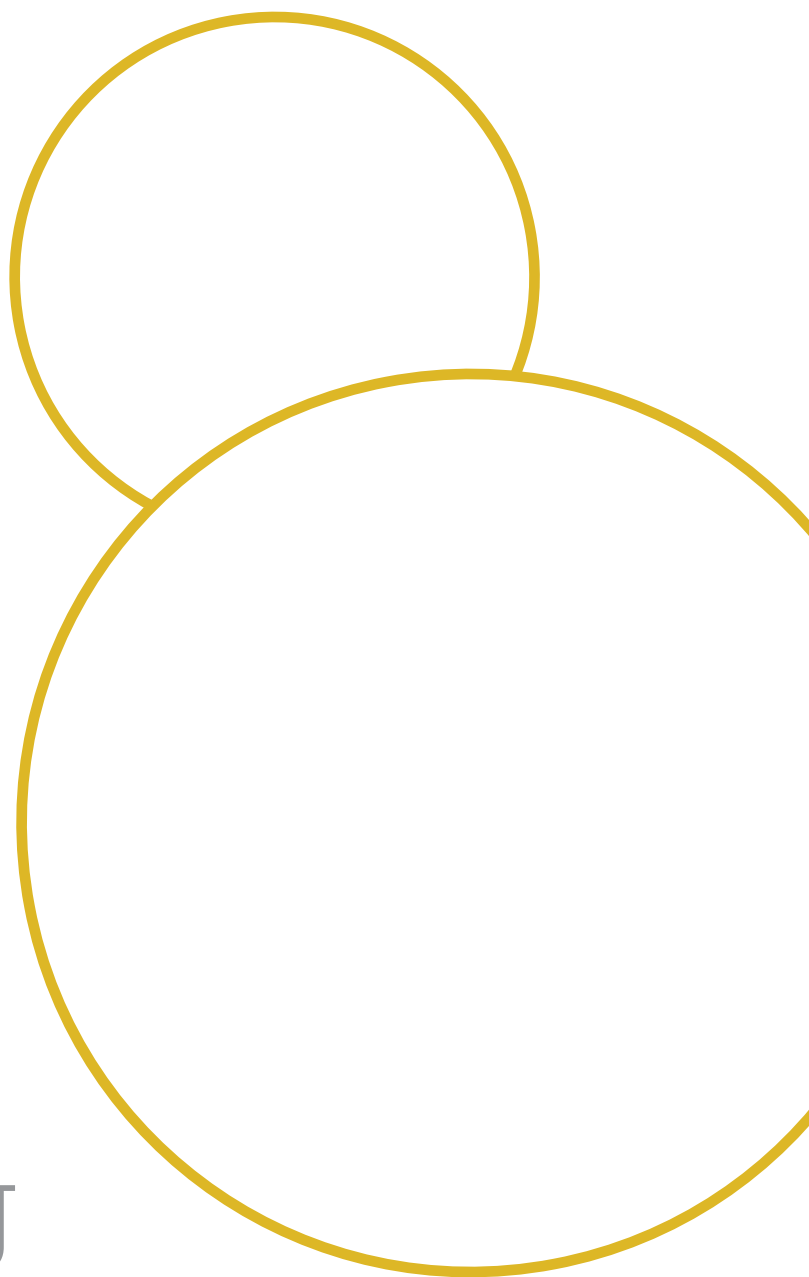
THE PROBLEM: CLUSTER NETWORKS ARE FAILING TO CONNECT PEOPLE WITHIN AND OUTSIDE THE CLUSTER SYSTEMATICALLY

Every cluster we examined contained networks which bring together people who are passionate about making the cluster successful. However, we found that these networks vary significantly in terms of the breadth of stakeholders involved and the depth of the interactions that the networks engage in to connect people. Narrow networks constrain growth because they limit the exchange of ideas and innovations that help the cluster to develop and maintain its competitive advantage.

WHAT NEEDS TO CHANGE? BROADEN AND DEEPEN THE CLUSTER NETWORK

- Networks varied across the five case studies, with poor networks being more of an issue for some clusters than others. Therefore we suggest that all clusters could benefit from ensuring that they review progress against these recommendations: cluster networks should have a broad membership (for example including SMEs, large businesses, local academic institutions, investors and local government) with strong ties to stakeholders in adjacent industries and to other global peer clusters
- Cluster networks should provide a range of opportunities for its members to interact and develop deep connections that ultimately provide business and mentorship opportunities

"There is a piecemeal network—companies are there but not close enough to have watercooler moments"

Professor Graham Richards,
Golden Triangle

"The gap is the culture. In Boston people are looking for their next venture, always talking to other CEOs and KOLs...keeping their finger on the pulse and getting the benefit of all of that collective knowledge and experience"

Matthew Foy, Golden Triangle,
Partner SR One Ventures

Recommendations

Recommendation 5: Run (or continue to run) engaging face-to-face events to encourage idea sharing, investor partnerships, and business ventures.

Potential owner: Cluster leadership teams

Regular, engaging events – whether over drinks, dinner or table tennis – provide occasions for establishing and deepening the links between cluster members, leading to the sharing of innovation, talent and capital. Many clusters do this to some extent and so this recommendation risks sounding obvious, but the challenge lies in institutionalising these events, ensuring they are attended by the "people that matter" in the cluster and keeping them engaging and beneficial to attendees – all of which requires careful coordination and on-going commitment to be effective.

Watershed is a facility in central Bristol that includes cinemas and collaborative workspace for SMEs in creative and tech industries working alongside academic researchers and artists. On the first Friday of every month, free drinks are served in Watershed's bar. There is neither a sign-up sheet nor a name badge in sight – anyone who turns up is able to get a drink.

Each month, the event averages 80 to100 attendees, from the creative, digital, tech and aerospace sectors, as well as academics, the LEP, and the local authorities. Dick Penny, Chair of the WoE LEP Culture Group, Chair of the BBC Bristol Partnership and Managing Director of Watershed, feels that the "informality and warm welcome makes it attractive to diverse attendees".

Each event is sponsored by a local organisation or by Watershed itself. For example, in March 2014, the Cabot Institute sponsored the event as part of its Future Cities research.

Recommendation 6: Organise mentorship programmes where executives of successful businesses can be brought together with the leaders of high-potential businesses

Potential owner: Cluster leadership teams

Where these do not exist and are regarded as useful by the cluster, cluster leadership teams should organise mentorship programmes on the SUCCESS model (detailed below) to help broker mentor relationships by introducing growing businesses to experienced executives who can act as informal advisers or non-executive directors. Wherever possible, these relationships should be publicised and celebrated in order to cement the commitment of both parties and develop a culture of mentorship within the community.

"A culture of generosity by mentors is important for encouragement of young entrepreneurs"

Charles Cotton,
Golden Triangle

A year-long scheme, the Hong Kong government's SUCCESS mentorship programme aims to provide early-stage SMEs with guidance and advice to help them grow. SMEs are matched to a mentor: an established entrepreneur or senior executive who has committed to meeting them at least three times over the 12-month period.

Alongside the mentorship relationships, participants are invited to sharing sessions, networking events, workshops and seminars on topics ranging from intellectual property to work-life balance.

The scheme, which has been running since 2000, is organised by the Trade and Industry Department in collaboration with 68 partners, most of them industry associations.

Recommendation 7: Establish and foster relationships with global peer clusters

Potential owner: Cluster leadership teams

Where appropriate, cluster leadership teams should establish and foster relationships with companies and institutions working in similar or adjacent fields elsewhere. For instance, the cluster body for the Golden Triangle should work to strengthen its ties with Boston's world-leading life sciences cluster. Links may be through exchange visits, talent swaps, university collaborations and/or challenge prizes requiring collaboration across clusters. This could build on the "Science Bridges" initiative (which ran from 2005-2012) and made government funding available (£17 million over 7 years) to encourage collaboration between UK clusters and those in the US, India and China.

Recommendation 8: Host an annual conference of UK cluster leadership teams and their main stakeholders to foster links between them and share best practice

Potential owner: National cluster champion

An annual conference of the country's top cluster leadership teams and their main stakeholders (companies, universities, and LEPs) should be organised to enable cluster leaders to share success stories, build relationships with one another, enhance their understanding of approaches to lead a business cluster, strengthen their leadership capabilities and foster the sharing of best practice (from the UK and other markets).

"We need to think beyond Scotland. What are other destinations doing? What is our competitive advantage?"

Dr Jane Ali-Knight,
Scottish tourism sector
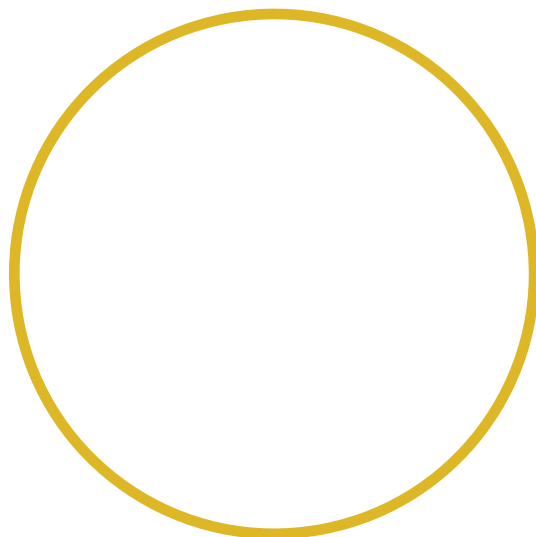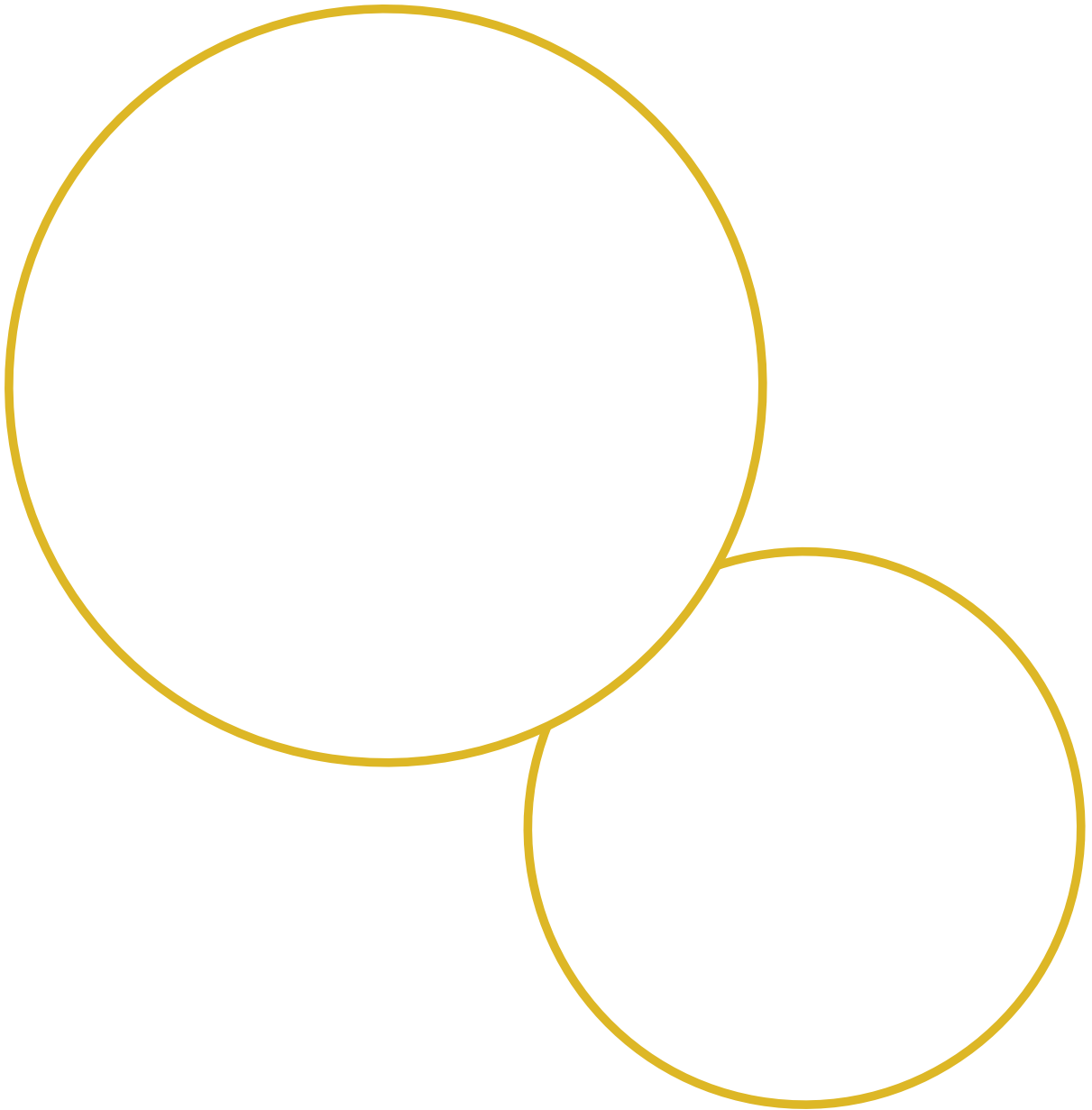
06

Fostering innovation within a cluster

THE PROBLEM: CLUSTERS ARE NOT FULFILLING THEIR POTENTIAL IN FOSTERING INNOVATION

All five clusters we reviewed could be better at capitalising on the full range of the innovation that they generate. This applies to innovations that are the fruits of university research, business best practices, and the output of commercial R&D. Failure to commercialise these innovations blunts the competitive advantage of businesses in the cluster and makes it a less attractive prospect to investors and talent.

WHAT NEEDS TO CHANGE: INCREASE IDEA SHARING BETWEEN UNIVERSITIES AND BUSINESSES

Again, these recommendations are more relevant to clusters reliant on leading-edge innovation primarily generated by universities, but all clusters could benefit from reviewing the extent to which the following would help them grow:

- Cluster-based universities should proactively look for opportunities to commercialise their researchers' innovations, working with local businesses and investors to do so
- Cluster members should have multiple opportunities to exchange ideas
- Cluster members should have access to the shared infrastructure they need to iterate innovations

"Research is the only way we will protect our industry from the emerging markets"

Cutlers' Company,
South Yorkshire metals cluster

"The region's universities are not very open to knowledge transfer and only pay lip service to entrepreneurship"

Glenn Smith,
South-West electronics and IT cluster

Recommendations

Recommendation 9: Incentivise universities to increase their focus on commercialising the innovations of their researchers.

Potential owner: Universities and Higher Education Funding Councils, working with leading investors

Sir Andrew Witty's 2013 Review of Universities and Growth proposed a series of nationwide actions to boost universities' contribution to UK growth. These include several that, if executed, would be of particular benefit in encouraging universities to commercialise their research, in particular:

- Requiring government to make an explicit long-term commitment to Higher Education Innovation Funding (HEIF), increasing to £250 million per year
- Increasing the impact weighting in the Research Excellence Framework to 25%
- Expecting universities to publish annual reports on their "Third Mission" activities (those which increase economic growth and support social progress) to which the government should respond.

Recommendation 10: Encourage joint appointments between academia and industry where appropriate, on the model of the Toshiba telecoms research lab.

Potential owner: Cluster leadership team (with support of local academic institutions and businesses)

For two decades, the Toshiba telecommunications research lab has been run by a series of Bristol University professors, who move to part-time roles both at the university and the Toshiba lab. This accelerates knowledge transfer, benefitting both parties. The cluster leadership body should broker links between companies and universities in the cluster to create such joint posts.

"Technology transfer should be judged by how it benefits the nation's health and wealth long-term, not this year's technology transfer office P&L, and that means reform"

Jon Rees,
Golden Triangle,
CEO, OBN

Recommendation 11: Provide shared "maker spaces" that help start-ups to access the technical facilities that they need to grow

Potential owner: Cluster leadership team

The cluster leadership body should mobilise stakeholders – businesses and universities –to provide facilities and funding to create spaces for those start-ups that require more than simply desks and Internet connections. These should feature shared technical facilities such as 3D printing, lab facilities, and maker spaces, helping entrepreneurs across sectors gain access to the equipment they need and to work alongside one another.

> "Americans have some really cool shared work areas where the top Harvard guys can just play with their new inventions and prototype their ideas really quickly. If I want to test out what my ideas look like, I need to go find someone with a 3d printer – we just don't have this stuff here"

Glenn Smith,
South-West electronics and IT cluster,
CEO, Maplebird

Bolt is a "maker space" and hardware accelerator in Boston. It provides state-of-the-art facilities, as well as capital, personnel and expertise.

In addition to office space, selected start-ups have access to:
- Rapid prototyping equipment like 3D printers, vacuum formers, laser cutters, and facilities for urethane casting and model making
- Electronics equipment like oscilloscopes, spectrum analysers, and function generators
- Machining and metal working equipment like milling machines and engine lathes

Bolt thereby enables start-ups to produce and test a proof of concept very quickly, as well as refining designs within hours, rather than days.

Selected start-ups are also supported by a group of experts with backgrounds from engineering to investment, creating a mentorship network that can support early growth before they are presented to investors at a 'demo day'.

Recommendation 12: Run pitch days judged by investors to enable aspiring entrepreneurs to gain access to advice, mentors and capital

Potential owner: Cluster leadership teams

Where locally deemed to be useful, cluster leadership teams should ensure that their clusters offer business case competitions that help entrepreneurs to refine their business ideas, access advice, meet potential mentors, and put their case to investors. Where such competitions already exist, more can be done to publicise the successes of previous participants, ensure that the competitions attract investors and mentors with a strong track record in the field, provide participants with the skills they need to develop a compelling and rigorous business case, and sustain the relationships that are formed during the events (e.g., through formal check-in sessions).

Y Combinator is a world-leading seed accelerator based in California, and as of early 2014 had funded over 500 companies in more than 40 markets. It is perhaps most famous for its pitch days – which it terms "demo days" – which have spawned a distinguished list of alumni. Collectively valued at $11.5 billion, they include luminaries such as Scribd, Airbnb, Dropbox and reddit.

The demo days bring together entrepreneurs with promising ideas and investors. Each entrepreneur gives a two-minute demonstration of their product or idea, before getting the chance to mingle with the investors. This must-see event is now so prestigious that many of the companies are profiled on leading tech websites, acting as further promotion and providing access to additional investment opportunities.

In advance of the demo day, Y Combinator provides mentorship, advice, and seed funding to the entrepreneurs selected to appear, helping them to refine their idea and their pitch.

Similar pitch events are held in the UK. For example, Venturefest is a one-day business creation networking event held in across the UK from Oxford and Bristol to Yorkshire and Wales. It brings together budding entrepreneurs, investors, local businesses and innovators to engage in networking events, showcases and a variety of talks. A key aspect is the investment competition, designed for very early stage companies to pitch for initial funding plus legal, financial and mentoring advice.

07

Ensuring the cluster has the skills base it needs
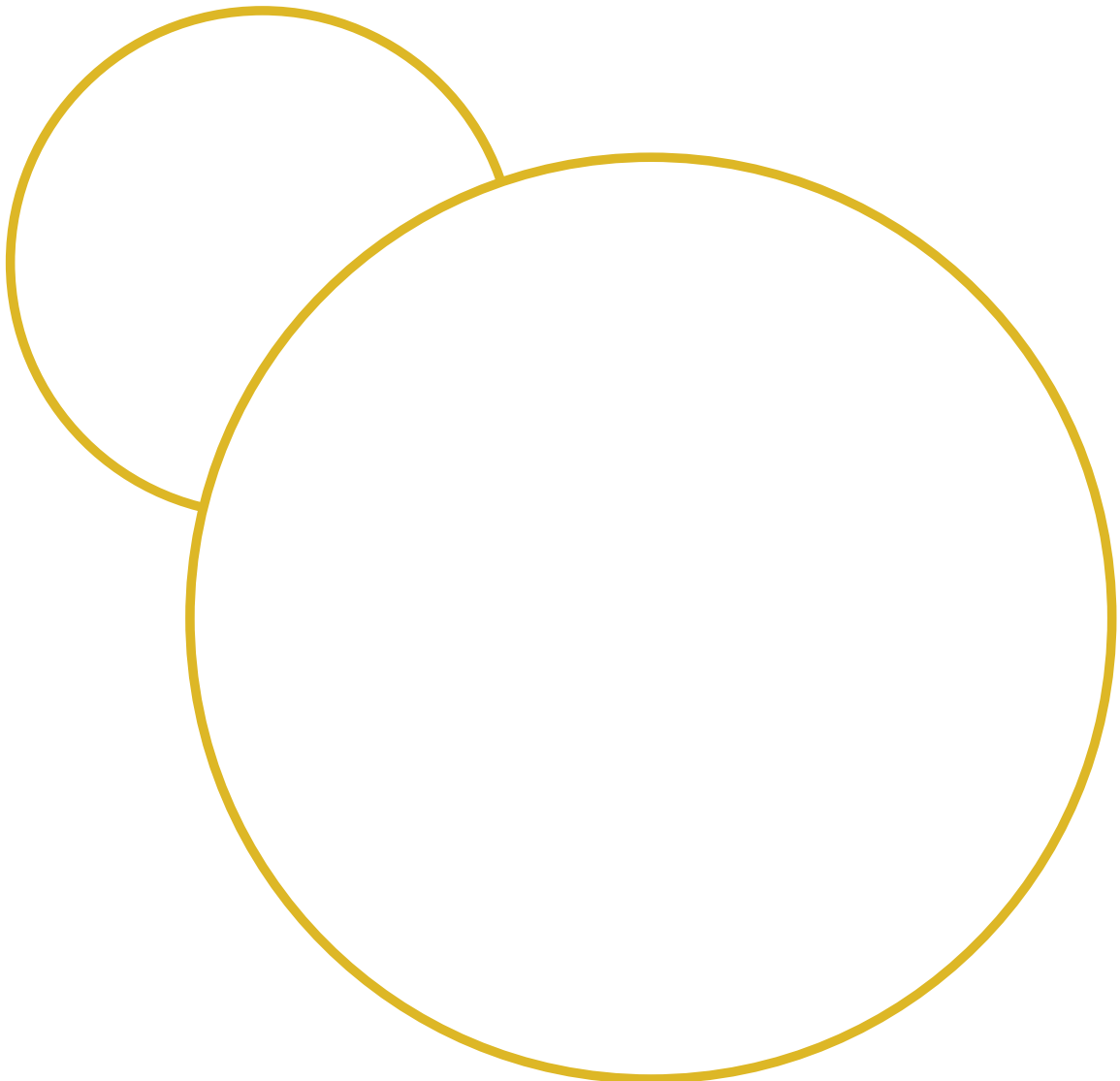
THE PROBLEM: THE EDUCATION AND SKILLS SYSTEMS ARE NOT PRODUCING THE CONCENTRATION OF SPECIALIST SKILLS THAT CLUSTERS NEED

Skills gaps were the most common barriers to growth mentioned during our interviews, although the detail of those gaps varied from cluster to cluster. Interviewees in clusters such as Motorsport Valley and Yorkshire Metals were especially concerned about a widespread shortage of high quality graduates in STEM subjects, particularly in engineering. Interviewees also noted a shortage of individuals with vocational training for particular jobs within their cluster, whether a shortage of classic vocational skills such as lamination for the motor industry or vocational skills for the knowledge economy such as computer programming in the latest computer languages. All five case studies noted a lack of world-class managerial skills, particularly for start-ups where the UK talent pool of serial entrepreneurs who know how to grow a start-up successfully is significantly smaller than in the United States.

Skills shortages were identified by interviewees as limiting clusters' growth by increasing costs and decreasing revenues. When skills are scarce, firms have limited options. They can pay more in salaries, recruiting costs, and training, thereby reducing their profitability – or forgo the necessary workers, potentially missing out on prospective customers because they either lack the knowledge or capacity to deliver.

"My members' biggest fear is not getting the staff of the calibre and experience they need"

Jeremy Hawkings,
Scottish tourism sector, CEO and
founder, Connoisseurs Scotland

WHAT NEEDS TO CHANGE: TRAIN MORE INDIVIDUALS, MAKING THEM BETTER PREPARED FOR WORK

This theme is one of the areas where the issues go far beyond clusters and are common to almost all firms. A national approach to ensuring the education and skills system is more responsive to local employer demand, whether those employers are in a cluster or not, is vital and should be a minimum requirement that would support all clusters, existing and nascent. Within this broader policy framework, specific policies would also help the five case studies we spoke to and, the literature suggests, could also have benefits for the other leading clusters. These are:

- The supply side: The education and skills system should offer courses employers want, to equip sufficient people with the skills that firms require
- The demand side: More people need to choose to study for skills that the clusters need – and then go on to choose a career in a cluster where they can use those skills.

"Finding skilled people with the right attitude is an absolute nightmare"

SME business owner,
Motorsport Valley

"It is very difficult to get high quality 20-30 year old engineers"

Prof Joe McGeehan,
South-West electronics and IT cluster,
University of Bristol, Toshiba

"There are not enough people strong in Java or Python"

Charles Grimsdale,
Partner, South-West electronics and IT cluster, Eden Ventures

Recommendations

Recommendation 13: Convene cluster employers to develop a 3-5 year "workforce plan" of future skills requirements and then position incentives for vocational training providers to ensure sufficient places are offered

Potential owner: Cluster leadership team, BIS, Skills Funding Agency

Cluster leadership teams should work with local businesses to publish projections of the current and expected skills vacancies in the cluster in the decade to come, highlighting shortfalls as early as possible.

Using these projections, the Skills Funding Agency would work closely with local Further Education colleges and shift the amount paid to providers away from courses that oversupply skills relative to job openings and towards courses that local businesses identify as being in short supply. This is likely to shrink capacity in subjects such as hair and beauty and increase capacity in courses such as laminating, programming or engineering. In addition, the national cluster champion could lead a review to ensure that providers are being fairly reimbursed for the capital and operating costs of running the new mix of courses.

Recommendation 14: Design curriculums jointly between
cluster businesses and educational institutions

Potential owner: Cluster leadership team

Many academics, college and school leaders acknowledge the
need to involve local business in designing their curriculums,
but our research suggests that this is still not happening
to anything close to the extent required. Therefore cluster
leadership teams could convene local employers and learning
providers to jointly design the qualifications and curriculums
the cluster needs. The example of AMTEC in the United States
illustrates the kind of collaboration which educators should aim
to replicate in the UK.

"The message is that
colleges are driven
by the market—what
students want to do
rather than businesses
want to see"

Adrian Cannard,
Golden Triangle

The Automotive Manufacturing Technical Education Collaborative (AMTEC) brings
together 28 automotive plants and 37 community colleges across 12 US states.

AMTEC was formed in 2005 when community colleges and automotive companies,
conscious that employers were struggling to find the mid-skilled workers they needed,
jointly created common courses with a modular curriculum. Each module contains an
applied learning requirement and is recognised across many companies.

The modules are delivered by community colleges and funded in the same way as those
colleges' other course offerings: through a mix of student fees and government sources.
AMTEC's overheads are funded by grants from the National Science Foundation that
average $1.4 million annually.

Recommendation 15: Expand University Technical Colleges and apprentice academies so that each of the top clusters in which there is a shortage of specific vocational skills has at least two UTCs or academies

Potential owner: Department for Education with Department for Business, Innovation and Skills (BIS)

The Department for Education could consider accelerating its support for UTCs, with the aim of ensuring that each of the UK's economically significant clusters should be served by at least two UTCs and academies. There is also the scope for the DfE and BIS to explore together how government could better support the spread of SME apprenticeship academies, with a particular focus on emulating the Advanced Manufacturing Research Centre in Sheffield which partners closely with Boeing to conduct cutting-edge research and build the skills base of the region. Ideally such institutions could award industry accredited vocational qualifications, along the lines of becoming a "chartered metallurgist".

"The Silverstone UTC is very good. We have a good relationship with the head teacher and pretty much every year they send us some young lads… and we give them work here and the ones that show the most promise we take on."

Bobby Issazadhe,
Motorsport Valley

Silverstone UTC specialises in high-performance engineering and technical events management. It is based at Silverstone, next to the circuit. UTCs are a new form of secondary school combining technical, practical, and academic learning in STEM (science, technology, engineering, and maths) subjects. The curriculum at Silverstone UTC is co-designed with the circuit, the University of Northampton, and the National College of Motorsport. Students work towards STEM GCSEs and A-levels, as well as engineering or events qualifications.

"The curriculum development is potentially very exciting…. It is about developing the interface between education, employability and entrepreneurship"

Richard Phillips,
Managing Director,
Silverstone Circuits Ltd

Recommendation 16: Create transparent, user-friendly data on employment rates and earnings for the courses people are considering

Potential owner: Department for Business, Innovation and Skills (BIS), Higher Education Funding Council for England (HEFCE)

Further and higher education providers should be required to provide data in their prospectuses on the employment rate and earnings of graduates for the qualifications they offer, both on graduation and 5 years later.

Dr Foster is a joint venture with the Department of Health providing performance-monitoring information about the NHS to the public. Introduced in 2010, their most famous publication is the annual "Dr Foster Hospital Guide" – the first comparison of national healthcare quality ever provided. It uses measures such as the Hospital Standardised Mortality Ratio (HSMR) and has revealed widespread differences in quality of care. By making this data so open and transparent, it garnered much media interest and stimulated a national debate over the standard of Britain's hospitals. The product offering has now expanded to include benchmarking for healthcare commissioners, a "TrustView" performance dashboard and global comparators.

Recommendation 17: Promote careers in cluster industries in schools

Potential owner: Cluster leadership team

Cluster leadership teams could organise for cluster businesses to go into schools to generate excitement about their work and proactively market their professions to the next generation of cluster talent. Primary Engineer and F1 in Schools offer good examples of schemes that create buzz and interest around careers in their respective industries.

Primary Engineer is a not-for-profit organisation established in 2005 to inspire primary school pupils to think about a career in engineering. It trains teachers in fresh and exciting ways to teach the practical application of mathematics and science. Pupils can then go on to compete for a series of regional challenge prizes.

The programme is backed by Engineering UK, the trade body for British engineering, in collaboration with five academies and institutes.

"The number one thing we can do is to promote manufacturing as a fulfilling, viable alternative to university.... What we need is more young people coming in with qualifications and life skills"

Oliver Baker,
South Yorkshire metals cluster
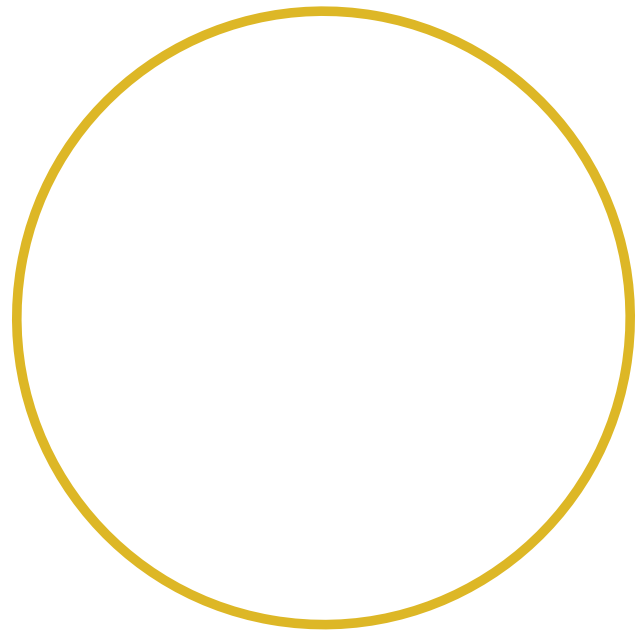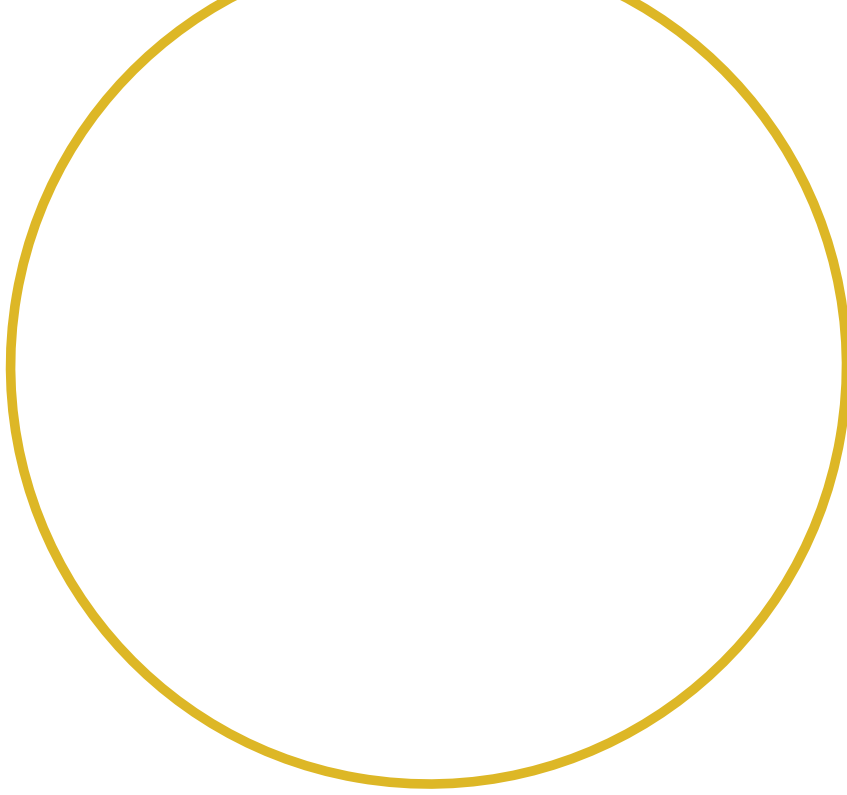
08

Helping clusters to improve their infrastructure

THE PROBLEM: INADEQUATE INFRASTRUCTURE TO SUPPORT CLUSTER GROWTH

Each cluster we spoke to had specific infrastructure challenges holding back growth – whether road, rail or air links; space and planning permission; broadband; housing; or energy.

Poor infrastructure was identified by interviewees as damaging the individual cluster's competitiveness by increasing the costs of facilities, of getting goods to market, of labour (principally as a result of the high cost of housing), and of other key inputs such as energy. Moreover, interviewees noted that inadequate transport links make it harder to build links, both within the cluster, or with other centres of expertise. Some interviewees suggested that, at a certain point, poor infrastructure has such an impact on the area that it becomes difficult to attract and retain talent.

"Here in Cambridge we feel very poorly serviced by transport links other than to London"

Trevor Perrior,
Golden Triangle

"Transport within the city is under pressure. Roads are not delivered and there is heavy congestion"

Dick Penny,
South-West electronics and IT cluster,
Managing Director of Watershed

"Access to high speed broad-band and bandwidth is a huge issue - and without buy-in from industry, government schemes have been ineffective"

Jaya Chakrabarti,
South-West electronics and IT cluster,
CEO, Nameless UK

"Our biggest problem is the high cost of electricity relative to our competitors, combined with the increasingly frequent outages that we suffer. When we have 100 tonnes of molten steel and we're told our power supply is going to be interrupted at short notice, that's a very big problem"

Peter Birtles,
Metals Yorkshire, Director,
Sheffield Forgemasters

WHAT NEEDS TO CHANGE: INCREASE INVESTMENT IN INFRASTRUCTURE, WITH AGREEMENT OF LOCAL POPULATION

Infrastructure challenges are particularly likely to vary by local area and by cluster: ensuring that the energy supply is affordable and not regularly interrupted is a priority for Yorkshire Metals but not for the Golden Triangle, where road and/or rail connectivity between Oxford and Cambridge is far more important. This means that any action on infrastructure needs to be designed locally, even if national support is required to make it happen. Specific recommendations that emerged from the five case studies, which they suggested could have relevance for other clusters too, are:

- Clusters should identify their top infrastructure challenges and define their impact on their local economy
- Better mechanisms are needed to fund cluster infrastructure
- Those that gain from infrastructure should pay a greater share of its cost
- Those that lose out, or fear they will lose out, as a result of new infrastructure need to be appropriately reassured and potentially compensated to enable new development

> "The physical communication between Oxford and Cambridge is difficult"
>
> Victor Cristou,
> Golden Triangle,
> Venture advisor for Wellington Partners

Recommendations

Recommendation 18: Develop business cases for the cluster's top three infrastructure priorities, including a clear view of benefits and costs, and how to ensure that local concerns are addressed

Potential owner: Cluster leadership teams

Cluster leadership teams should regularly convene local cluster businesses, universities, LEPs, and local authorities to determine infrastructure priorities, if these are regarded as a barrier to growth in the cluster. The group should then prepare business cases for the top three priorities, quantifying the costs and benefits to cluster companies and wider society. Recommendations should include how local groups impacted by the change would benefit and/or be compensated (where appropriate). They should put their case to their LEP and/or the relevant national government department (e.g., the Department for Transport), with the support of the national cluster champion if needed.

Recommendation 19: National government undertake to match local funding if clusters can locally raise 50% of the cost of an infrastructure project and demonstrate the benefits of that infrastructure project, subject to a risk cap

Potential owner: Cluster leadership teams, with support of national cluster champion

To encourage local financial participation in infrastructure development and ensure that clusters can overcome their infrastructure challenges, government should undertake to co-fund specific infrastructure projects that can demonstrate a clear return on investment. Clusters should be responsible for raising their share themselves, through industry contributions, business improvement districts levies, business rate supplements, user fees, tolls, or similar initiatives.

Londoners and London's businesses were instrumental in getting Crossrail off the drawing board, engaging with government over decades to resolve emerging issues. Groups such as London First, the City of London Corporation, and the London Chamber of Commerce led the charge, proposing to shoulder much of the cost.

When the initial proposed route served neither Canary Wharf nor Heathrow Airport, London business leaders were the catalysts in proposing a new alignment and additional stations. BAA and Canary Wharf Group were amongst those who agreed to make contributions.

The final package sees more than 60% of the funding coming from Londoners and London businesses. Individual beneficiaries are contributing directly, including the City of London Corporation (£200 million plus a goal of £150 million from local businesses), BAA (£230 million) and Canary Wharf Group (£150 million). They and other London businesses are also contributing indirectly through a Business Rate Supplement, set at 2% for non-domestic properties with rateable values over £55,000. In addition, both Transport for London and the Greater London Authority are contributing on behalf of London's farepayers and council-tax payers.

Conclusion

The UK's economic recovery will be built on thriving firms across all sectors, but clusters can play an important role in driving future growth. A review of the top UK clusters in 2012 found 31 economically significant clusters in the UK, representing 8% of the businesses but 20% of the GVA. The UK economy has a clear opportunity to capitalise on its economically significant clusters, while ensuring that nascent clusters continue to be nurtured. Some of the ways in which this can most effectively happen are by creating a better business environment in general, understanding local economies and improving skills, housing and infrastructure to respond to local business needs. However, our case studies suggest that individual clusters can also benefit from more specific interventions and we have set out a series of actions that can be taken to strengthen the UK's economically significant clusters and therefore its overall economy. Executing these recommendations will not be easy, but if the momentum of the UK's top clusters can be capitalised on, as well as mechanisms introduced to identify and support future fast-growing clusters, then there is real potential to unlock further growth in the UK economy.