Executive Summary

Whilst much has already been achieved in the transformation of the North of England from a region with a reputation for poor productivity and low living standards to a modern, dynamic economy, many parts of the North continue to struggle to evolve.

As the region seeks to build upon the Northern Powerhouse concept, fuelled by promises of an economic “levelling-up” from central government, the on-going coronavirus pandemic has, for many, highlighted the North/South divide.

The imperative to ensure this recovery is effective, inclusive and for all is clear. It will take place in tandem with structural shifts already in train as the world of work evolves. To tap into the opportunities provided by high-growth industries, and mitigate the impact on disrupted sectors, local leaders must be able to understand where the opportunities are, and which levers will give them the greatest chance of securing inclusive growth.

Data has been integral to the pandemic response, particularly at a local level. It will prove equally vital to the economic recovery, with the potential to enable tailored, granular policy interventions which take account of the mosaic makeup of the North.

A key component of the recovery is the region’s ability to harness the growth opportunities presented by the innovation environment in the North.

This report examines the underpinnings of innovation-led growth across the North, evaluating the ecosystem that exists to support the creation and development of the companies that will anchor the future economic prosperity of the region.

A successful innovation environment is built on five key pillars - Innovation, Business, Workforce, Infrastructure and Funding.

In this report, we have outlined, by Local Authority, where the region is doing well in relation to these five pillars, as well as those areas where lessons can be learned and opportunities grasped.

There are significant opportunities for levelling-up across the North by capitalising on the region’s successes. For any levelling-up agenda, it is not simply about raising standards in the North compared to the rest of the country, but within the North’s individual policy-making areas. The differences between Local Authorities that have been highlighted show that there is no single solution. Local and Combined Authorities need to play to their strengths but must also be prepared to take advantage of better practice amongst their neighbours in the region, partnering with similar areas to develop common solutions. This will not only serve to focus more resource into solving problems, but also to strengthen relationships across the North of England, something which has all to often been missing.

A range of attitudes and behaviours across the region need to change if the North is to have any chance of levelling up its constituent parts.

- Local and Combined Authorities need to recognise and accept their differences. Not all cities can or should be the same - just because one city has something doesn’t mean that the other Northern cities also need to have one. What is more important is that the North’s collective offering is effectively and efficiently co-ordinated and presented in such a way to attract business, research and workers to the region.

- Policy making across the North needs to become more agile and responsive to take advantage of the growth opportunities that are available. Dynamically growing businesses need to be supported and nurtured to ensure that they achieve their full potential. Increasing the cohort of high-growth businesses will not only provide more opportunities for the local workforce but will improve the attractiveness of the North for qualified and skilled workers from elsewhere in the UK.

- A higher level of performance monitoring needs to be applied across policy areas. It is not enough to simply report outputs, with the view, heard all too often, that, “It’s always been this way.” Decisive and effective interventions need to be made in response to under-performance to achieve positive change.

- A greater level of collaboration is required across the region - particularly in relation to innovation-led growth. Rather than expecting innovation to thrive in isolation, those groups that share cluster characteristics should work together to provide solutions for all and then test and propagate those solutions in other areas across the region.

- The speed of translation of innovation needs to be increased and made more effective. This must be achieved without the layering of a multitude of different structures. It is essential that the complexity of the support network for growing businesses is reduced and simplified.
Based upon the analysis herein, we have identified ten specific recommendations which, if implemented, can help to transform the prospects for innovation-led growth across the North of England.

1. Establish a Northern Innovation Forum to streamline, co-ordinate and implement innovation policy for the North.
2. Innovation policy needs to broaden its reach outside of city centres to foster activity in the region’s towns.
3. Actively facilitate clustering of research and commercial activity across Local and Combined Authority boundaries.
4. Propagate experience gained from success across the five pillars of innovation - whether it be in establishing centres such as the Advanced Manufacturing Research Centre in Sheffield or improved school performance in Blackburn - to support levelling-up across the region.
5. Incentivise the development of mixed-use, innovation-led infrastructure that benefits the community at large.
6. Refill the Northern Powerhouse Investment Fund with funds specifically targeted at dynamically growing businesses in the developing industry sectors aligned with the Grand Challenges with fund management incentives that reward greater risk taking.
7. Leverage existing tax reliefs to drive early-stage funding into regional businesses.
8. UK Government should raise capital allowances to incentivise growth in the North’s manufacturing businesses.
9. Use the planned overall increase in public funding of research to increase the proportion of funding for academic research that is specifically tied to industrial collaboration and commercialisation.
10. Provide incentives for venture capital and private equity funds to invest in businesses in the region.
Introduction

The North of England is undergoing a transformation, albeit not quickly enough for many, that seeks to reverse decades of underinvestment that resulted in the region becoming one of the least productive areas of Europe. Much has already been done with parts of the North’s key cities having changed out of all recognition over the last 25 years. However, at the same time, many parts of the North continue to struggle to adapt to an evolving economy and society.

In 2014, when George Osborne, then Chancellor of the Exchequer, launched the idea of the Northern Powerhouse, he outlined an ambition to bring together the cities, towns and rural communities of the North to fuel economic growth through modern transport links, devolved powers and increased investment. Despite dissatisfaction in many quarters over the progress since, the most recent UK General Election in December 2019 resulted in a large swing towards the governing Conservative party, fuelled by promises of an economic “levelling-up” across the UK. This has resulted in calls from northern MPs for a radical approach to stimulate investment across the region, creating a “Northern Big Bang” to mirror that which happened in London in the 1980s.

The economic impact of the on-going coronavirus pandemic has, for many, highlighted the North/South divide. The response to the pandemic will be analysed and debated for years to come. Regional responses have been, generally, agile, informed by data, and aligned with the specific needs of communities. This has been crucial, as both the drivers behind the spread of the virus, and the impact it has on industries and communities, differ by geography.

In some cases they are nuanced, in others stark. The challenges facing Chester are distinct to those posed to Manchester. Within GM itself, Hale and Rochdale are less than 30 miles apart, but the communities within them are likely to have had markedly different experiences of the pandemic. Covid has highlighted this variation, often in cruel fashion.

The Government’s pledge to “build back better” and level up the UK includes funding and initiatives aimed at supporting the economic regeneration of left-behind, post-industrial towns. But individual towns and cities have their own distinct challenges, and their own strengths to play to. A one-size-fits-all approach to devolution policy will not deliver what advocates of a more balanced UK economy are calling for.

In the recovery from Covid-19, it is vital that both Whitehall and Northern leaders create policy which accounts for this mosaic, both across the North and within individual city regions.

The ability to create flexible, hyper-local policies and initiatives is dependent on the ability to accurately quantify need and verifiably measure progress – both objectives which are dependent upon analysis of robust data.

Some towns and city regions will undoubtedly derive the most benefit from improvements in physical or digital infrastructure. But others have more deep-rooted issues to address, such as reducing NEETs (Not in Education, Employment, or Training) or tackling healthcare inequalities.

In many cases, multiple policy interventions will be necessary but with varying levels of importance placed on each. It is only through understanding the true local picture that it will be possible to deliver effective local interventions.

The imperative to ensure this recovery is effective, inclusive and for all could not be clearer. It will take place in tandem with structural shifts already in train as the world of work evolves. To tap into the opportunities provided by high-growth industries, and mitigate the impact on disrupted sectors, local leaders must be able to understand where the opportunities are, and which levers will give them the greatest chance of securing inclusive growth.

In a post-Covid world, proximity to the City, or any city, may be less of a barrier than ever before. Harnessing the immense economic potential of digitally-driven ways of working could be transformative for the life chances of people living in coastal or rural areas; or indeed any location which has been overly reliant on industries ravaged by the pandemic, or affected by automation.

Data has been integral to the pandemic response, particularly at a local level. It will prove equally vital to the economic recovery, with the potential to enable tailored, granular policy interventions which take account of the mosaic makeup of the North.

Sustainable economic growth is the holy grail for policy-makers worldwide. Securing that growth from the economic base that is a consequence of decades of local, regional and national policy that has rarely been consistent, let alone joined up, presents a huge challenge.

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Drivers of Future Growth

Growth driven by innovation offers the possibility for the North to position itself at the forefront of sectors that are critical to national and global sustainability going forward. In looking at the innovation potential of the region, it is important to assess the impact of business-led innovation as well as the research being undertaken across the North’s academic institutions. By harnessing both of these outputs, the North can take advantage of the opportunities being generated by its technological base to deliver sustainable growth and, in the process, achieve some of the levelling-up that is so necessary across the region.

But if the North is to be successful in creating a multitude of market-led, dynamic new businesses with the potential to become the unicorns of the future, it has to deliver the right environment that will nurture and nourish those companies and support the translation of innovation.

The five pillars that underpin this environment (fig. 4) are:

- **Innovation** - producing the ideas around which companies can be formed
- **Business** - supporting the existing economy with the capabilities to capitalise on emerging opportunities
- **Workforce** - ensuring that there is an available pool of skilled talent across the region to sustain business creation and growth
- **Infrastructure** - providing the best environment for businesses to thrive to the benefit of the community at large and enabling the development of co-operative ecosystems that support business growth
- **Funding** - delivering the lifeblood that allows companies to execute on future strategies.

The impact of this geographic spread on the knowledge and innovation supply chain is that the flow of ideas, talent and, therefore, opportunity and growth is generally slower in the North compared to London. As a result, innovation policy must take account of the spatial differences.

A successful innovation environment is built on five key pillars - Innovation, Business, Workforce, Infrastructure and Funding.

In this report, we will look to identify, by Local Authority, where the region is doing well in relation to these five pillars, as well as those areas where lessons can be learned and opportunities grasped.

There are significant opportunities for levelling-up across the North by capitalising on the region’s successes. The report will highlight differences between Local Authorities to show that there is no single solution. Local and Combined Authorities need to play to their strengths but must also be prepared to take advantage of better practice amongst their neighbours in the region, partnering with similar areas to develop common solutions. This will not only serve to focus more resource into solving problems, but also to strengthen relationships across the North of England, something which has all too often been missing.

Scale-up businesses² contributed £1 trillion to the UK economy in 2018, employing 3.5 million people and with an average productivity that is 54% higher than their peers³. These are the businesses with the potential to become the next unicorn and this sector needs to be provided with the right environment to enable their success.

London is widely accepted as leading the way in innovation-led growth in the UK. In social terms, the North can be viewed as a facsimile of London but over much larger distances.
The UK Government has highlighted the critical importance of research and development to economic and social recovery from the pandemic. Their goal is to strengthen science, research and innovation across the UK, making them central to tackling major challenges and taking advantage of opportunities that arise with an aspiration to make Britain the best place in the world to be a researcher, inventor or innovator.

Our commitment to increasing UK investment in R&D to 2.4% of GDP by 2027 and to increase public funding for R&D to £22 billion per year by 2024/25 will allow us to make major strides towards this goal. We will use this investment to raise domestic and international business investment into UK R&D, increasing economic productivity and prosperity through new products, services and jobs and helping to transform our public services. Across the UK government and the devolved administrations, working with businesses, academia, charities and wider society across the UK, we will tackle some of our biggest societal challenges, advancing our understanding of the world and translating that delivering benefits to people, communities and places around the UK and globally.

UK INDUSTRIAL STRATEGY GRAND CHALLENGES

The societal challenges described in the UK Research and Development Roadmap are enshrined in the UK Government’s Industrial Strategy, which is built around three core concepts:

• Grand Challenges
• Local Industrial Strategies
• Sector Deals

The Grand Challenges are intended to position the UK at the forefront of the industries of the future. The Grand Challenges include:

Whilst the component parts will be common, different geographies and sectors will face different challenges. Access to funding for businesses in Preston is not the same as it is in Manchester. The pool of talent in the Northeast is dissimilar to that in Liverpool. These distinct breakages in the supply chain must be resolved if the ambition of delivering growth is to be achieved.

The diversity of capability that exists means that there are opportunities to establish growing enterprises across the North. The challenge for policy makers will be to put the right levels of support in place to enable unicorns to thrive across the region - not simply in major centres of population.
Artificial Intelligence and Data: “We will put the UK at the forefront of the AI and data revolution.”

Ageing Society: “We will harness the power of innovation to help meet the needs of an ageing society.”

Clean Growth: “We will maximise the advantages for UK industry from the global shift to clean growth.”

Future of Mobility: “We will become a world leader in the way people, goods and services move.”

As it seeks to deliver against these challenges, the Government has identified a series of discrete missions, each focusing on a specific problem, with the intention of fostering collaboration between Government, businesses and organisations across the country.

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**Artificial Intelligence and Data**

**Mission:** Use data, Artificial Intelligence and innovation to transform the prevention, early diagnosis and treatment of chronic diseases by 2030

Using AI and data, there is an opportunity to accelerate medical research in early diagnosis, leading to better prevention and treatment of disease. Within 15 years better use of AI and data could result in over 50,000 more people each year having their cancers diagnosed at an early rather than late stage. This would mean around 20,000 fewer people dying within 5 years of their diagnosis compared to today.

This mission aims to put the UK at the forefront of the use of AI and data in early diagnosis, innovation, prevention and treatment. The mission builds on the £210 million of funding announced for the Data to Early Diagnostics and Precision Medicine Industrial Strategy Challenge Fund.

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**Ageing Society**

**Mission:** Ensure that people can enjoy at least 5 extra healthy, independent years of life by 2035, while narrowing the gap between the experience of the richest and poorest

We are living longer lives because of medical advances, better drugs, healthier lifestyles, and safer workplaces. A girl born in the UK today has a 1 in 3 chance of living to 100, and the chance of living to 100 will double in the next 50 years. Given this trend, it’s time to radically rethink how we respond, at each stage in life, to the way that we support our families and communities, as well as the way that we approach work, finances, health and care, and housing.

This mission aims to ensure that people can enjoy at least 5 extra healthy, independent years of life by 2035, while narrowing the gap between the experience of the richest and poorest.

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**Clean Growth**

**Mission:** At least halve the energy use of new buildings by 2030

Heating and powering buildings accounts for 40% of our total energy usage in the UK. By making our buildings more energy efficient and embracing smart technologies, we can cut household energy bills, reduce demand for energy, and boost economic growth while meeting our targets for carbon reduction.

For homes this will mean halving the total use of energy compared to today’s standards for new build. This will include a building’s use of energy for heating and cooling and appliances, but not transport. The mission is backed by £170 million of public money through the Transforming Construction Industrial Strategy Challenge Fund. This is matched by £250 million of private sector investment, meaning over £400 million will be invested in new construction products, technologies and techniques.

**Mission:** Establish the world’s first net-zero carbon industrial cluster by 2040 and 4 low-carbon clusters by 2030

This mission will further establish the UK’s position at the forefront of the global shift to Clean Growth by developing world-leading expertise in green manufacturing products, and the technologies and services required to produce them. The mission aims to attract inward investment, new business and employment opportunities.

It will support the cost-effective decarbonisation of our industrial sector, which accounts for around a quarter of all UK GHG emissions.

The mission is backed by £170 million public investment through the Industrial Strategy Challenge Fund.
Future of Mobility

Mission: Put the UK at the forefront of the design and manufacturing of zero emission vehicles, with all new cars and vans effectively zero emission by 2040

How we get around is going to change significantly in the future. New technologies, such as zero emission vehicles and self-driving cars, are improving transport to make it safer, cleaner and better connected.

This mission aims to put the UK at the forefront of the design and manufacture of zero emission vehicles and sets an ambition for all new cars and vans to be effectively zero emission by 2040. This will help improve the air we breathe, support the shift to clean growth, and help the UK seize new economic opportunities.

The mission will support innovation in clean ways of powering vehicles, including £1 billion over 10 years for development of low carbon powertrains through the Advanced Propulsion Centre, and £246 million for the Faraday Battery Challenge to develop safe, cost-effective and high-performance batteries for electric vehicles.

LOCAL INDUSTRIAL STRATEGIES

In response to the Government’s Industrial Strategy, LEP’s and Combined Authorities across the UK have been challenged to produce their own Local Industrial Strategies to describe how they will contribute to the national plan. With regard to innovation activity, they have been specifically tasked with identifying how they will address the various Grand Challenges as they fit with local capabilities, expertise and opportunities.

A review of those Local Industrial Strategies that have been published shows a mixed picture with a number of LEPs simply quoting aspirational statements rather than producing concrete strategies and plans. However, there are some good examples to be found. For example, the North East LEP’s approach shows a strong commitment to delivery against specific initiatives.

SECTOR DEALS

Sector Deals are partnerships between the government and industry on sector-specific issues that aim to create significant opportunities to boost productivity, employment, innovation and skills. Ten sectors have been identified:

- Aerospace
- Artificial Intelligence
- Automotive
- Construction
- Creative Industries
- Life Sciences (2 deals)
- Nuclear
- Offshore Wind
- Rail
- Tourism

Each deal has a range of targets and commitments from both the sector concerned and government aimed at delivering widespread benefits to the UK economy. In implementing each deal, the Government is seeking to cover the whole of the UK. However, that ambition is clearly limited by existing regional capabilities in any given sector. For example, the biggest impact from the Automotive sector deal is being seen across the Midlands.

That is not to say that the North is not seeing benefit. Sectors such as Nuclear, Offshore Wind, Creative Industries, Life Sciences and Rail are all engaged with businesses and innovators across the North.
PUBLIC FUNDING OF RESEARCH

Expenditure on research and development across the UK is driven by businesses, funding 68% of R&D activity according to the most recent data (2018). The disbursement of public research funding is undertaken by UKRI, which brings together the seven disciplinary research councils, Research England and the UK’s innovation agency, Innovate UK. UKRI’s mission is, “to convene, catalyse and invest in close collaboration with others to build a thriving, inclusive research and innovation system that connects discovery to prosperity and public good.”

Funding is competitively awarded and, whilst the North receives a healthy amount, the majority goes to London, the South East and East of England (Table 1). In assessing the North’s innovation performance, we have analysed data relating to UKRI grant awards from 2015 to 2020.

Clearly significant concentrations of activity, funding, skilled people and more mature ecosystems in some of the more prosperous parts of the UK – most notably in London, the South East and the East of England.

**Table 1: Gross Expenditure on R&D by UK NUTS1 region (Source: ONS)**

<table>
<thead>
<tr>
<th>Region</th>
<th>Government &amp; UKRI 1</th>
<th>Higher Education 2</th>
<th>Business 3</th>
<th>Private Non-Profit 4</th>
<th>Total 5</th>
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</thead>
<tbody>
<tr>
<td>United Kingdom</td>
<td>2,460</td>
<td>8,740</td>
<td>25,048</td>
<td>823</td>
<td>37,072</td>
</tr>
<tr>
<td>North East</td>
<td>250</td>
<td></td>
<td></td>
<td></td>
<td>780</td>
</tr>
<tr>
<td>North West</td>
<td>749</td>
<td></td>
<td>2,031</td>
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<td>2,950</td>
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<tr>
<td>North East and North West</td>
<td>211</td>
<td>969</td>
<td>2,474</td>
<td>46</td>
<td>3,730</td>
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<tr>
<td>Yorkshire and the Humber</td>
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<td>597</td>
<td>921</td>
<td>3</td>
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<td>927</td>
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<td>2,306</td>
<td>303</td>
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<tr>
<td>South East</td>
<td>643</td>
<td>1,262</td>
<td>5,031</td>
<td>93</td>
<td>7,029</td>
</tr>
</tbody>
</table>

PUBLICLY FUNDED RESEARCH IN INDUSTRY

Innovate UK is the agency within UKRI which is focused on driving productivity and economic growth by supporting businesses to develop and realise the potential of new ideas, including those from the UK’s research base.

Since being established in 2007, Innovate UK has invested more than £2.2 billion to help businesses across the country to innovate. This has spanned more than 11,000 projects that have generated up to £16 billion in Gross Value Added for the UK economy and 70,000 jobs.

Innovate UK funding has been disbursed across the North of England with a total of £1014.4m spread over 3841 grants between 2015 and 2020 (inclusive). Of this money, £437.2m has been provided directly to businesses to fund R&D projects leveraging a further £269.9m of R&D spend.

Over this period, our analysis (fig. 5) shows that the North has received around 14% of total Innovate funding compared to 47% for London, the South East and East of England combined. The ratio is worse, 12%/56%, when direct funding to businesses is analysed (as opposed to Innovate funding to academic partners, Catapults and the like).

![Fig. 5: Comparative levels of Innovate UK funding](image-url)
Topic modelling and subsequent cluster analysis of research activities funded by Innovate UK in the North (fig. 6) shows that Local Authorities fall into 6 distinct clusters which display similar areas of expertise.

Cheshire East is the most successful Local Authority for securing Innovate UK funding with a total of £94m across the period, followed by York (£79.1m) and Sheffield (£70.4m) (table 2). Whilst it should be noted that some of these figures are skewed by funding to Catapults and other large centres, it simply highlights the requirement for that funding to be effectively translated into business growth support.

IDM’s analysis of this funding in relation to the Grand Challenges shows a mixed picture when considering the strengths of Northern businesses in these sectors (fig. 7). Given that these funding awards are disbursed through a competitive process, it is encouraging to see a slightly higher success rate for awards supporting Clean Growth & Infrastructure where the North has secured 16% of Innovate funding awards by value - a slight increase on its success rate of 14% for Innovate awards as a whole.

The picture in the other Grand Challenge sectors is not as bright. For grants awarded for projects in Manufacturing, Materials & Mobility, the North gained a 14% share of funding - in line with their overall average. For Ageing Society, Health & Nutrition awards, the North’s share was 13%. However, for AI & Data Economy grants, the North secured a lowly 5% of funds. This compares with the 82% of these funds that were awarded to businesses in the Golden Triangle of London, the South East and East of England.

It is accepted that the North has high quality businesses that serve the AI & Data Economy sector. However, if the North is to compete effectively across all four Grand Challenges, it has to take the lessons from other sectors, such as Clean Growth, and use these to improve its ability to secure R&D funding that will support the growth of these businesses.

<table>
<thead>
<tr>
<th>Area</th>
<th>Funding Name</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheshire East</td>
<td>Innovate UK</td>
<td>93,994</td>
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<td>York</td>
<td>Innovate UK</td>
<td>79,134</td>
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<td>59,309</td>
</tr>
</tbody>
</table>

Table 2: Top 5 Local Authorities by total grant value
As in the business sector, academic institutions across the North support a range of capabilities and research fields. However, analysis of research grant awards deploying Topic Modelling allows us to profile institutions and identify those Local Authorities clustered with similar areas of expertise (fig. 8).

Generation of sustainable business opportunities from the innovation base relies on the ability of institutions to effectively translate public research funding into commercial opportunity. This process is far from straightforward - not all research ideas bear fruit and some of those that do, only do so after multiple iterations. Therefore, to develop a contextualised picture of this capability across the region’s institutions, we have analysed performance by Higher Education Institutions (HEIs), as reported to UKRI, against each of the four activities that lead to commercialisation.

**Transfer of Knowledge**

**Dissemination of Knowledge**

**Protection of Intellectual Property**

**Commercial Exploitation**

As a comparator, data for both Oxford and Cambridge have been included since they are regularly held up as examples of best practice in research translation.

Knowledge transfer for publicly funded research principally arises from collaboration activity associated with that work. Collaborations can be with other academics, industry, charities or other groups (such as hospitals or other parts of the public sector). Looking across collaborative activity for northern Local Authorities from 2014-2020 (fig. 9), academic collaborations typically make up ca. 50% of activity. Amongst the most active authorities, Liverpool is the exception with more than 57% of their collaborations being with other academics and only 16% engagement with industry. By comparison, Newcastle is collaborating with the private sector 25% of the time while Manchester is as high as 29%.
Dissemination of Knowledge

Dissemination of research-generated knowledge happens most frequently through publication activity in peer-reviewed journals. Across the period studied, not surprisingly given the range and breadth of their research activities, Oxford and Cambridge engaged in the highest level of dissemination activity with each involved in over 6,000 examples (fig. 10).

Protection of Intellectual Property

Whilst not all intellectual property can or, indeed, should be formally protected through, for example, filing a patent, such activity is a key measure of translation and commercialisation. Patents, copyright and trade marks enable the potential generation of value from licensing and underpin spinout activity.

Across the region, Manchester leads the way with the highest number of intellectual property protections related to grants awarded between 2015 and 2020 (fig. 11). However, their activity is 45% lower than Oxford's and 27% lower than Cambridge over the same period.

Commercial Exploitation

The commercial exploitation of intellectual property originating from publicly funded research falls into two main areas - licensing and creation of spinout businesses.

Licensing (primarily to commercial entities) clearly has the potential to create value as the licensor exploits the technology but, whilst the license will secure a commercial return, the bulk of the value creation is less likely to happen locally since the licensee can be located anywhere.

The creation of spinout businesses, on the other hand, is more likely to result in local growth as such businesses tend to be located close to the institution where they are born.

Our research into spinout activity from Northern HEIs has found that there is no definitive and accurate list available within the public domain, or through paid for services. Indeed our own analysis (data not shown) has found that such lists can contain contentious assignments of spinouts to HEIs, where companies are tagged as spinouts of a particular University when in fact their origin lies elsewhere. Whilst this is not necessarily a result of erroneous reporting by HEIs, and is more likely be reflective of the poor quality of available data sets, we still looked at how we could establish a verifiable and more accurate measure of spinout activity that reflects the relative activity and cost of such activities to the tax payer.
In order to achieve this, we looked at UKRI funding that has been explicitly linked to a spinout via grant awards to HEIs in the North of England (fig. 12). Whilst one may argue that it will be incomplete, what it does represent is a bona fide source of data from which a direct relationship between an input (grant funding) and output (spinout creation) can be measured. All things being equal, it is likely that this will hold for all spinouts, and thereby provide a measure of the cost of spinout creation in each economy. It is also worth noting that we recognise that spinouts in different sectors will cost more, e.g. establishing a tech business with a secured patent portfolio will be more costly than for a software service business. Additionally, in this analysis, we are not looking at where the spinouts are currently located, simply where they originated. This serves as an objective measure of the spinout creation performance of HEIs in Local Authority areas across the North of England.

Interestingly, a scatter plot of Mean Grant Value per spinout (fig. 13) shows a linear relationship with $r^2 = 0.77$. This would indicate that there are no significant economies of scale or, in other words, putting more funding in does not increase the relative proportion of spinouts created per pound spent.

Looking at the performance, by Local Authority, in translating grant funding to measured outputs, we can assign a capability index. It should be noted that this is focused on identifying those geographies where best practice, across the region, could be accessed and is based on the objective measures that institutions are reporting to UKRI, in order to give the North the greatest opportunity to improve its overall capabilities in commercialisation of academic research.

Cluster analysis of these results allows us to identify those institutions with similar activities, producing 5 clusters whose members are listed in fig. 14. The characteristics of the cluster members are described in fig 15.

Cluster 1 contains mainly smaller institutions with an emphasis on dissemination and training funding. Interestingly, both Durham and Lancaster fall into this grouping.

Cluster 2 includes the larger research-intensive universities such as Oxford, Cambridge, Manchester, Liverpool and Leeds.

Cluster 4 (Hull and Salford) are heavily focused on training grants.
Figure 16 provides a comparative analysis of research and innovation outputs covering the phases of transfer, dissemination, protection and exploitation. The data covers those Local Authorities that have at least one research-intensive academic institution within their area with profiles being derived from the mean numbers of outputs (i.e. collaborations, publications, patents and spin-outs) per £100,000 of associated grant funding.

The cluster analysis above indicates where fair comparisons in performance should be made between peer groups of areas that have similar activities. Looking at cluster 2, which has the main impact on research-driven innovation we see that, interestingly, Oxford and Cambridge have very comparable profiles with relatively low levels of publications and high levels of innovation protection and exploitation. For the Northern institutions, on the other hand, publication activity seems to have a higher priority. This will directly impact their ability to protect innovations and it is not surprising to see that they fare less well in protection and exploitation activities.

Changing this behaviour and increasing the focus on research exploitation will provide a greater number of growth opportunities that can be exploited in the North.

Using IDM’s proprietary Business Premises Database, which monitors the operating locations of companies as opposed to their registered office address, the diversity of business activity across the North’s Local Authorities is clear to see. There are around 868,000 active business locations across the region and fig. 17 displays the mix of industrial sectors by Local Authority.
Taking this business landscape as a baseline, one key point that is immediately apparent is the difference in business make-up between component Local Authorities that constitute larger policy making bodies such as LEPs and Combined Authorities.

For example, there are distinct differences in the business mix of operating companies in Liverpool City Region Combined Authority with Halton, Knowsley and St Helens having a profile that is closer to that of areas such as Barnsley, Rochdale or Gateshead than Liverpool or Wirral.

Innovation-driven growth is particularly dependent on business activities in several key sectors such as Professional, Scientific & Technical, Manufacturing, Information & Communication and Human Health. The importance of those sectors locally can be measured by looking at the relative percentage of employment for each sector by Local Authority (fig. 18).

Turning to the resilience of the business base, comparison of business creation rates for 2020 with the yearly average for the period from 2015-2019 by sector and Local Authority (fig. 19) highlights those areas that have been most heavily impacted by the coronavirus pandemic. Once again, this shows the differentiated experience of Local Authorities within larger policy-making bodies. For example, by this measure, Manchester's business base has been particularly resilient, whereas other Local Authorities within Greater Manchester CA such as Trafford have seen a reduction in new businesses across several key sectors including Information & Communication and Human Health & Social Care.

As well as looking at how many new businesses are being formed, it is also important to consider those businesses that are being lost each year in order to understand the net gain in companies.

Data for the North as a whole, shows that numbers of companies experiencing an administration or liquidation event has been increasing each year since 2016. However,
there was a significant increase in these numbers during 2020 (fig. 20). These numbers will not yet reflect the full impact of the UK Government’s pandemic intervention measures as a number of companies that would otherwise have gone under will have survived through Government support. Indeed, there has been a sharp drop in the number of solvent company dissolutions which may reflect business owners keeping companies alive in order to access pandemic intervention schemes.

Looking across the region by Local Authority and sector (fig. 21), and comparing 2020 with the mean rate of company death, the impact of the economic slowdown is clear with cities such as Newcastle, Sheffield and Hull being particularly impacted. Indeed, the North East, generally, has seen increasing company deaths across key sectors such as Retail, Professional, Scientific & Technical and Manufacturing.

The net impact of business creation and death together can be seen in fig. 22.

The sectors that represent key areas for innovation-driven growth, such as Professional, Scientific & Technical, Manufacturing, Information & Communication and Human Health have all been impacted over the last 12 months. As the economy recovers, it is critical that the business base in these areas is restocked with the right companies, positioned to take advantage of growth opportunities aligned to emerging new industries.

Fig. 20: Trends in activities leading to business death

Fig. 21: Net business growth/death ratio by Local Authority

Fig. 22: Mean year-on-year change in business death (light blue indicates increasing number of businesses closing, dark blue is decreasing and mid-blue is no change)
The most recent data (2019) indicates that there are 6.98m people employed full-time, part-time or as registered business owners across the North. This number has been steadily rising over the last few years and represents an overall increase of 4.8% since 2018 (table 3).

As described above, analysis based upon the operating locations of businesses in the North shows that there are significant variances in employment by industry sector across the diverse range of Local Authorities in the region. Involvement with key sectors that can be growth accelerators tends to be focused around large centres of employment such as manufacturing infrastructure and major science parks.

<table>
<thead>
<tr>
<th>Year</th>
<th>Employment in North</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>6,659,235</td>
</tr>
<tr>
<td>2016</td>
<td>6,721,120</td>
</tr>
<tr>
<td>2017</td>
<td>6,834,365</td>
</tr>
<tr>
<td>2018</td>
<td>6,877,945</td>
</tr>
<tr>
<td>2019</td>
<td>6,981,150</td>
</tr>
</tbody>
</table>

Table 3: Annual employment in the North (Source: ONS)

Top 5 LAs by % employed

1. North Tyneside
2. Salford
3. Newcastle upon Tyne
4. Leeds
5. Manchester

1. Copeland
2. Barrow
3. Pendle
4. Ribble Valley
5. Wyre

Rates of employment through 2020 have clearly been impacted by the pandemic and the UK Government’s response. The Coronavirus Job Retention Scheme (CJRS) was established by the Government early in the pandemic to mitigate the consequences of the subsequent economic slowdown on companies’ ability to continue employing staff by enabling them to place employees on furlough, paid for by the state. Looking at the usage profile for the scheme, the majority of Local Authority areas in the North have seen take-up in line with the national average, although there have been some areas, particularly those with tourism-driven economies such as Blackpool and parts of Cumbria, where use of the scheme has consistently been higher than average (fig. 23).

Looking across sectors (fig. 24), there is, typically, a consistency in the approach of businesses to furloughing staff, independent of Local Authority boundaries and local policy.
The effectiveness of CJRS furloughing means that the full consequences of the pandemic on employment metrics as a measure of local pandemic impact has yet to be seen. Many jobs, that would otherwise have been lost, have been protected by the scheme. Whilst the most recent figures put national unemployment levels at 1.72m (5.0%) for the September to November 2020 period, most economic commentators are forecasting a significant rise once the CJRS comes to an end. Official estimates indicate that as many as 2.2 million (6.5%) will be unemployed by the end of 2021. Whilst this is lower than earlier estimates, following the extension of the CJRS until September 2021 in the recent budget, this represents an increase of 490,000 over this year.

However, the most recent data for unemployment (December 2020), as measured by numbers of benefits claimants, shows that there have been significant increases in claimant numbers across the North with the overall rate for the region rising from 3.5% of residents aged 16-64 to 6.8% over the last 12 months. This compares with a national increase from 2.9% to 6.4% by the same measure.

Some Local Authorities have already been heavily hit (fig. 25) with areas, such as York and parts of Cumbria, having seen a >150% increase in the proportion of their populations that are unemployed. Others, such as Blackpool, Middlesbrough and Greater Manchester have seen less dramatic, but still significant increases from a much higher baseline.

Developing the quality of the Northern workforce to ensure that advantage can be taken of growth opportunities in potentially new sectors and industries will be based upon a steady flow of technically and academically qualified students. Feeding the workforce with skilled employees across the spectrum requires us to improve the prospects for students at the lower end of the range and raising the quality of students at the higher end. This starts with secondary education and ensuring that students are properly prepared for entry to the workforce or further study.

### WORKFORCE OF THE FUTURE

### SECONDARY EDUCATION

The proportion of 16-24 year olds Not in Education, Employment or Training (NEET) is a key measure of success for the secondary education system. Historically, levels of NEETs have generally been higher across the regions of the North compared to the rest of England (fig. 26).

In the most recent 2019 Labour Force Survey by ONS, the North East (16.8%), North West (14.4%) and Yorkshire and the Humber (12.5%) all recorded levels that were significantly above the national average for England of 11.3%.
Looking at schools’ output data in more detail, the performance of Local Authorities across the North gives significant cause for concern. Fig. 27 shows Progress 8 outputs at Key Stage 4 (GCSE) across the region. Progress 8 is a measure that aims to capture the progress a pupil makes from the end of primary school to the end of secondary school. It is a type of value added measure, which means that pupils’ results are compared to the actual achievements of other pupils with similar prior attainment. Taking the data for 2019 (2020’s results were impacted by the move to Centre assessed Grades as a result of the pandemic), more than 70% of Local Authorities across the North reported Mean Progress 8 scores that were below the national average for England.

The picture for Attainment 8 - a measure of students’ achievement across a range of 8 subjects - is similarly bleak with two-thirds of Local Authorities reporting figures below the national average (fig. 28).

Clearly, there are notable exceptions in these numbers and many will point to local socio-economic factors in explanation of poor performance. However, this is not always an explanation. For example, Knowsley has the worst Progress 8/Attainment 8 performance in the North, whilst Blackburn with Derwen is one of the best performing Local Authorities. Index of Multiple Deprivation data puts both areas in the same decile when looking at the seven domains of deprivation.

The simple truth is that, if it is to improve the quality of its workforce going forwards, the North needs to improve the quality of its education provision. As areas like Blackburn with Derwen have shown, this is achievable and Local Authorities should seek to identify and implement best practices from successful peers to ensure that the North’s young people get the best educational opportunities available.
HIGHER EDUCATION

Students are attracted to the North’s academic institutions from all over the world (fig. 29). However, just over half (52%) of those students are home grown in the region and have chosen to stay in the North to study. Of the remainder, 28% come to the North from elsewhere in the UK with a further 20% from overseas.

With regard to subjects of study for students (fig. 30), 46% are studying in what could be regarded as innovation intensive subject areas, namely, medicine and life sciences, mathematical and physical sciences and engineering and technology. As one would expect, the top five Local Authorities by student numbers in these disciplines are Manchester, Sheffield, Liverpool, Leeds and Newcastle.

The ability to retain high quality graduates in the North after their studies is a key contributor to growth and development of the workforce to support new innovation opportunities. Historically, the north has generally fared well in keeping hold of its graduates relative to the rest of the UK. A recent survey by Knight Frank and UCAS indicated that, across the five main cities in the North, between 35% and 43% of students surveyed indicated an intention to remain post-graduation (fig. 31).

Looking beyond local graduate retention, of more importance is the ability to retain talent across the North as a whole. Analysis of data from the most recent HESA Graduate Outcomes study shows that 65% of students that study in the North are working in the North 5 years after graduation. Whilst this may appear to compare favourably with London, which also retains 65% of its students, a total of 88% of London graduates remain in either London, the South East or East of England. Of greater concern is that only 4.3% of graduates who studied in London, the South East or East of England end up working in the North 5 years later (fig. 32).

This would imply that the North of England is still not generating significant levels of opportunities that will attract graduates to the region and simply highlights the need to produce higher levels of growth aligned to dynamic industries. In short, the North is not competing effectively for the best talent that the UK has to offer. If the region is to grow, it requires more talent, and history indicates that this will be difficult to secure.
There is a rich tapestry of innovation facilities distributed across the North supporting life sciences, technology, manufacturing and engineering with almost a fifth of the UK’s incubators and a sixth of the country’s accelerators (table 4). Remarkably, 60% of the UK’s accelerators are sited in London, the South east and East of England.

<table>
<thead>
<tr>
<th>Region</th>
<th>Number</th>
<th>% of UK Total</th>
<th>Number</th>
<th>% of UK Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>36</td>
<td>17%</td>
<td>23</td>
<td>14%</td>
</tr>
<tr>
<td>London, South East and East</td>
<td>79</td>
<td>38%</td>
<td>96</td>
<td>60%</td>
</tr>
<tr>
<td>Midlands</td>
<td>39</td>
<td>19%</td>
<td>19</td>
<td>12%</td>
</tr>
</tbody>
</table>

Table 4: Incubator/Accelerator numbers by region (Source: BEIS)

Further innovation space continues to come on stream across the region with a move away from the standard science park model towards integrated innovation districts. Newcastle Helix is a £350m development that brings together business, academia and residents in a 24-acre innovation quarter in the centre of Newcastle. With a focus on data science, urban science and life science, Newcastle Helix is already home to the National innovation Centre for Ageing and the National Innovation Centre for Data and is a core component of the North East LEP’s Local Industrial Strategy.

A similar approach is envisaged for the innovation zone within the Salford Crescent development in Greater Manchester with a focus on technologies that support Healthier Living as well as, potentially the ID Manchester project, with developments in other cities underway or in planning.

A key aspect of the Newcastle Helix development is the integration of a Living Lab within the development masterplan. Living Labs are a developing concept based around user-centred, open innovation environments that integrate public, private and people stakeholder groups where users are fully engaged in the research and innovation process. Going one step further than innovation districts, the concept promotes an environment with a high degree of interaction and knowledge flow extending beyond the physical boundaries of any Innovation Zone, into the surrounding area, engaging a wider and more diverse stakeholder group. Not only does this foster and encourage business growth, but it provides wider benefits to the community at large.

A Living Lab needs people to stimulate multiple levels of interactions between stakeholder groups and, as such, is not something that can be simply constructed as a building. They address key issues affecting communities and their development, ranging from infrastructure to the environment, and education to public services and, ultimately, generate the critical mass to establish a “way of working and a way of living.”

A search of the web will yield various views and examples of Living Labs that are currently operating and designated as such. These range from groups of Universities working together to promote skills development, transfer of knowledge and sharing of research efforts with an aim to support the development of communities; to focused University efforts towards supporting a change in society and the way it is assembled; to entire campuses that focus on turning ideas into new commercial ventures with the aim of improving the health and well-being of residents and the economy.

At the heart of such examples is a clear focus on priorities to establish a working environment (physical and people focused) that addresses challenges to improve the lives of all members of a community.

The University of Manchester are running a number of Living Lab initiatives ranging from teaching and pedagogy, to energy and sustainability and low carbon. Manchester Metropolitan University’s Living Lab is also focused upon sustainability and the circular economy.

In looking to support new industries that feed into the Grand Challenges, Living Labs can provide an effective model that will not only benefit stakeholders, but encourage businesses to relocate to take advantage of the innovation and growth opportunities that Living Labs represent.

Historically, one of the main challenges for Local Authorities across the North has been provision of grow-on space for successful businesses. Understandably, individual Local Authorities are keen to retain companies within their boundaries but, as sub-regional entities, there is only so much that they can do to meet the growth needs of dynamic business success stories. This would be improved by a pan-North approach that seeks to ensure that, if a company cannot expand within the region that it was incubated, that company is accommodated elsewhere in the North.

The goal of the Manchester Cycling Lab is to turn Manchester into a real-life laboratory for the study of cycling. This involves working in collaboration with Manchester City Council, Transport for Greater Manchester (TIGM) and local businesses to identify the gaps in knowledge that need to be filled in order to facilitate the Velocity programme and transform Manchester into a cycling city.
The growth of effective clusters is a key component of innovation policy. The UK tends to take a parochial view of clusters, which are typically viewed on a small geographic scale. Whilst local interactions and collaborations are undoubtedly a good thing, there are opportunities for the North to foster such interactions across the region rather than having component geographies vying with each other.

There are many examples where large, established companies exit facilities (and, potentially, the region) due to changes of strategy or business. These have the potential to be catastrophic for individual Local Authorities and a workforce that has taken years, if not decades, to build and skill.

One example was the relocation of AstraZeneca away from its major research centre at Alderley Park in Cheshire. The site employed around 2,500, highly skilled staff when the move from the 400-acre, world-class facility was announced and, although a number of staff were offered the chance to relocate, the move threatened hundreds of jobs.

A collaborative bid from the Local Authority, Cheshire East, property company Bruntwood and Manchester Science Parks (whose shareholders include the University of Manchester, Manchester Metropolitan University, Manchester City Council and Salford City Council as well as Bruntwood) secured the future of the facility. Alderley Park is now home to more than 60 established and 150 pre-start up companies in life sciences and technology with more than 2,000 people employed on site.

This is an example of how collaborations across Local Authority and LEP boundaries can benefit all parties and this type of approach needs to be deployed more often if the North, as a whole, is to be successful.

There are currently 2 examples of similar challenges where the North can bring its overall strength to bear to find a solution.

- GlaxoSmithKline’s plant at Ulverston in Cumbria is due to close in 2025.
- Vauxhall’s Ellesmere Port car manufacturing plant is under strategic review.

Pharmaceutical manufacturing is a key driver of the North’s economy with a range of facilities located across the region. GSK has been manufacturing drugs at Ulverston for over 70 years and, whilst Lakes Biosciences has plans to build a new manufacturing facility on land to be purchased from GSK, the closure presents an opportunity for the broader sector network in the North to develop an innovative solution that ensures, not only that skills are retained, but that value and growth can be generated for existing capability.

Vauxhall’s plant at Ellesmere Port has been periodically under threat of closure as its parent company’s fortunes have changed. However, with the UK Government’s commitment to ban the sale of new internal combustion engined cars from 2030, the site’s owner, Stellantis, has indicated that the site’s future is again under review. One option is manufacture of a new electric vehicle but there are questions about the economics of importing batteries for production in the UK. Given the North’s role in automotive battery manufacture - Envision’s plant in Sunderland has capacity to produce 1.9GWh per year and is currently operating under capacity - there are opportunities to develop a solution that, again, benefits the region as a whole and creates added value.

Similar opportunities will continually arise due to the changing nature of business. Policy should be developed to ensure that these are captured for the benefit of the North as a whole. This will require the use of all of the region’s capabilities to support redevelopment/reuse in order that both skilled workforce capabilities are retained and growth is secured.
FUNDING

Amongst the biggest challenges in funding innovation - and particularly translation - are funders’ appetites for risk and their willingness to be patient whilst supporting companies as they grow. This challenge is not unique to the UK’s regions, but it is there where it is felt most acutely, as compared to London and the Southeast.

Successive UK Governments have sought to use the tax system to incentivise investment into early innovation through schemes such as the Enterprise Investment Scheme (EIS) and its sister Seed Enterprise Incentive Scheme (SEIS), and this enlightened approach is welcome. However, they have generally deployed too short term an outlook.

Moreover, EIS and SEIS funding highlight the discrepancy in funding with London, the SouthEast and East of England accounting for around 75% of the £1.99bn of EIS/SEIS funding raised by companies in 2018/19 (table 5). By comparison, the North secured around one tenth of that amount. The average raise under EIS for Northern companies was £407,000, compared to £504,000 for London, the South East and East. The average amounts raised under SEIS were £72,000 and £85,000 respectively.

The UK, never mind the North, has never had an end-to-end solution for innovation funding. Interventions have generally been early and confounded by the inability or reluctance of fund managers to identify potential winners early and stick with them. This is largely due to the model by which fund managers are judged and, crucially, remunerated, which provides no incentive for them to take any level of significant risk.

One of the key funds specifically targeted at the North is the Northern Powerhouse Investment Fund (NPIF). A collaboration between the British Business Bank and ten Local Enterprise Partnerships (LEPs) in the North West, Yorkshire, the Humber and Tees Valley, the fund is investing more than £500m between 2016 and 2021. Funding is drawn from several sources including the UK Government, the European Investment Bank, the British Business Bank and the European Regional Development Fund (including nominal allocations from 10 out of the 11 Local Enterprise Partnerships (LEPs) in the North of England). There is a separate £120m North East Fund that covers the North East LEP area.

Table 5: EIS/SEIS investment by region (2019) (Source: HMRC)

<table>
<thead>
<tr>
<th>Region</th>
<th>No. Companies</th>
<th>Amount Raised (£m)</th>
<th>% of UK Total Raised</th>
<th>No. Companies</th>
<th>Amount Raised (£m)</th>
<th>% of UK Total Raised</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>40</td>
<td>14</td>
<td>0.8%</td>
<td>38</td>
<td>2</td>
<td>1.2%</td>
</tr>
<tr>
<td>North West</td>
<td>190</td>
<td>103</td>
<td>6.4%</td>
<td>106</td>
<td>7</td>
<td>3.6%</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>90</td>
<td>40</td>
<td>2.2%</td>
<td>58</td>
<td>4</td>
<td>2.5%</td>
</tr>
<tr>
<td>East of England</td>
<td>120</td>
<td>103</td>
<td>6.7%</td>
<td>105</td>
<td>11</td>
<td>6.5%</td>
</tr>
<tr>
<td>South East</td>
<td>180</td>
<td>105</td>
<td>6.4%</td>
<td>128</td>
<td>17</td>
<td>0.9%</td>
</tr>
<tr>
<td>London</td>
<td>1,050</td>
<td>1,050</td>
<td>50.0%</td>
<td>1,050</td>
<td>1,050</td>
<td>50.0%</td>
</tr>
<tr>
<td>UK Total</td>
<td>2,188</td>
<td>1,204</td>
<td>51.0%</td>
<td>2,188</td>
<td>1,204</td>
<td>51.0%</td>
</tr>
</tbody>
</table>

As a consequence of this challenge, fund managers generally spread their funds widely in small amounts rather than make fewer, more selective but meaningful, large investments. This approach starves companies of true development capital in an environment where there are currently few significant alternatives.

Recent data on UK equity funding in the regions, undertaken in 2019 by the UK Government Department for Business, Energy and Industrial Strategy (BEIS) confirmed the pre-eminence of London, the South East and East of England, highlighting that they received 67% of all equity deals and 75% of all invested funds in the UK over the period studied (2011-2017) with the three regions receiving higher proportions of investments than would be anticipated based upon their respective numbers of high growth firms (HGFs) and small and medium-sized enterprises (SMEs).

Despite the impact of the pandemic, Venture Capital funding in the UK still grew slightly in 2020, increasing from £11.6 bn to £11.7 bn (fig. 33).

Several external stakeholders identified that fund managers had a different approach to risk, and that they would like to see a greater risk appetite. This is an inherent challenge with the Fund: levels of risk will inevitably vary across the North, reflecting the types of businesses supported and local contexts, but the overarching rationale for NPIF is to provide finance to higher risk propositions that cannot secure finance from private sector sources. At the same time, the Fund also needs to generate a positive return (overall) and repay the EIB and Bank’s loan.

The most recent evaluation of NPIF’s progress highlighted issues with the fund’s appetite for risk.
However, as described in table 6, the North’s share of that investment pales when compared to Oxford and Cambridge, let alone London.

Comparing access to public and private sector funding, a major disconnect is apparent (table 7). Of the £37.1bn Gross Expenditure on R&D (GERD) across the UK in 2018, the most recent period reported, 14% was in the North compared to 53% in London, the South East and East (the so-called Golden Triangle). Innovate UK funding to business between 2015 and 2020 is very close to this ratio. However, private funding is heavily skewed in favour of the Golden Triangle with almost 11 times as much EIS/SEIS funding heading there and 14 times as much VC funding in 2018. The picture was even worse in 2020 with more than 21 times as much VC funding going to the Golden Triangle.

Sectors relevant to the Grand Challenges were key beneficiaries of this funding with 86% of funds raised being focused on tech, healthcare, transportation and energy (fig. 34).

Structurally, there are two major issues around private sector funding of innovation in the North.

Firstly, the proportion of capital flowing to the North to support the R&D activity that is happening there is clearly insufficient for the volume of R&D being performed.

Secondly, the money that is flowing to the North is not being deployed as efficiently as it could be in support of dynamically growing businesses.

If we are to truly level up in the UK regions, there needs to be equivalent opportunity of funding for businesses. An eco-system needs to be created in the North that provides end-to-end funding that is targeted at key industry sectors. That funding needs to not only support businesses early in their life cycle, but provide follow-on funding that leverages agreed relationships with selected Venture Capital funds who are focused on those key sectors. Executed correctly, this will not only improve the growth potential for local businesses, but will attract businesses from outwith the region and support the development of true clusters for the key industrial sectors that will be at the core of growth in the North going forward.

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Table 6: Venture Capital Investment in key UK cities (Source: Technation/Dealroom.co)

<table>
<thead>
<tr>
<th>City/hub</th>
<th>Venture capital investment (in m)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>London</td>
<td>10,700</td>
<td>10,430</td>
</tr>
<tr>
<td>Oxford</td>
<td>1,350</td>
<td>532</td>
</tr>
<tr>
<td>Cambridge</td>
<td>496</td>
<td>295</td>
</tr>
<tr>
<td>Manchester</td>
<td>203</td>
<td>71</td>
</tr>
<tr>
<td>Newcastle upon Tyne</td>
<td>21</td>
<td>80</td>
</tr>
<tr>
<td>Leeds</td>
<td>34</td>
<td>45</td>
</tr>
</tbody>
</table>

Table 7: Relative share of GERD, Innovate, EIS/SEIS, VC funding for North v Golden Triangle

<table>
<thead>
<tr>
<th></th>
<th>North</th>
<th>Golden Triangle</th>
</tr>
</thead>
<tbody>
<tr>
<td>GERD 2018</td>
<td>14%</td>
<td>53%</td>
</tr>
<tr>
<td>Innovate Businesses only 2015-20</td>
<td>12%</td>
<td>56%</td>
</tr>
<tr>
<td>EIS/SEIS 2018/19</td>
<td>7%</td>
<td>76%</td>
</tr>
<tr>
<td>VC 2018</td>
<td>6%</td>
<td>84%</td>
</tr>
<tr>
<td>VC 2020</td>
<td>4%</td>
<td>86%</td>
</tr>
</tbody>
</table>

---

Fig. 34: UK Venture Capital investment by sector (2020) (Source: Technation/Dealroom.co)
Conclusions and Recommendations

The data in this report highlights a number of key challenges that need to be addressed if the North is to improve its ability to deliver innovation-led growth consistently across the region. This requires both changes in behaviours across the region as well as support and intervention from UK Government.

For any levelling-up agenda, it is not simply about raising standards in the North compared to the rest of the country, but within the North’s individual policy-making areas.

A range of attitudes and behaviours across the region need to change if the North is to have any chance of levelling up its constituent parts.

Local and Combined Authorities need to recognise and accept their differences. Not all cities can or should be the same - just because one city has something doesn’t mean that the other Northern cities also need to have one. What is more important is that the North’s collective offering is effectively and efficiently co-ordinated and presented in such a way to attract business, research and workers to the region.

Policy making across the North needs to become more agile and responsive to take advantage of the growth opportunities that are available. Dynamically growing businesses need to be supported and nurtured to ensure that they achieve their full potential. Increasing the cohort of high-growth businesses will not only provide more opportunities for the local workforce but will improve the attractiveness of the North for qualified and skilled workers from elsewhere in the UK.

A higher level of performance monitoring needs to be applied across policy areas. It is not enough to simply report outputs, with the view, heard all too often, that, “It’s always been this way.” Decisive and effective interventions need to be made in response to under-performance to achieve positive change.

A greater level of collaboration is required across the region - particularly in relation to innovation-led growth. Rather than expecting innovation to thrive in isolation, those groups that share cluster characteristics should work together to provide solutions for all and then test and propagate those solutions in other areas across the region.

The speed of translation of innovation needs to be increased and made more effective. This must be achieved without the layering of a multitude of different structures. It is essential that the complexity of the support network for growing businesses is reduced and simplified.

Recommendations

1. Establish a Northern Innovation Forum to streamline, co-ordinate and implement innovation policy for the North.
2. Innovation policy needs to broaden its reach outside of city centres to foster activity in the region’s towns.
3. Actively facilitate clustering of research and commercial activity across Local and Combined Authority boundaries.
4. Propagate experience gained from success across the five pillars of innovation - whether it be in establishing centres such as the Advanced Manufacturing Research Centre in Sheffield or improved school performance in Blackburn - to support levelling-up across the region.
5. Incentivise the development of mixed-use, innovation-led infrastructure that benefits the community at large.
6. Refill the Northern Powerhouse Investment Fund with funds specifically targeted at dynamically growing businesses in the developing industry sectors aligned with the Grand Challenges with fund management incentives that reward greater risk taking.
7. Leverage existing tax reliefs to drive early-stage funding into regional businesses.
8. UK Government should raise capital allowances to incentivise growth in the North’s manufacturing businesses.
9. Use the planned overall increase in public funding of research to increase the proportion of funding for academic research that is specifically tied to industrial collaboration and commercialisation.
10. Provide incentives for venture capital and private equity funds to invest in businesses in the region.
Methodology

Data Sources

The data were sourced principally from:

- Impact Data Metrics proprietary place-based datasets. These include the IDM Business Premises database, which is generated from multiple data sources and provides an accurate picture of operational (not registered) addresses for businesses. Examples of businesses provided herein are sourced from original desk research undertaken by IDM.

- The UK Office for National Statistics (ONS).

- UKRI Research Grants - analysis is based on listed unique UKRI grant records with a start date between 2015 and 2020 inclusive and which have an award or expenditure value ascribed to them. This represents 59.2% of all grants in the period.

Data analysed and presented within this report includes public sector information licensed under the Open Government Licence v3.0.

Topic modelling and Cluster Analysis

The topic modelling analysis within this report was undertaken by creating a corpus of text for each local authority area, which was then processed (by removing numbers, punctuations, and a variety of common terms such as limited in company names, names of places, etc.) to generate a document term matrix. This enabled a review of word frequencies to be undertaken to identify an optimal number of topics for the text used by employing Latent Dirichlet Analysis (LDA).

Outputs were assessed by looking at the coherence score for each model and determining the number of topics that were sufficient to describe the diversity of the subject matter. Using the model that was generated, the top terms for each of the topics was extracted. The model was then used to generate assignments of topic prevalence to the original data for each of the Local Authority areas.

A similarity grouping was generated using hierarchical clustering to aid visualisation. Using these data, a cut-off value at which all 71 LAs were represented in the topic analysis was developed, summarised and plotted.

Outside of Topic Modelling, K-Means clustering was also employed.

In presenting cluster characteristics, error bars were removed for simplicity of presentation.

About Impact Data Metrics Ltd

Impact Data Metrics Ltd ("IDM") is a knowledge and insight generator which supports clients in making better, more informed decisions.

IDM deploys its proprietary AI and machine-learning technologies to ingest, clean, organise and integrate data to allow knowledge generation to take place. We have collated billions of public and semi-public data records which we have refined and structured to answer key questions across Economic Development, Property, Healthcare and Research & Innovation. Adding editorial expertise to the analysis of these proprietary datasets allows us to generate real-time knowledge and insights.

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References

2. A high-growth, or scale-up company is one that has achieved growth of 20% or more in either employment or turnover year on year for at least two years, and with a minimum employee count of 10 at the start of the observation period - OECD.
7. UK gross domestic expenditure on research and development (R&D), 2018; ONS, 2nd April 2020.
8. Unless otherwise indicated, analysis of innovation performance is based upon data and reported outputs for UKRI grant awards between 2015 and 2020 inclusive.
10. UKRI.
11. Using data from Innovate UK active funding awards with project start date 2015-2020, Published February 2021.
18. http://www.energy.manchester.ac.uk/research/university-living-lab/