Department for
Business, Energy
& Industrial Strategy

LEP Outlook Report 2019

An assessment of economic performance of Local Enterprise Partnership geographical areas

July 2020

Acknowledgements

Executive Summary

Local Enterprise Partnerships (LEPs) are private sector led partnerships between businesses and local public sector bodies responsible for establishing priorities for public funding in the local area that they cover. Following their inception in 2011, LEPs have delivered over £9 billion worth of publicly funded projects through their management of Growth Deals, and other policies channelled through them.

The motivation for this LEP Economic Outlook report was two-fold. First was to bring together accessible open data that can be used to represent aspects of economic performance in LEP geographies under a single public resource. Such data can be used by the LEPs themselves in developing their economic strategies and by others interested in economic performance in LEPs.

The second motivation was to propose a framework of economic performance that arranges the 83 selected indicators alongside dimensions of productivity corresponding to the foundations of the Industrial Strategy White Paper: Ideas, People, Infrastructure, Business Environment, and Place. Such structure enables LEPs and other users to assess relative economic performance for many purposes but specifically for Local Industrial Strategies committed in the White Paper.

The importance of generating and exploiting new ideas for innovation and the role this plays in improving the productivity is captured in the ideas dimension alongside 16 indicators. There is a strong correlation between spending in R&D and innovation outputs, and between these two and productivity growth across countries and firms. The LEP Outlook shows areas of the North as well as the South are performing well in R&D investment and in innovation outputs such as patents. The detail in addition highlights high performing areas in Leeds or Sheffield, particularly when factoring in recent growth in these activities compared to others.

The people dimension encompasses the quantity and quality of labour supply and demand across LEP geographies using 25 indicators. The descriptive analysis shows that places with a limited number of higher education qualifiers also tend to experience skills shortages. The uneven distribution of skills can be associated with the urban-rural divide, where rural areas also experience negative growth in a pool of highly qualified individuals.

The quality of a region's physical, digital and natural infrastructure, is known to improve productivity significantly by encouraging worker reallocation, enabling agglomeration effects through business clustering, and attracting investment and trade. Throughout 16 indicators, the LEP Outlook shows that residents of urban areas are also more likely to enjoy expansive transport links. These areas also tend to present with lower transaction costs when considering the movement of goods and services. Further, as a result of better infrastructure links, urban economies also tend to achieve lower per capita emissions, although this comes at the expense of lower overall air quality.

The business environment dimension deploys 15 indicators to cover the competitiveness of the different local economies. Indicators that reflect how competitive or dynamic an area is consider entrepreneurship, export activity, amongst others. For example, the report finds that businesses in Oxfordshire, Worcestershire and South East Midlands have the highest incidence of scale ups, which in turn may explain their economic success compared to others.

In recognition of the importance of "place" in understanding an area's strengths and weaknesses, the place dimension consists of a selection of indicators from the other four dimensions. The 23 place indicators draw out those characteristics of LEPs that make them distinctive from other places and attractive as an area to reside, work and/or visit. For example, it is one thing to have access to static indicators such as workforce size, which tells businesses how much labour is available at a point in time. However, it is more insightful to see how labour flows in and out of a place (i.e. migration flows), which reveals if an area is attractive enough to retain qualified labour.

This is the first attempt to bring together multiple indicators from disparate sources with the aim of equipping LEPs with the kind of evidence that enables robust and comparative analysis of local economies across England. The chapters within this report give an overview as well as more detailed analysis of regions bound by LEP geographies. The results demonstrate the diverse distribution of drivers of productivity and will facilitate benchmarking of LEP-level economic performance.

The indicator framework presented in the Outlook was populated with available data in the summer of 2019. As a result, some indicators will no longer consist of the most recent data at the time of publication.

Contents

The LEP Outlook

Context for the LEP Outlook

Local Enterprise Partnerships (LEPs) are private sector led partnerships between businesses and local public sector bodies responsible for establishing priorities for public funding in the local area that they cover. They were set up in 2011 and have since 2014 delivered in excess of £9 billion publicly funded projects allocated through three rounds of Growth Deals[1]. LEPs were set up to reflect functional economic geographies better than other institutional structures[2], but at the time robust data suitable to represent economic performance of these emerging geographies was not available.

LEPs nowadays offer a unique infrastructure for championing and catalysing growth in their local areas, as well as providing a platform for balancing the economy more generally. The Industrial Strategy White Paper of 2018[3] and subsequent review of LEPs' role as local government institutions strengthened the position of LEPs as key strategic partners in the design and management of future local growth funding[4]. Among several commitments to reposition LEPs as strategic partners for local growth policy was a recommendation to publish an economic outlook of LEPs. This commitment was in recognition of a gap in the Government's understanding of LEPs that had been identified as a weakness for devolution policy design and implementation more generally[5].

Partly due to data availability, LEPs have traditionally lacked a common transparent framework to represent economic performance and its determinants in the geographies they cover. This has traditionally led each of the 38 LEPs to commission their own independent analysis and forecasts, resulting in fragmentation and duplication of evidence for policy making. This LEP Outlook 2019 is a first attempt to bring together as many indicators as there are currently available at the LEP geography level, and arrange them alongside five dimensions that correspond to the five foundations of the UK Industrial Strategy: Ideas, People, Infrastructure, Business Environment, and Place.

There have been multiple other frameworks of indicators of performance across LEPs, for example by the Smart Specialisation Hub[6], BEIS itself[7] or the Enterprise Research Centre[8], each of these have typically covered particular aspects of economic geography and performance. The LEP Outlook 2019 is a summative review of suitable metrics in all of these, plus others suggested in consultation with stakeholders across the country. The resulting selection has been curated by analysts, policy makers, and the LEPs themselves, to represent the most comprehensive set of robust indicators available to date at LEP level.

The LEP Outlook 2019 is a tool for benchmarking LEPs according to aspects of their economic geography. Deeper analysis and context is needed to ascertain how the relative position of LEPs against others in one or another indicator or dimension impacts on the LEP performance

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[1] https://www.gov.uk/government/collections/local-growth-deals Link
[2] http://researchbriefings.files.parliament.uk/documents/SN05651/SN05651.pdf Link
[3] https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future Link
[4] https://www.gov.uk/government/news/government-proposes-shake-up-of-local-enterprise-partnerships Link
[5] https://www.intechopen.com/books/perspectives-on-business-and-management/measuring-urban-development-and-city-performance Link
[6] https://smartspecialisationhub.org/lep-profiles/ Link
[7] https://www.gov.uk/government/collections/science-and-innovation-audits Link
[8] https://www.enterpriseresearch.ac.uk/publications/uk-local-growth-dashboard-2018/ Link

altogether. As such the Outlook of LEPs 2019 is not to substitute economic analysis of what determines overall economic performance but to be a consistent input into such analysis, be that for strategic or for monitoring processes in LEPs and their funders.

In the current policy landscape of producing economic plans or agreeing local industrial strategies the LEP Outlook could usefully release resources of LEPs from doing comparative analysis on these common indicators to dedicate to adding the context needed to understand the observed positions of each LEP compared to others. This local context is something the LEPS themselves are best placed to do as they have a deeper knowledge and can engage local stakeholders in explaining the observed patterns.

In addition, as the sources of these indicators are free and available to all, the LEP Outlook puts all LEPs on an even keel to access and analyse their relative positions, or to seek detail on the aspects of economic performance captured by these indicators. This will increase transparency and reduce inequality in access to comparative evidence, whilst improving intelligence for local decision making, and enhancing the value of local knowledge to explain differences captured in the LEP Outlook.
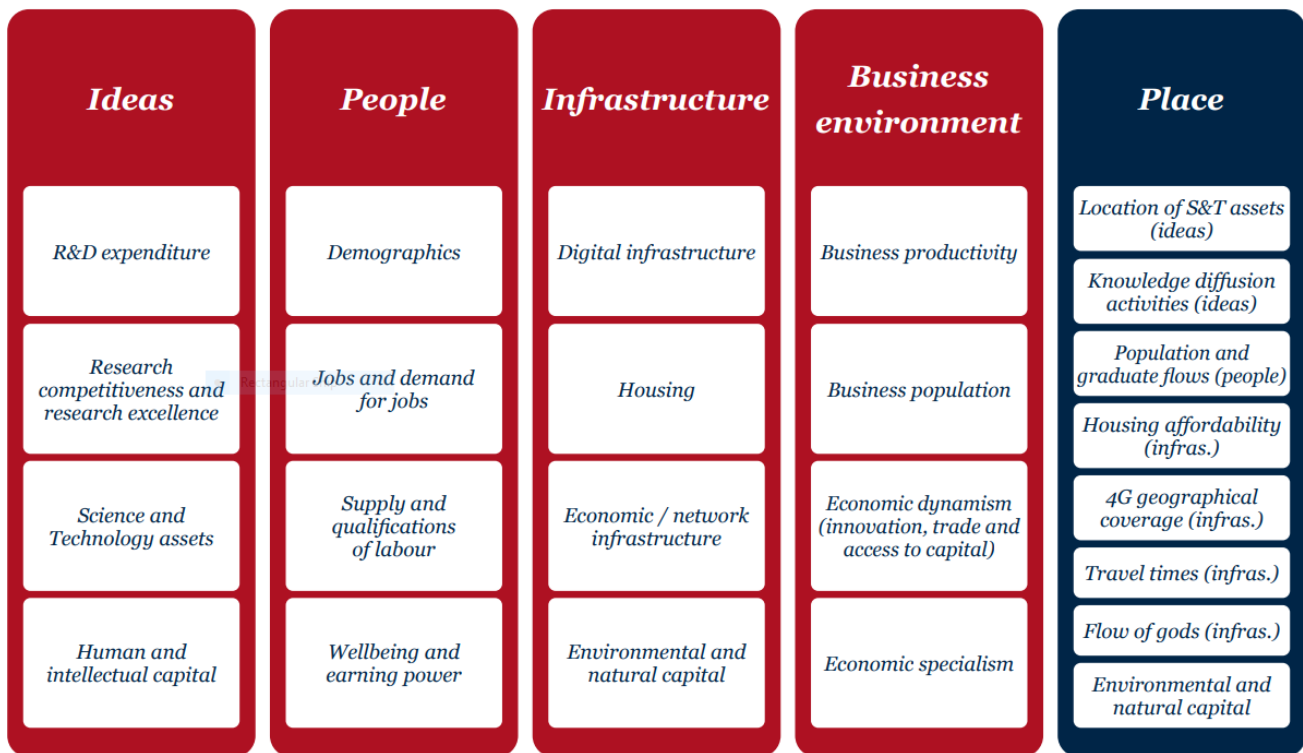
The Outlook's indicator framework

The LEP Outlook provides a snapshot and current trend information on a variety of relevant indicators for LEP area geographies, aligned with the UK Industrial Strategy. It is a living document that will evolve in response to growing data availability, changing trends in policy making, and changes in the LEP geographies. It has been developed after broad consultation with relevant stakeholders, including BEIS, the Local Industrial Strategy Analysts Panel (which contains members across Government), and several LEPs in coordination with the LEP Network.

The proposed Indicator Framework for the 2019 Outlook builds on the UK Industrial Strategy, which identifies five foundations strongly linked to local productivity growth: Ideas, People, Infrastructure, Business environment, and Place. The 2019 Outlook provides indicators for each of those five foundations, based on available data, providing comparable baseline information across the 38 LEP geographies. It provides a good resource for building narratives that are evidence-based, as well as more complex studies that attempt to capture and model causal links between those indicators and local productivity growth.

The dimensions covered in the framework are outlined in Figure 1, below. The next sections describe the indicators compiled and the national picture emerging from the data, for each of the foundations.

Figure 1 Indicator dimensions of the 2019 Outlook

Ideas	People	Infrastructure	Business environment	Place
R&D expenditure	Demographics	Digital infrastructure	Business productivity	Location of S&T assets (ideas)
Research competitiveness and research excellence	Jobs and demand for jobs	Housing	Business population	Knowledge diffusion activities (ideas)
				Population and graduate flows (people)
				Housing affordability (infras.)
Science and Technology assets	Supply and qualifications of labour	Economic / network infrastructure	Economic dynamism (innovation, trade and access to capital)	4G geographical coverage (infras.)
				Travel times (infras.)
				Flow of gods (infras.)
Human and intellectual capital	Wellbeing and earning power	Environmental and natural capital	Economic specialism	Environmental and natural capital

Ideas

This chapter provides an overview of the LEP areas' ability to generate new ideas and exploit knowledge, which is measured in terms of its public and private capacity in science and innovation, and level of investment in R&D and innovation.

R&D spending has a strong and significant positive effect on local productivity and growth. It also produces strong spill overs into adjacent areas of the economy, which in some international studies are found to capture 70-80 per cent of the total returns[9]. European evidence too emphasises the role of R&D in driving regional productivity, with overall effects enhanced by high levels of human capital in an area[10]. University and Business R&D generate positive effects in the host area, with universities also having significant benefits to the local economy through demand effects catalysed by staff and students[11]. The presence of a university in a locality can also stimulate productivity by stimulating the growth of high-technology industries, through start-up businesses and through university-business interaction. The ability to retain high quality university graduates ('talent') in an area has the potential to strongly enhance both local labour quality and increase the rate of high-quality start-up activity. This suggests the importance for the Ideas Foundation of both 'flow' metrics such as R&D spend and levels of local patenting and innovation but also measures of the quality and scale of localities' intellectual and human assets.

Key Industrial Strategy policies within this foundation are to raise total research and development (R&D) investment to 2.4% of GDP by 2027, to increase the rate of R&D tax credit to 12%, and to successfully deploy the Industrial Strategy Challenge Fund programmes.

Table 1 Ideas indicator framework

Dimension	Indicator
R&D expenditure	- R&D Expenditure as a percentage of GDP (percentage) - Annual research and development spending by UK businesses (% of total Business R&D expenditure) - Manufacturing R&D expenditure of UK businesses (% of total Manufacturing R&D expenditure
Research competitiveness and research excellence	- Value and share of number of grants participated from UKRI (Gateway to Research) - HESA Value and share of project funding (£m) in national programmes - HESA Value and share of funding (£m) in EU and international programmes
Science and Technology assets	- Number and location of main research-active organisations and facilities 🔬
Intellectual capital	- HESA HE staff (researchers): HE staff FTE by HE provider (number of people)

[9] Blanco, L. R., et al. (2016). "The Impact of Research and Development on Economic Growth and Productivity in the US States." Southern Economic Journal 82(3): 914-934.
[10] Bengoa, M., et al. (2017). "Do R & D activities matter for productivity? A regional spatial approach assessing the role of human and social capital." Economic Modelling 60: 448-461.
[11] Lee, J. (2019). "The local economic impact of a large research university: evidence from UC Merced." Economic Inquiry 57(1): 316-332.

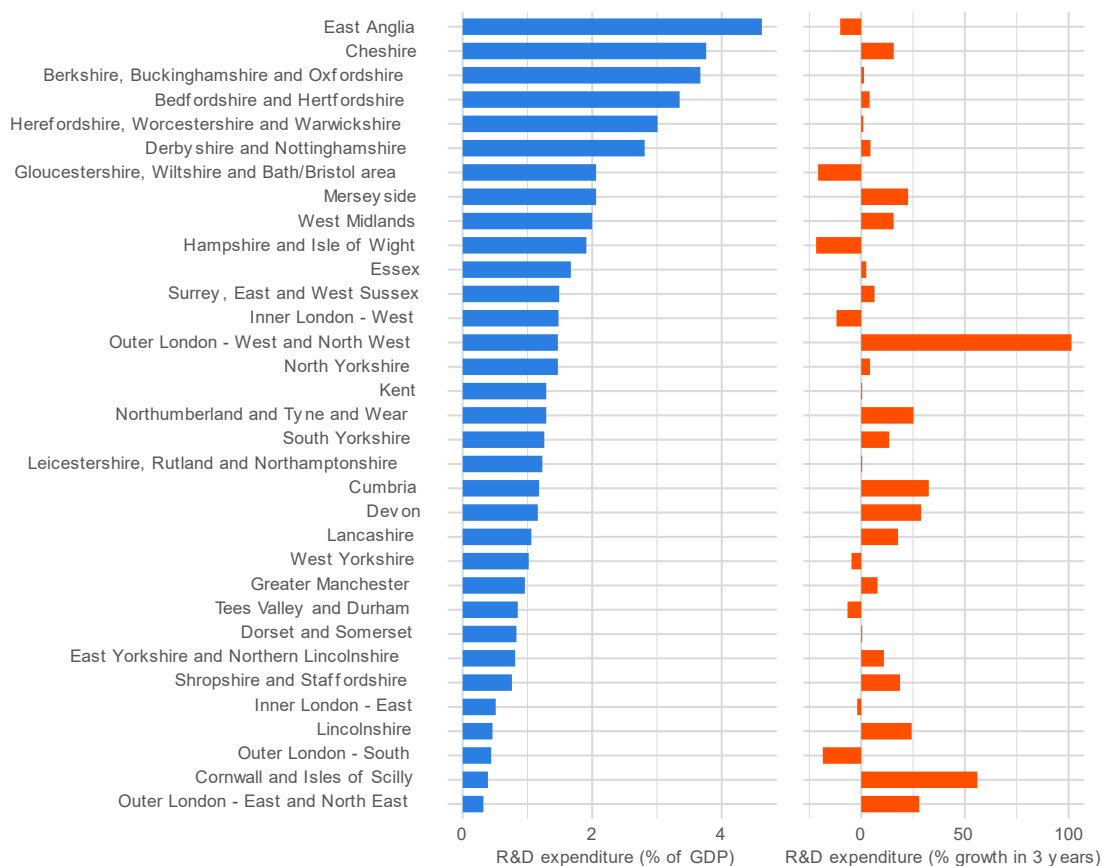| Dimension	Indicator
	- % all in employment who are - 21: science, research, engineering and technology profs (SOC2010)
	- % all in employment who are - 31: science, engineering and technology associate profs (SOC2010)
	- HESA Cumulative patent portfolio of institutions (number)
	- HESA Intellectual property income (including patents, copyright, design, registration and trade marks) by HE provider, type of organisation, income source and academic year (£)
	- Total income from contract research (£)
	- Number of active firms, all categories of spin-offs (number of firms)
	- Social, community and cultural engagement. Total number of attendees, all events ⛲
	- Contribution(s) to economic development. Total income from regeneration initiatives (£) ⛲

Note: ⛲ indicator with particular relevance to the place foundation

R&D Expenditure

There is strong evidence of the correlation between spending on R&D and innovation, which in turn is an important determinant of productivity and economic growth.

Data on Business Expenditure on R&D (BERD) (Figure 2) show areas in the north and south performing well, and across the urban/rural divide. This can be attributed to the presence of research-performing firms or clusters of firms – for example around Cambridge (East Anglia), and Alderley Park and Daresbury (Cheshire). As the chart below shows, many of the top R&D-performing regions exhibit relatively small rates of change in BERD over the five years to 2016. In terms of growth, Inner London (West) is an outlier, with 100% growth over the five-year period. As could be anticipated, larger growth rates can also be seen in areas with lower volumes of R&D expenditure.

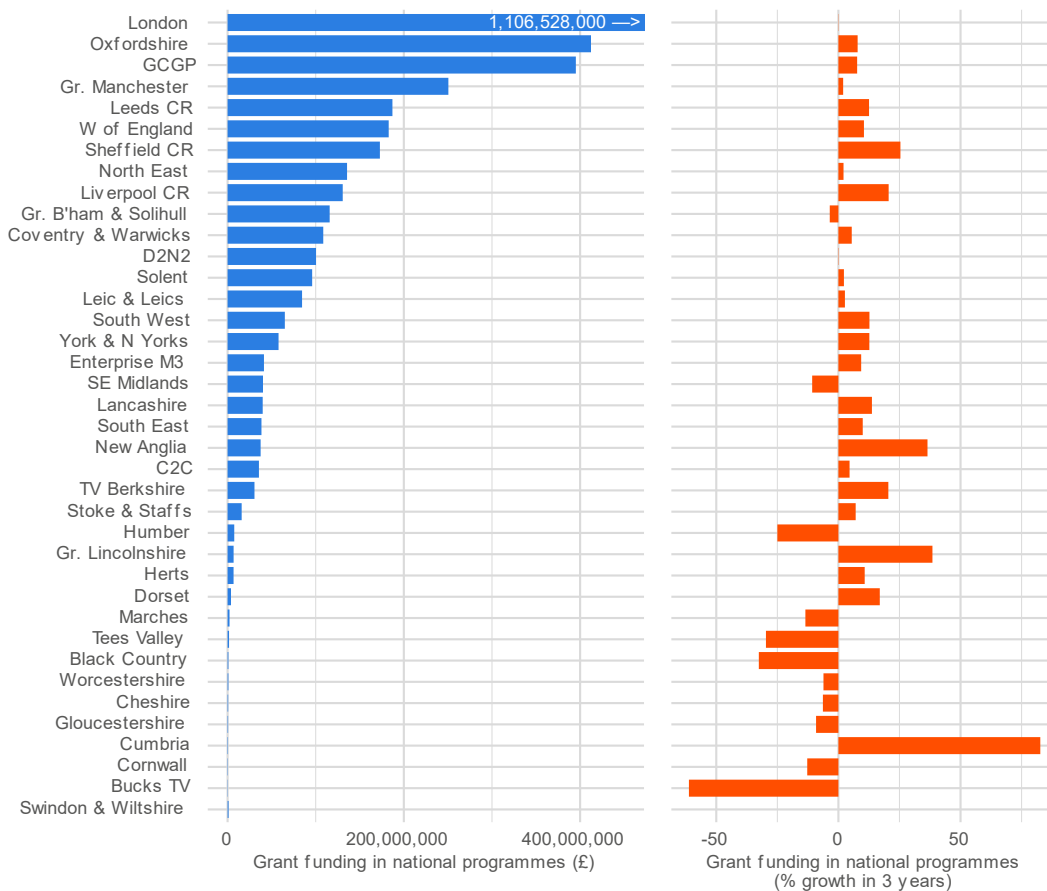**Figure 2 Business Expenditure on R&D (% of GDP), businesses NUTS2, 2016**

Source: EU Open Data Portal. Intramural R&D expenditure (GERD) by sectors of performance and NUTS 2 regions.

Research competitiveness and research excellence

The ability to secure funding from nationally-and internationally-competitive research funding sources is an indicator of an area's capacity and capability to undertake high-quality research (and generate new ideas). The value and share of competitive funded research projects indicate thereby the extent to which an area is leading in certain fields. While the causality between academic research and productivity has proven difficult to substantiate, evidence shows that the generation of new knowledge does contribute to long-term economic growth.

Figure 3 shows the performance of LEPs in securing national research funding. The London LEP is somewhat an outlier, securing approximately double the amount of funding as compared to the next highest performers, Oxfordshire and Greater Cambridge and Greater Peterborough. The next group of LEPs that perform well in this indicator are also home to large universities: Greater Manchester, Leeds City Region, West of England, Sheffield City Region. Among the LEPs in the top half of this indicator, the top performing LEPs also demonstrate growth, suggesting that these areas continue to strengthen their positions. Sheffield City Region and Liverpool City Region demonstrated the highest growth over the three years to 2017.
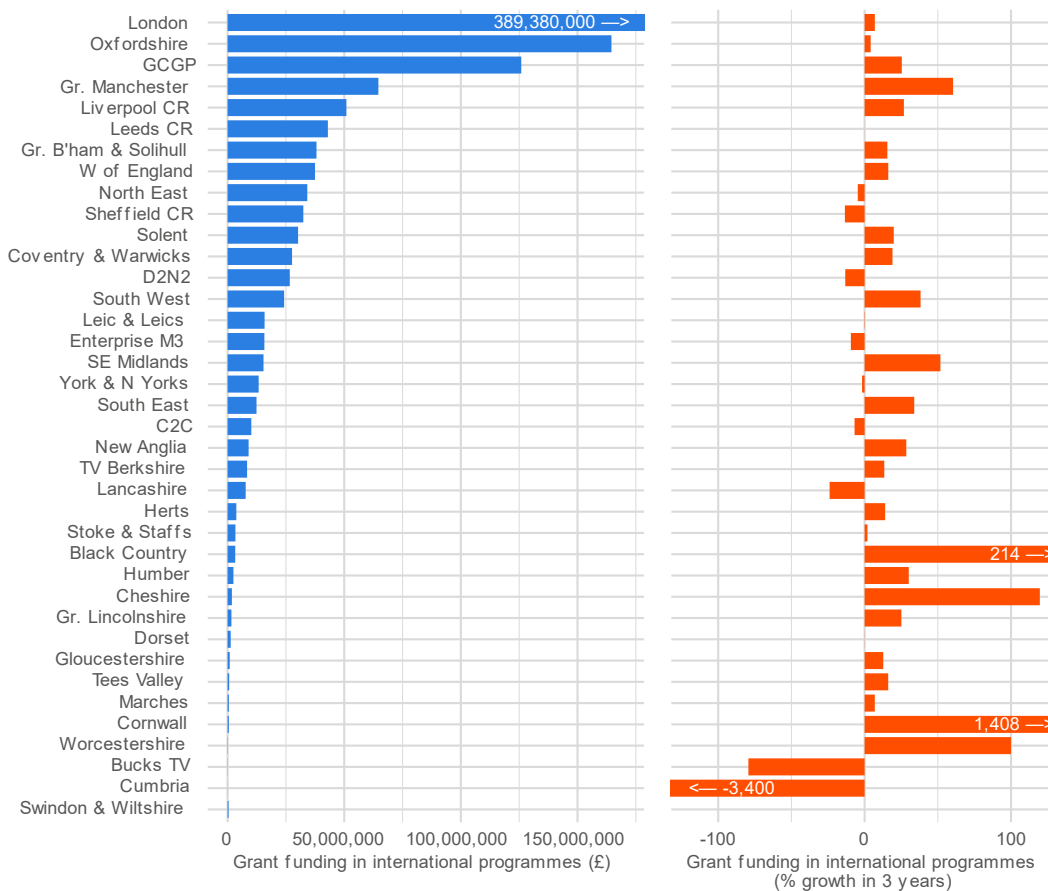
Figure 3 Value of grant funding in national programmes (£), 2017

Source: HESA. Research grants and contracts - breakdown by source of income and HESA cost centre

Examining internationally-competitive funding shows a similar picture to that of national funding in terms of top performers (Figure 4), albeit with small differences in the order. Greater Manchester demonstrates the highest growth among top performers, while the North East LEP and Sheffield City Region demonstrate small decreases over the three years to 2017. A number of outliers are evident in the growth of international grant funding secured in LEPs with lower volumes. In particular, Cumbria demonstrates a very large decrease in international funding secured.

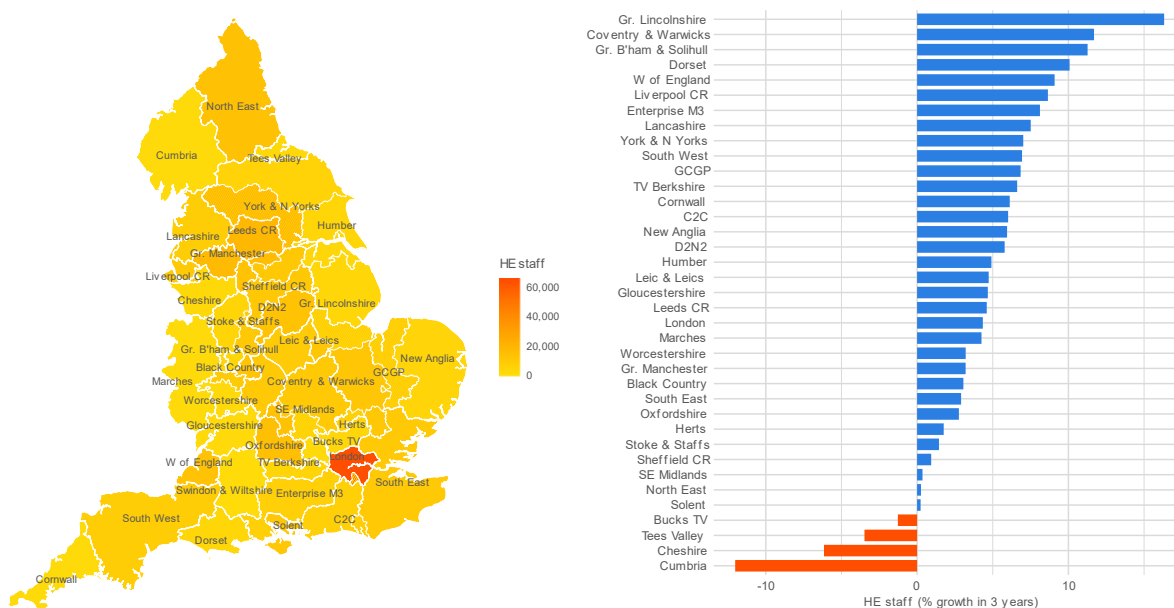**Figure 4 Value of grant funding in international programmes (£), 2017**

Source: HESA. Research grants and contracts - breakdown by source of income and HESA cost centre

Intellectual capital

The number of researchers in higher education institutions is an indicator of an area's research capacity. The chart below (Figure 5) shows that London is the LEP with the highest number of staff in higher education institutes (HEIs), which is likely due to the higher number of HEIs within the London LEP area. Elsewhere, the highest concentrations of research staff are also evident in LEPs that are performing well in securing national and international funding, which is again likely to be a cause and result of this success. The data show that of those LEPs with already significant numbers of research staff in HEIs, Coventry and Warwickshire and Greater Birmingham and Solihull have experienced the highest growth. A number of LEPs have experienced significant negative growth in this indicator, including two in the North West, Cumbria and Cheshire and Warrington.

Figure 5 Staff in Higher Education Institutions (researchers), 2017

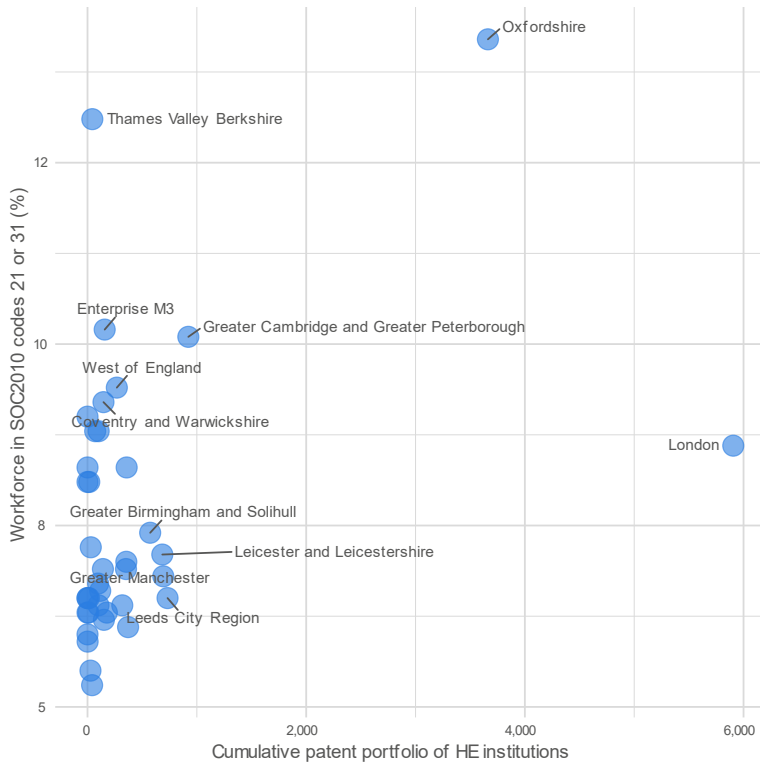Source: HESA. Detailed tables (Staff)

In addition to examining the number of research staff in HEIs, the proportion of all individuals in a local economy that are in employment that are engaged in science, research, engineering and technology is also an indicator for the area's broader research capacity. Figure 6 plots this against the number of patent applications as an indicator for the quantity and extent of research and development activities within an area. With a small number of exceptions (i.e. Oxfordshire), there does not appear to be a strong relationship between the proportion of workers employed in these SOC codes and the number of patent applications filed.

The knowledge produced via research and development activities can result in real-life applications going to market. This can be captured via indicators related to IP and spin-out formations. This knowledge can also be transferred from academia to industry (via contract research) helping to translate new discoveries into solutions that address industry needs.

Looking at the total value of income from IP, Figure 7 shows that few LEPs demonstrate serious returns from IP, with only London and Oxfordshire registering large values in this measure. A similar picture is shown in the total income from regeneration initiatives. Only Greater Birmingham and Solihull demonstrates a large amount in this measure.
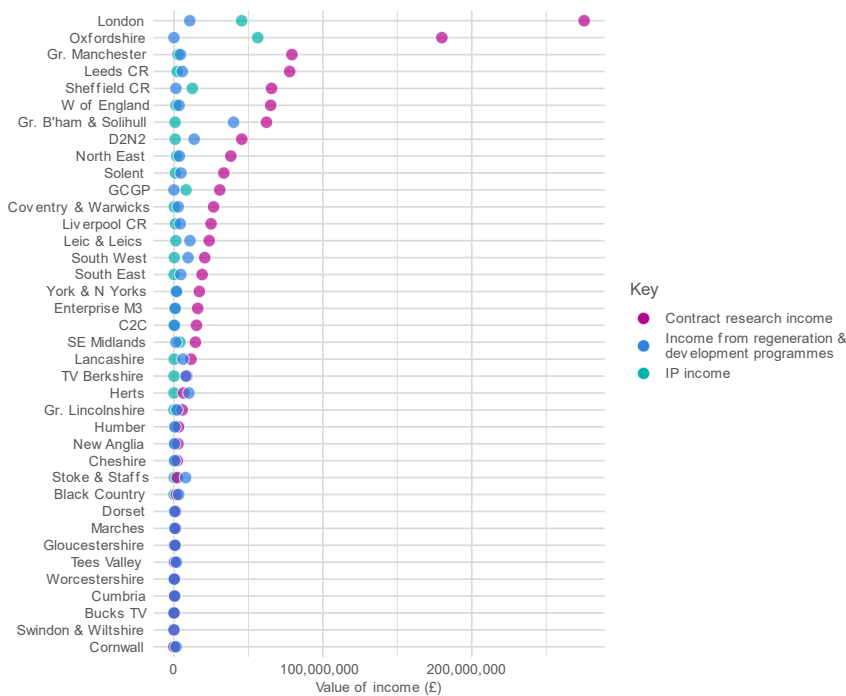
In terms of total income from contract research, Figure 7 shows that again London and Oxfordshire are the top performing LEPs in this area, though other LEPs that house large research universities also perform well in this measure.

Figure 6 Cumulative patent portfolio of HE institutions (number), 2017 & Proportion of the workforce employed in SOC2010 codes 21 (Science, Engineering and Technology Professionals) or 31 (Science, Engineering and Technology Associate Professionals)

Source: NOMIS. Annual Population survey - Occupation (SOC2010) sub-major group of employment & HESA. HEB-CI Higher Education Community Interaction Survey
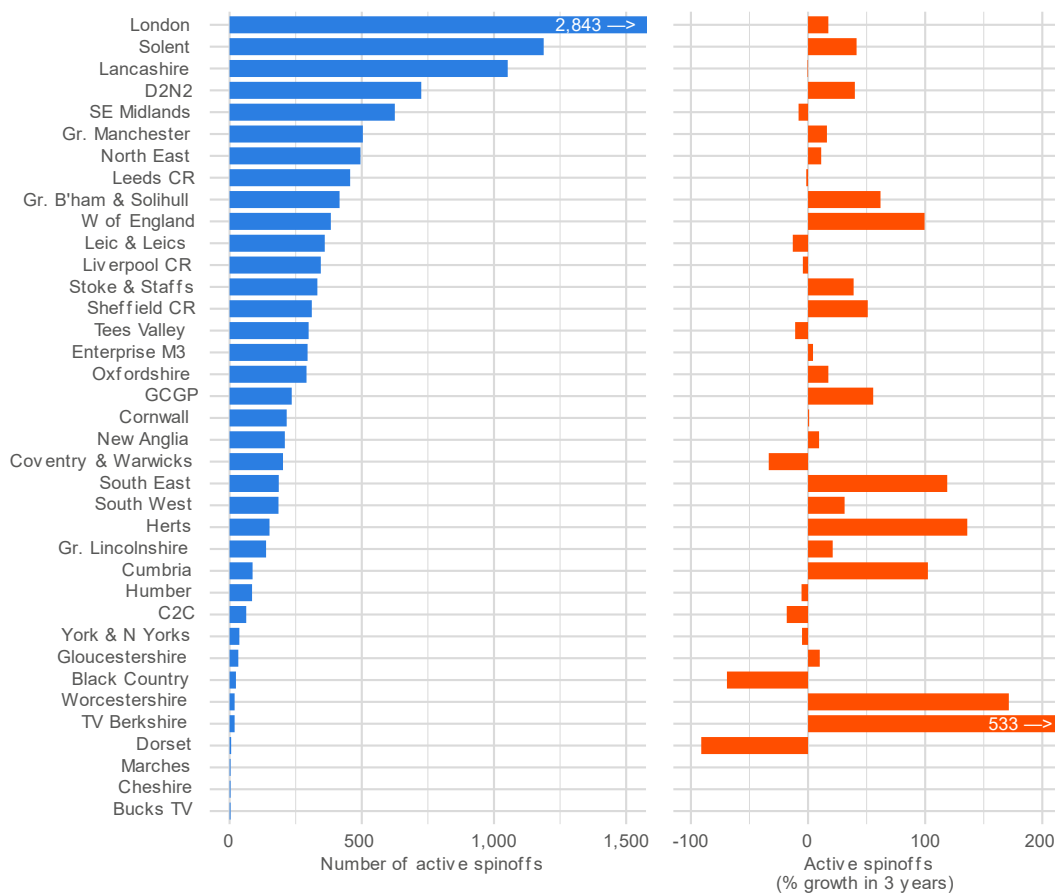
Figure 7 Income from contract research (£), 2017; Income from regeneration and development programmes & Intellectual property income (£), 2017

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Source: HESA. HEB-CI Higher Education Community Interaction Survey, HESA. Business and community services by HE provider, type of organisation, type of service and academic year & HESA. Income from regeneration and development programmes by programme, HE provider and academic year

In terms of number of spin-offs, the data captures the number of new spinoffs plus the number still active (i.e. those which have survived at least 3 years) and those which have been active between one and three years. This is important in assessing both the presence of ideas and creativity, the capacity of the local ecosystem to support this transfer, and the robustness and sustainability of these companies. London is again an outlier in this indicator with a much larger number of active firms, and modest growth also demonstrated over the three years to 2017 (Figure 8). Several LEPs demonstrate high levels of growth (even beyond those with the smallest volume of firms). Among those LEPs demonstrating larger numbers of active firms, the West of England demonstrates significant growth (almost 100%) over the three years to 2017. Data were not available for Buckinghamshire Thames Valley, Cheshire and Warrington, and The Marches.

Figure 8 Number of active firms, all categories of spin-offs (number of firms)
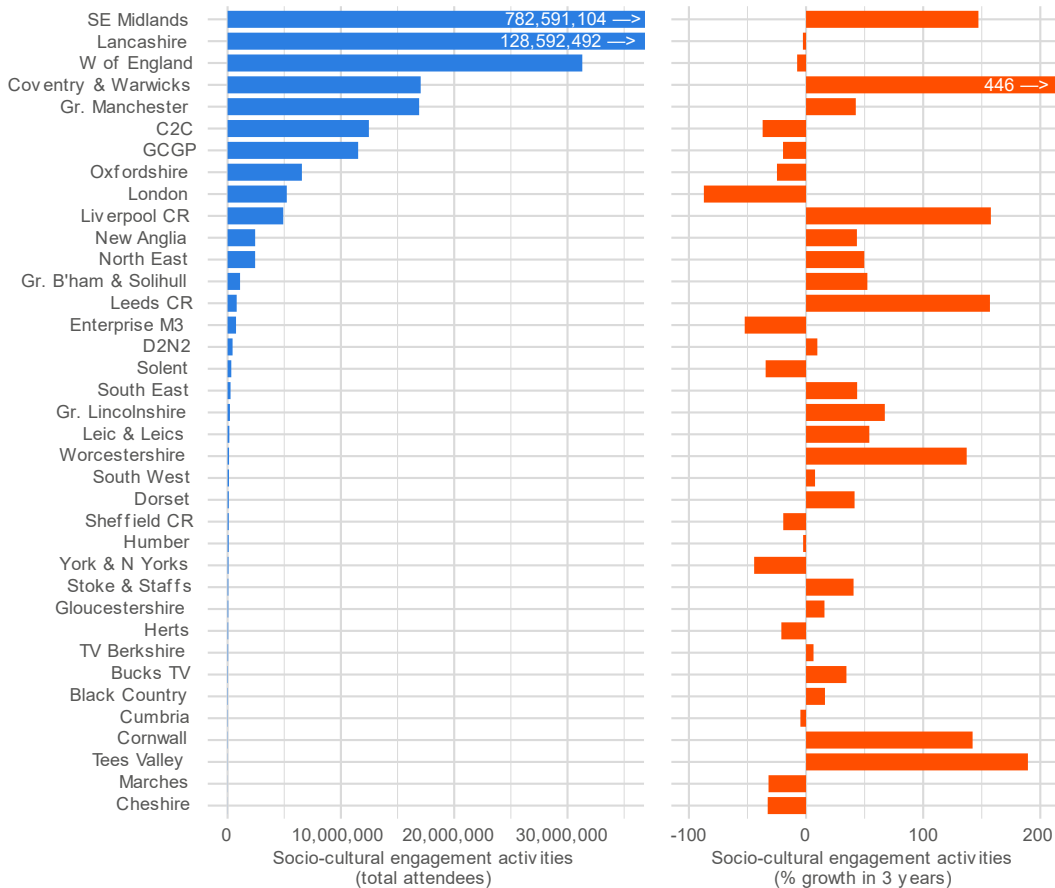

Source: HESA. Intellectual property: Spin-off activities by HE provider, type of activity, metric and academic year

The total number of social, community and cultural engagements by higher education institutions is a broad indicator of the community engagement undertaken by that institution. Dissemination of research findings and engagement with specialist and lay communities are important factors of the third mission of HEIs in the UK and a contributor to knowledge diffusion from academia to society at large. Figure 9 demonstrates two outliers: South East Midlands and Lancashire, each of which demonstrate numbers orders of magnitude higher than all other LEPs. In addition, South East Midlands also demonstrates significant growth over the three

years to 2017. Among other LEPs, Coventry and Warwickshire demonstrate significant growth, while the picture elsewhere is more mixed.

Figure 9 Social, community and cultural engagement carried out by HEIs. Total number of attendees, all events, 2017

Source: HESA. Social, community and cultural engagement: designated public events by HE provider, type of event, nature of event, metric and academic year

People

Indicators in the People Foundation reflect both the structure and characteristics of the residents of a locality but also the level and nature of their engagement with paid work. These indicators are also important to put other information across the framework in context.

Local productivity is strongly related to access to a qualified workforce, and the level wellbeing of its population enjoy (which is both an input and an output of a prosperous local economy).[12] One recent study examined the distribution of 'talent' across the UK and found that highly educated workers are very unevenly distributed – some areas have three times the level of highly educated workers than others.[13] High levels of unemployment or disengagement from paid work due to illness or not seeking work limit measured productivity in a locality (although not productivity per employee). Skill shortages can also have a detrimental impact on productivity performance limiting firms' ability to capitalise on new investments or market opportunities.[14] Some recent evidence also points to the negative effect of temporary contracts – the 'gig economy' – on productivity, an effect which is greater in higher skilled sectors.[15] European evidence suggests that an increase of 10 percentage points of the share of temporary employment in skilled sectors would decrease labour productivity growth of about 1-1.5%. In unskilled sectors the decrease would be of 0.5-0.8%.

The nature and well-being of those employed can also significantly influence productivity. Evidence suggests positive relationships between the quality and diversity of firms' leadership teams and productivity.[16] Recent analyses have also emphasised the negative effects of poor mental health on productivity. National costs were estimated at £33-42b or £1,205-£1,560 for each employee.[17]

Key Industrial Strategy objectives include improving the country's technical education system, increasing the numbers of apprenticeships and investing into STEM and national retraining initiatives. The quantification of these activities needs to be put into context with the demography and education landscape of each of these areas.

Table 2 People indicator framework

Dimensions	Sub-Dimension	Indicator
Demographics	Population stock	- Population estimate (number of people) - Working age population (Population estimate (number of people), 16-64 years old) - Aged dependency ratio (%)

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[12] Abreu, M (2018) 'Skills and productivity – evidence review'. Available at: www.productivityinsightsnetwork.co.uk Link

[13] Cowling, M. and N. Lee (2017). "How entrepreneurship, culture and universities influence the geographical distribution of UK talent and city growth." Journal of Management Development 36(2): 178-195

[14] Bennett, J. and S. McGuinness (2009). "Assessing the impact of skill shortages on the productivity performance of high-tech firms in Northern Ireland." Applied Economics 41(6): 727-737

[15] Lisi, D. and M. A. Malo (2017). "The impact of temporary employment on productivity. The importance of sectors' skill intensity." Journal for Labour Market Research 50(1): 91-112

[16] Luanglath, N., et al. (2019). "Top management team gender diversity and productivity: the role of board gender diversity." Equality Diversity and Inclusion 38(1): 71-86

[17] Deloitte (2017) 'Mental health and employers: the case for investment', October. https://www2.deloitte.com/uk/en/pages/public-sector/articles/mental-health-employers-review.html Link

Dimensions	Sub-Dimension	Indicator
	Population flow	- Long-Term International Migration 🏃 - Internal Migration (within UK) 🏃
Jobs and demand for jobs	Stock of workforce	- Total jobs - Total employment by sector - Unemployment rate - aged 16+ (percentage) - % in employment who are self-employed - aged 16+ (percentage) - % of all aged 16+ in employment in non-permanent employment (percentage) - Probability of automation (%) for jobs in the area
	Demand for jobs	- Jobs density - Vacancy rates. Number of vacancies divided by total employment (percentage) - Difficult to fill vacancies or skills gaps - Number of HtF vacancies divided by total number of vacancies (percentage) - Number of skills shortage vacancies divided by total number of vacancies (percentage)
Supply of labour	Student Population	- HE Qualifiers. Number of students (number, HESA definition). - UK domiciled higher education leavers taking employment in the region (number of students) 🏃 - Ratio of UK domiciled higher education leavers in the region and higher education leavers taking employment in the region (percentage) 🏃
	Further education and apprenticeships	- % of economically active with Trade Apprenticeships - aged 16-64
	Qualification level of workforce	- % of economically active with NVQ4+ - aged 16-64 - % of economically active with NVQ2 or less - aged 16-64
Wellbeing and earning power	Economic wellbeing	- Earnings: Median annual pay (gross), total full-time - Ratio of median house price to median gross annual workplace-based earnings 🏃 - Ratio of lower quartile house price to lower quartile gross annual workplace-based earnings 🏃 - Gross disposable household income (GDHI) per head
	Personal wellbeing	- Estimates of personal well-being from the Annual Population Survey (APS): Mean score - Extent of respondents' satisfaction with life (scored between 0-10)

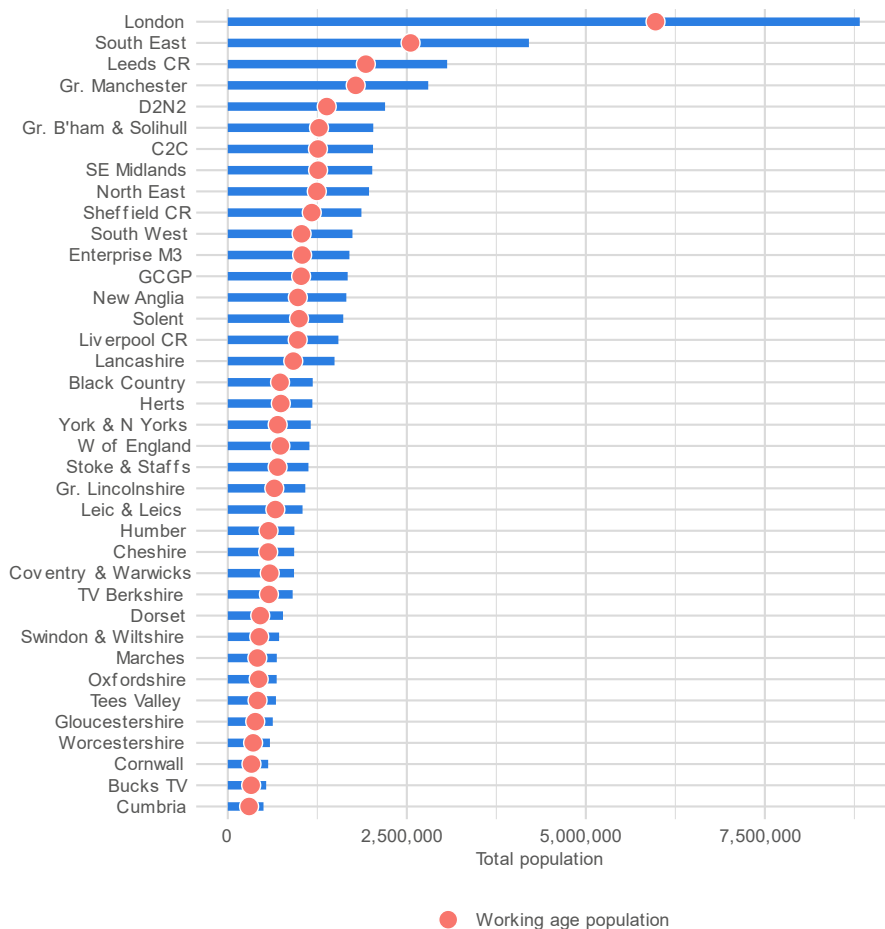Note: 🏃 indicator with particular relevance to the place foundation

Demographics

The size (and change) of a population is an indicator of the available economic resources and opportunities. While a correlation between population size and productivity is not universally

confirmed, a large or growing population can be both a result and cause of positive developments in economic productivity. Areas that provide more and or better jobs and career opportunities are likely to attract and retain more people than deprived areas. In turn, according to endogenous growth theory, a large and/or growing population can be a driver of productivity, providing greater possibilities for productive knowledge accumulation and absorption.

The working age population, in turn, is a strong indicator for the economically active population. It represents the pool of human resources available to employers. As with total population, working population can be a result and a cause of high economic productivity, though an exact correlation is not universally confirmed. Figure 10 shows total population and working age population. The most populous LEPs, and therefore those with a larger working-age population are generally London and the South East, and those around most of the English Core Cities (Birmingham, Bristol, Leeds, Manchester, Newcastle, Nottingham and Sheffield). Liverpool City Region is somewhat less populous.

Figure 10 Population, 2017 (number of people) and Working age population, 2017, 16-64 years old (number of people)
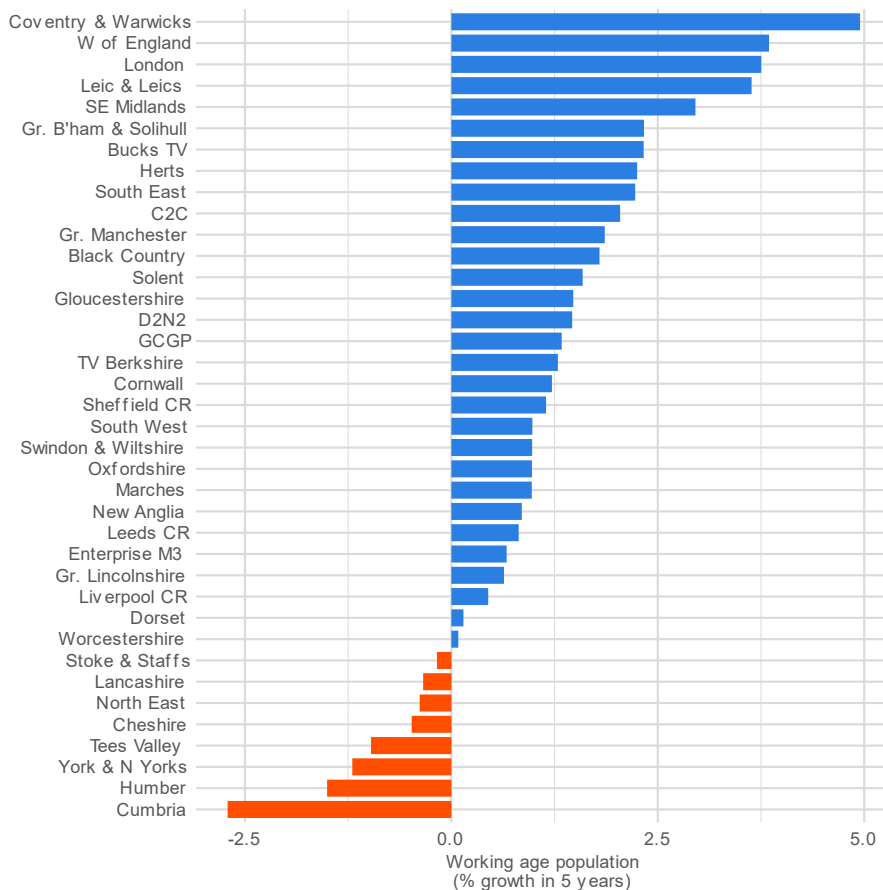

Source: NOMIS. Population Estimates - local authority based by single year of age. Available at: https://www.nomisweb.co.uk/

Population flow is characterised by the net population increase/decrease plus migration in and out of the local areas, a growing and successful area is expected to attract younger people/workers. Figure 11, below, summarises the five-year growth of the working age population for each LEP. The highest growth is evident in Coventry and Warwick and West of

England, though each of these are among less-populous LEPs, where growth rates over time are naturally more volatile. Significantly, the working age population of London has grown by 4% over the five years to 2017, the highest of the most-populous LEPs, while some areas with already-small working age populations have experienced a decrease over the same period. Cumbria, which had the lowest working-age population in 2017 data also demonstrated a decrease of almost 3%. This suggests that individuals of working age are leaving such areas to seek work elsewhere.

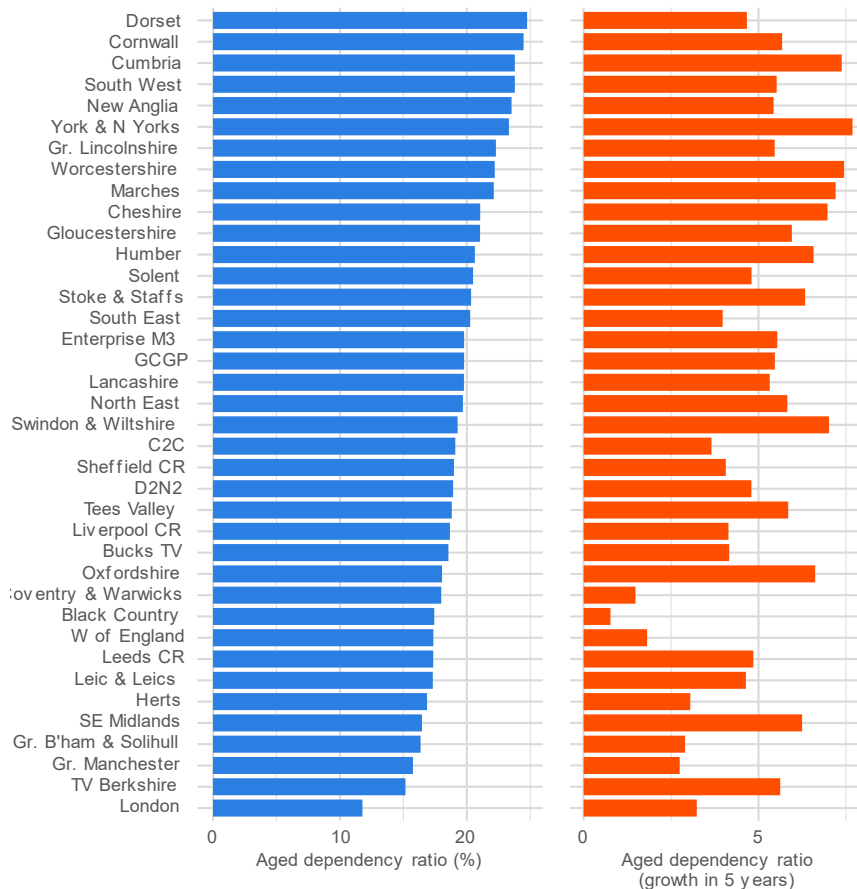**Figure 11 Working age population, 2017, 16-64 years old (number of people)**

Source: NOMIS. Population Estimates - local authority based by single year of age. Available at: https://www.nomisweb.co.uk/

The aged dependency ratio is a broad-based measure of the pressure on an area's productive population from the dependent population aged 65+. A growing aged dependency ratio enumerates the pressure on an economy in supporting its dependent populations and can be associated with adverse effects to productivity due to more resources being required for pension, health and care purposes.

Figure 12 below, reveals a general urban/rural split, whereby LEPs with a high number of predominantly rural areas also demonstrate high age dependency ratio values (left, below). Further, these areas often also show higher growth in their age dependency ratio.

Figure 12 Aged dependency ratio, 2017, 64+ over working population 16-64 years old (%)

Source: NOMIS. Population Estimates - local authority based by single year of age. Available at: https://www.nomisweb.co.uk/
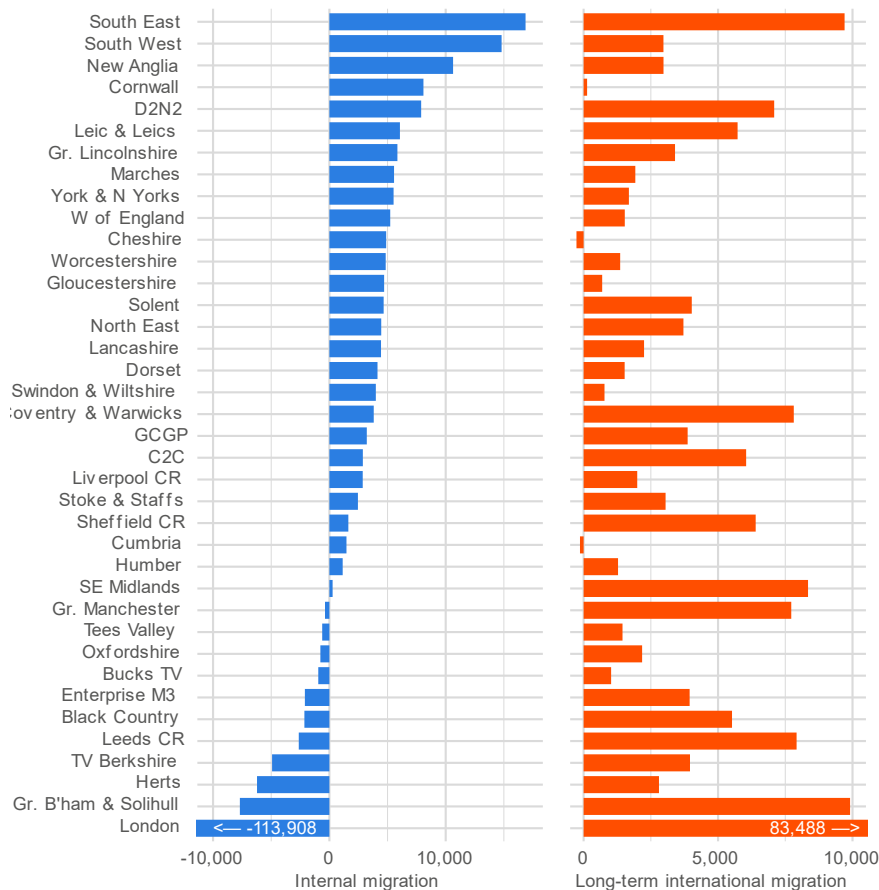
Another important aspect of demographics is migration. As a flow measure, migration has a strong place component and is also presented as an indicator in the place foundation.

Internal migration provides a broad indication of structural and demographic change in an area. It can be both a driver and result of differences in regional productivity and economic growth. Higher/positive internal migration is proxy for higher quantity or quality of working opportunities or personal wellbeing, providing an indication of the attractiveness of a place. Important in this context is the age structure of the internal "migrants", i.e. whether people are coming for work and education or for resettlement and retirement purposes.

Long-term international migration (net immigration for number of non-UK migrants staying longer than 12 months) is broadly associated with possible short-term increases in costs (e.g. requirement of additional investment in human capital) and long-term increases in productivity due to an increase of the working age population and positive links to labour productivity, such as GVA per capita. This is due to the diversity of skills and ideas, and associated encouragement of an investment in 'native' skills.

Figure 13, shows that London is a particular attractor of international migration. The South East is a popular destination for both internal and international migrants.

Figure 13 Migration. Internal migration (within the UK) 2017, all ages, number of people (left) and Long-term international migration flow (inflow - outflow), 2017, all ages, number of people (right)
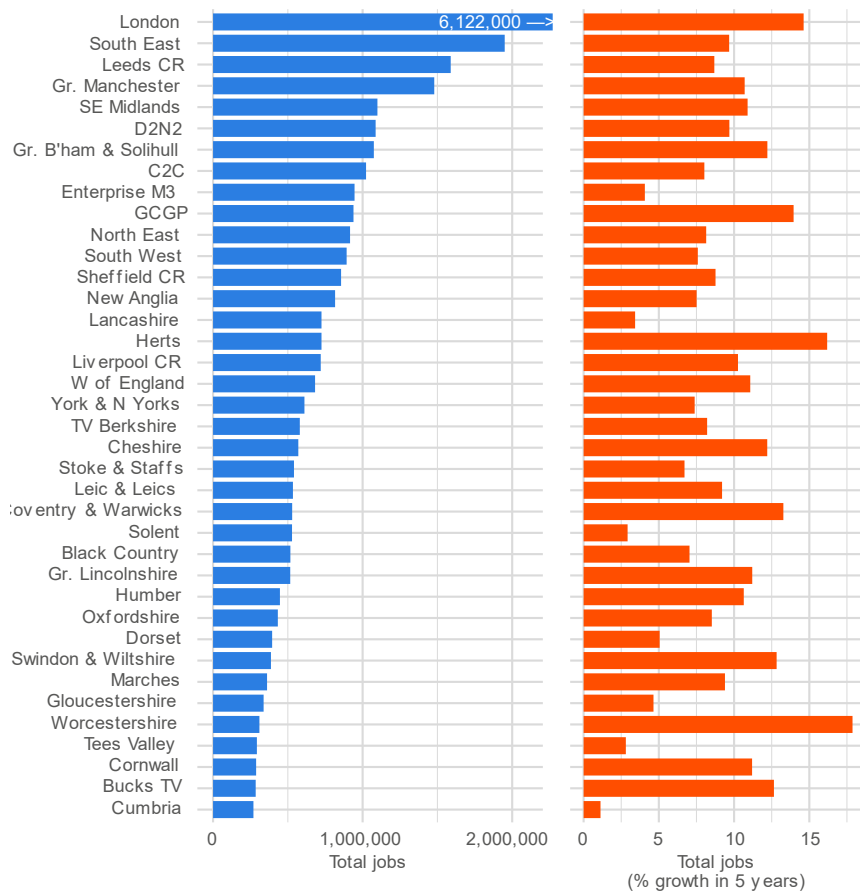

Source: Internal migration: detailed estimates by origin and destination local authorities, age and sex. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/migrationwithintheuk/datasets/internalmigrationbyoriginanddestinationlocalauthoritiessexandsingleyearofagedetailedestimatesdataset Link and NOMIS. Population Estimates - local authority based by single year of age. Available at: https://www.nomisweb.co.uk/

Employment

The total number of jobs is an indicator for the overall size of an area's economy. The number of jobs tends to correlate with the work and economic flexibility of an area. Jobs density indicates whether a particular geographical area has more or less jobs than working age residents. As seen in Figure 14 below, London and the South East and the LEPs in which English Core Cities[18] sit are generally among the highest in terms of number of jobs. According to the data, there is no north-south divide among the LEPs in terms of both number of jobs and the rate of growth over the past five years.

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[18] The Core Cities are a group of large regional cities that work together to tackle issues related to economic growth and prosperity. The first wave of City Deals from the Government recognised the cities of the group. The full list is: Birmingham, Bristol, Cardiff, Glasgow, Leeds, Liverpool, Manchester, Newcastle, Nottingham and Sheffield.

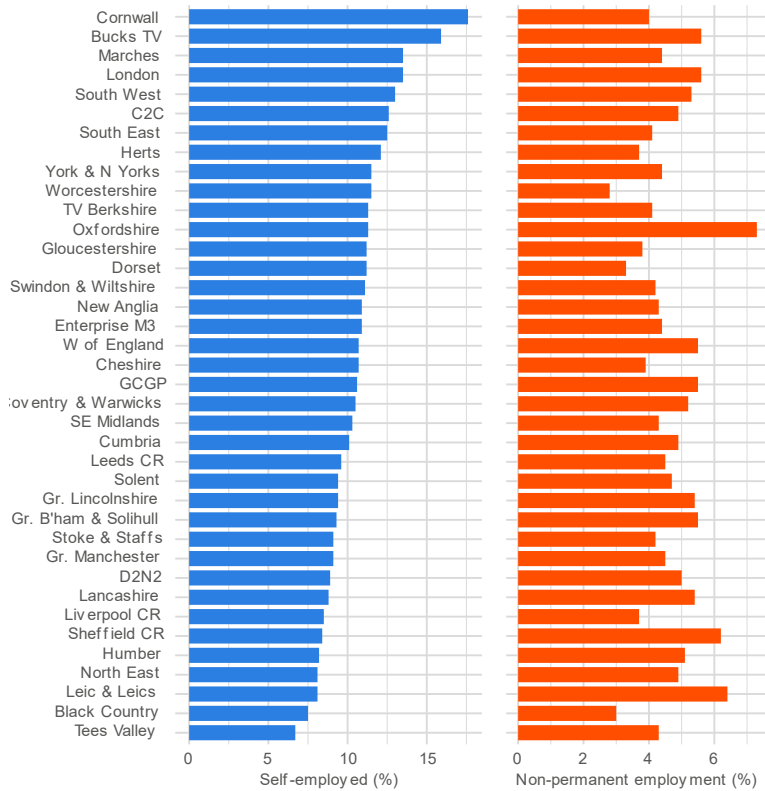**Figure 14 Total jobs, 2017 (number of jobs)**

Source: NOMIS. Jobs density. The total number of jobs is a workplace-based measure and comprises employee jobs, self-employed, government-supported trainees and HM Forces. Available at: https://www.nomisweb.co.uk/

The rate of self-employment is an indicator that provides two potential insights. On the one hand, self-employment may be an indicator of how entrepreneur-friendly a locality is. For advanced economies, research suggests a general positive correlation between a high rate of self-employment and the average productivity per capita. On the other hand, self-employment can also be an indicator of precarious employment, especially where it correlates with economies that have significant seasonal employment due to tourism, for example. People aged 16+ in non-permanent employment provides an indication of the share of employees with more precarious working arrangements. For example, areas with large seasonal tourism flows usually rely on temporary employment to cover their needs. Figure 15 highlights a similarity between the proportion of working-age people in self-employment and the proportion in non-permanent employment.
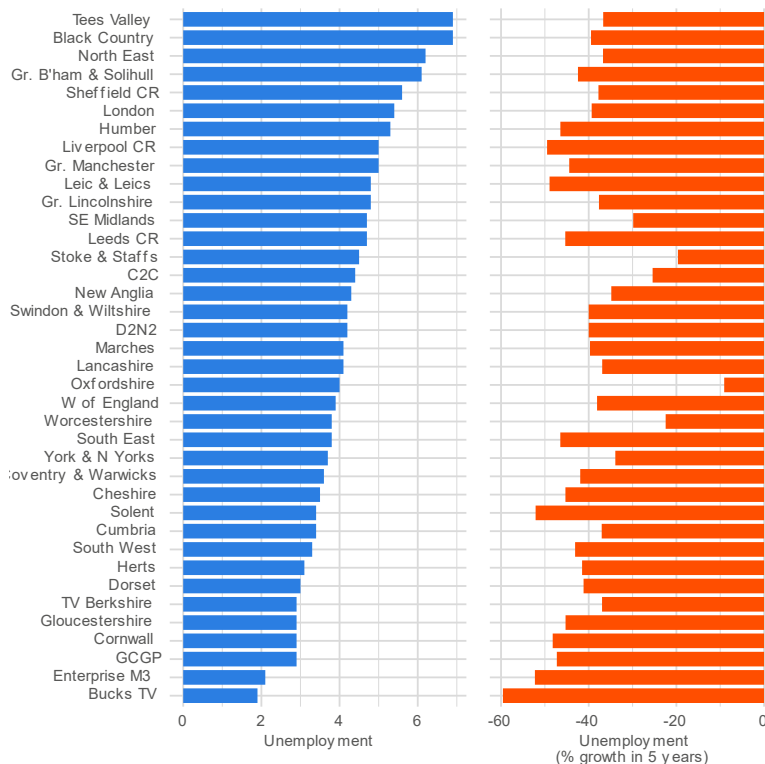
Figure 15 Percentage in employment who are self-employed - aged 16+, 2017 (%) and Percentage of all aged 16+ in employment in non-permanent employment, 2018 (%)

Source: NOMIS. Annual Population Survey - Self employed, employees and non-permanent employment. Available at: https://www.nomisweb.co.uk/, NOMIS. Annual Population Survey - Self employed, employees and non-permanent employment. Available at: https://www.nomisweb.co.uk/

Figure 16 Unemployment rate, 2017 - aged 16+ (%)

Source: NOMIS. Annual Population Survey - Headline indicators. Available at: https://www.nomisweb.co.uk/

Vacancy rates show the total number of vacancies divided by total employment, giving an overall idea of the unmet demand for labour. Hard to fill and skills shortage vacancies give an overall idea of the imbalance between the supply and demand for labour in knowledge intensive jobs and occupations. These classifications highlight shortages in local skills and qualifications that are pertinent to certain types of job opportunities.

Figure 17 brings together the overall vacancy rate for each LEP, with the proportion of vacancies that are i) hard-to-fill and ii) skills shortage vacancies. There appears to be little relationship between overall vacancy rates and the proportion of vacancies that are hard-to-fill or based on skills shortages. Figure 17 shows that there is some prevalence of more rural areas with high proportions of hard-to-fill vacancies.

Figure 17 Number of vacancies divided by total employment, 2017 (%), Number of HtF vacancies divided by total number of vacancies, 2017 (%), and Number of Skills-shortage vacancies divided by total number of vacancies, 2017 (%)
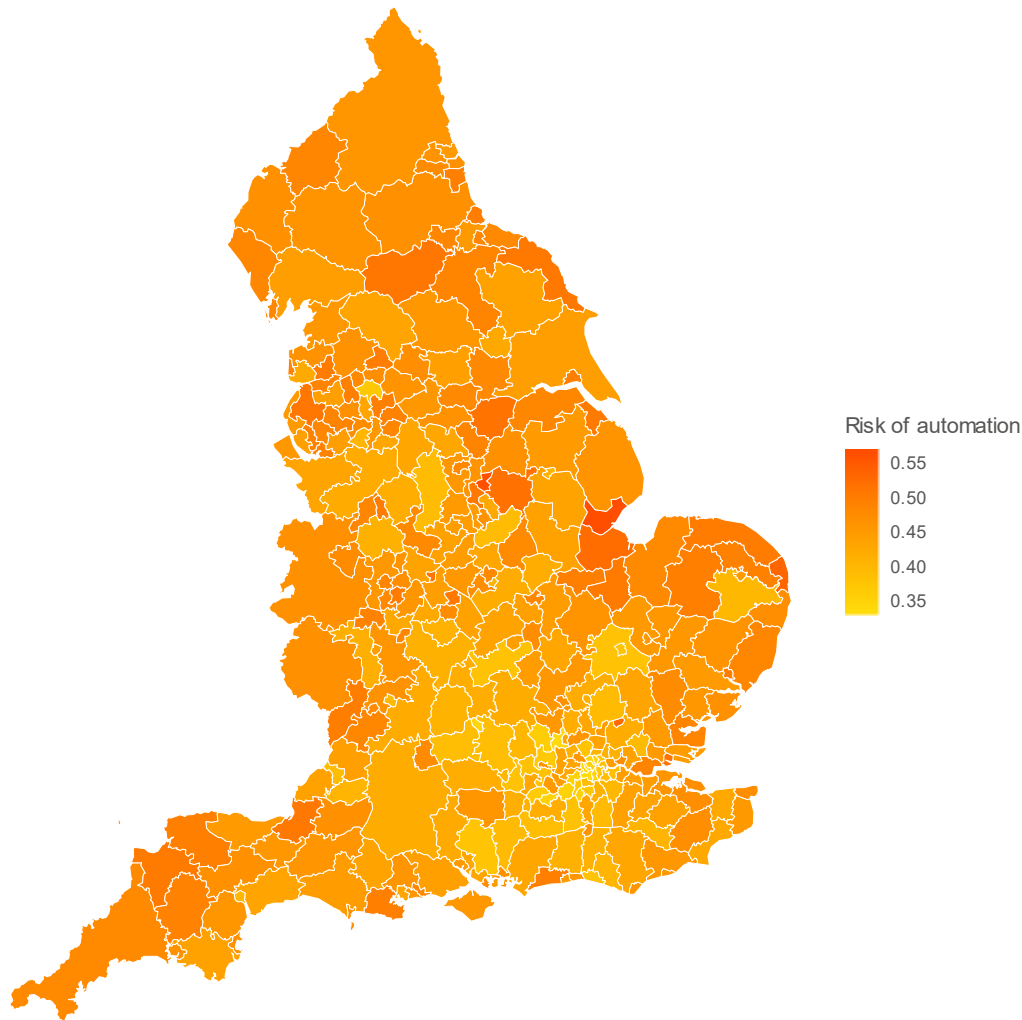

Source: Department for Education. Employer skills survey. Table 1 - Employee summary table. Base: All Employment. Available at: https://www.gov.uk/government/publications/employer-skills-survey-2017-england-and-local-toolkit Link

In terms of future trends, the increase in the level of automation across all sectors of the economy poses a great economic opportunity, but also a potential threat. The ONS provides an estimate of the percentage of jobs at high risk of automation. The estimate builds on prior studies that identify occupations (and task within occupations) that are likely to be automated in the near future and estimates the probabilities of being at risk for individuals in England (based on their occupations, but also their location). The indicator shows local authority areas that have a relatively high or low percentage of jobs at high risk of automation. The data

presents a mixed picture across England, albeit with slightly higher percentage of jobs at high risk in rural areas (Figure 18).

Figure 18 Probability of automation (%) for jobs in the area, 2017
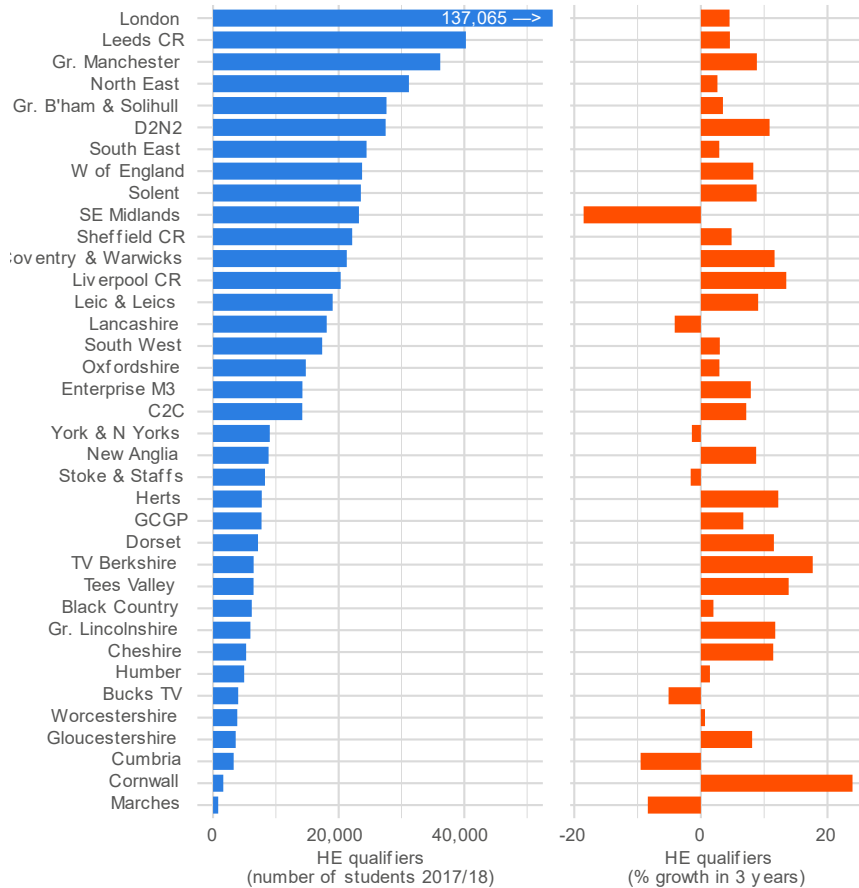

Source: ONS. Probability of automation in England.
https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/theprobabilityofautomationinengland/2011and2017 Link

Workforce qualifications

The number of higher education qualifiers provides a measure of the number of graduates that are trained by higher education institutions (HEIs) in an area, and consequently the potential pool of highly qualified individuals available in the area. As expected, those LEPs that contain large (and/or multiple) universities perform better against this indicator, and Figure 19 summarises this for each LEP. Most of the top-performing LEPs demonstrate moderate growth over the three years to 2017, though the South East Midlands and Cornwall are somewhat outliers, showing growth and decline of around 20% over the period.
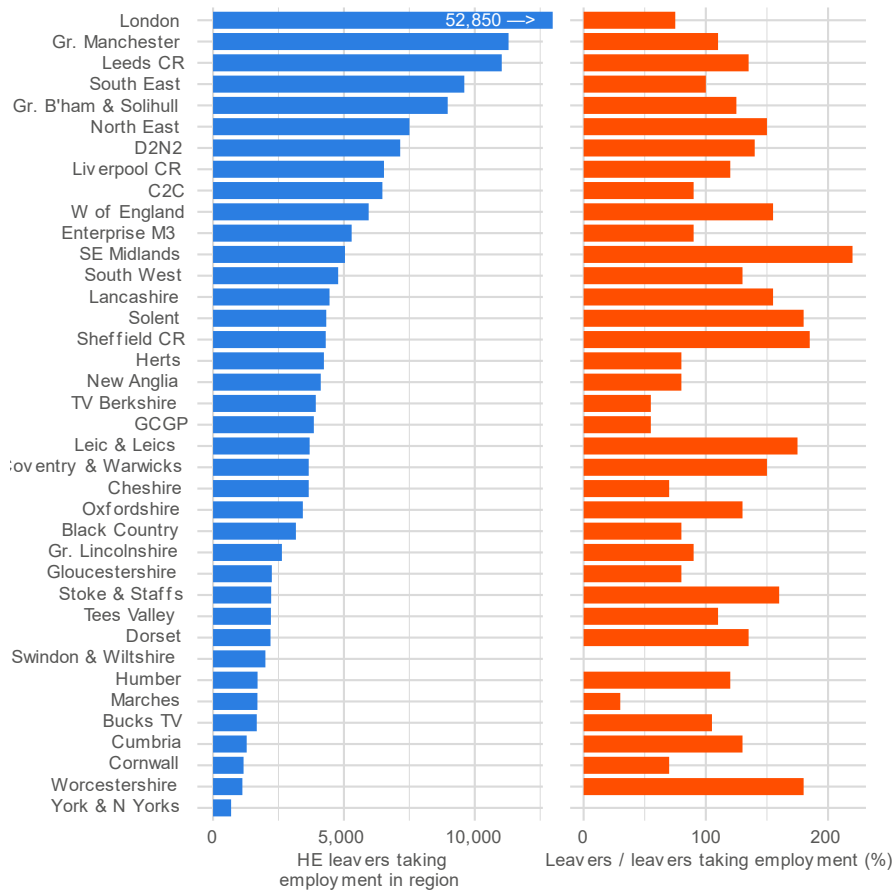
Figure 19 HE Qualifiers Number of students 2017/18 (number)

Data on the destination of leavers of higher education reveals whether an area attracts and retains new graduates or is an exporter of graduates. The ability to attract and retain graduates has important implications for an area's labour force and long-term productivity. Figure 20 shows that London is again an outlier, attracting around five times the number of graduates of the next well-performing LEPs. Northern and Midland LEPs that are well-represented in this indicator include Greater Manchester, Leeds City Region, Greater Birmingham and Solihull, the North East, Derby, Derbyshire, Nottingham and Nottinghamshire, and Liverpool City Region each attracting significant numbers of graduates.

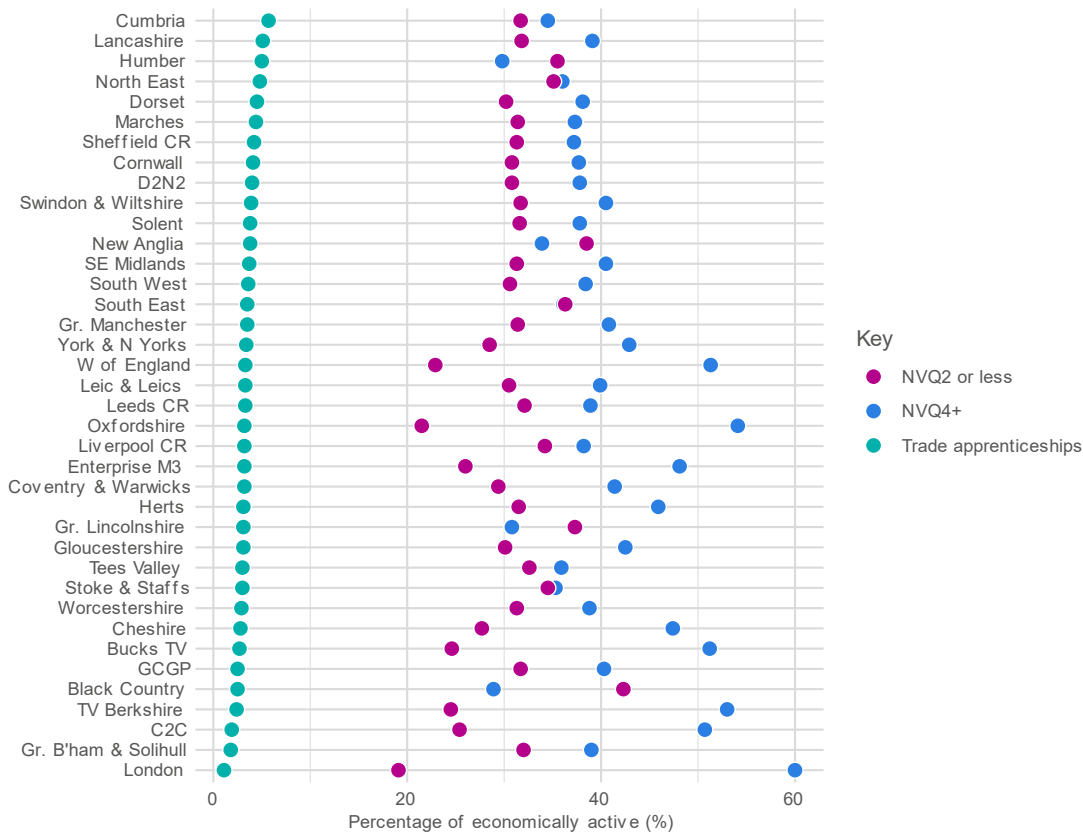**Figure 20 UK domiciled higher education leavers taking employment in the region (number of students)**

Source: HESA. UK domiciled higher education leavers in work in the UK by region of domicile, region of HE provider and region of employment. Copyright Higher Education Statistics Agency Limited

Apprenticeships are a vital UK-wide vehicle for employer investment in their workforce. Apprenticeships help employers and individuals to develop the skills and behaviours that they need, as well as offering opportunities for those already in work and those entering it for the first time. Economically active people with qualifications at NVQ4+ broadly align with those having undertaken a higher national diploma (HND) or a university-level degree. The analysis also includes those with qualifications at NVQ2 or below, equivalent to the attainment of 4-5 GCSE grades A*-C.

Figure 21, below, shows the level of qualification and uptake of apprenticeships in the workforce. Some of the LEPs with the highest proportion of economically active with NVQ4+ are also among the lowest in terms of the proportion of trade apprenticeships (e.g. London, Coast to Capital, Thames Valley Berkshire, Buckinghamshire Thames Valley).

Figure 21 Percentage of economically active with Trade Apprenticeships - aged 16-64, 2018, Percentage of economically active with NVQ4+ - aged 16-64, 2018, and Percentage of economically active with NVQ2 or less - aged 16-64, 2018

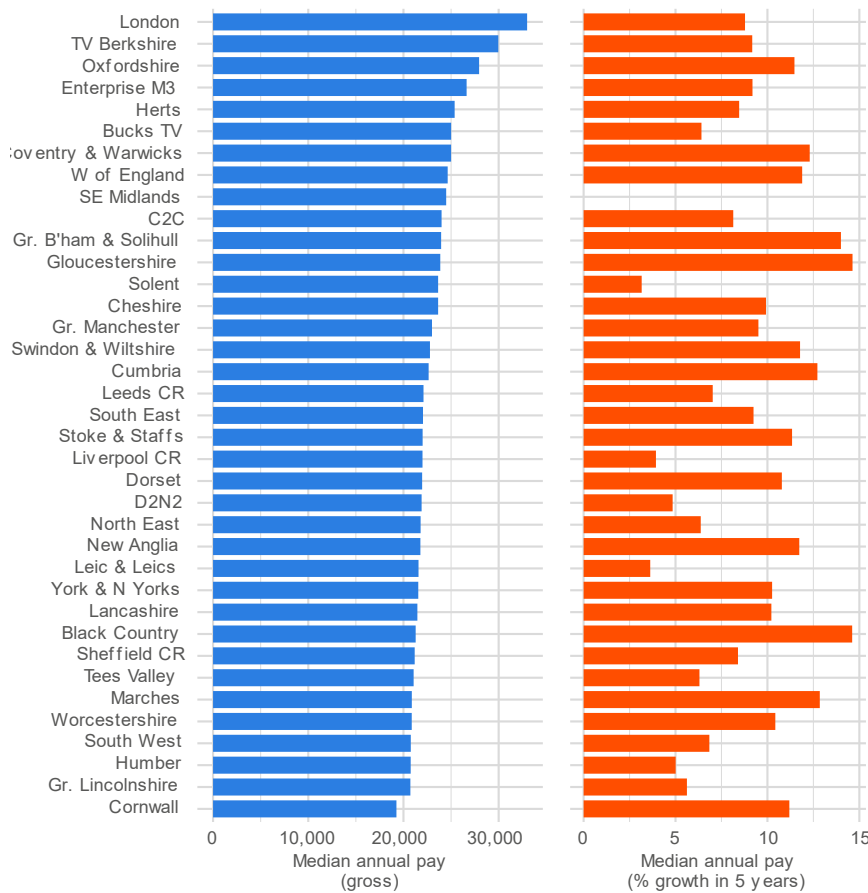Source: NOMIS. Annual Population Survey. Qualifications of economically active. Available at: https://www.nomisweb.co.uk/

Wellbeing and earning power

In terms of economic wellbeing, earnings, gross disposable household income (GDHI) and housing affordability provide a reasonably complete picture, combining both subjective and objective metrics with metrics at both the personal, the household level and also in relation with housing. These can be analysed in combination with other metrics in the framework such as those related to unemployment and GVA. As recommended by the ONS, personal wellbeing is analysed based on yearly estimates of personal well-being from the Annual Population Survey (APS), generated via self-reporting.

Median annual earnings provide an indication of the earning power of the individual employee. Increasing median annual salary is broadly linked with a healthy and growing economy, in contrast to stagnant wages. Figure 22 shows that median annual household income in the LEPs ranges from £19,000 in Cornwall and the Isles of Scilly to £33,000 in London. The LEPs neighbouring London make up the highest earners, and each demonstrate annual income

above the England average. The five-year growth rate was not available for South East Midlands.
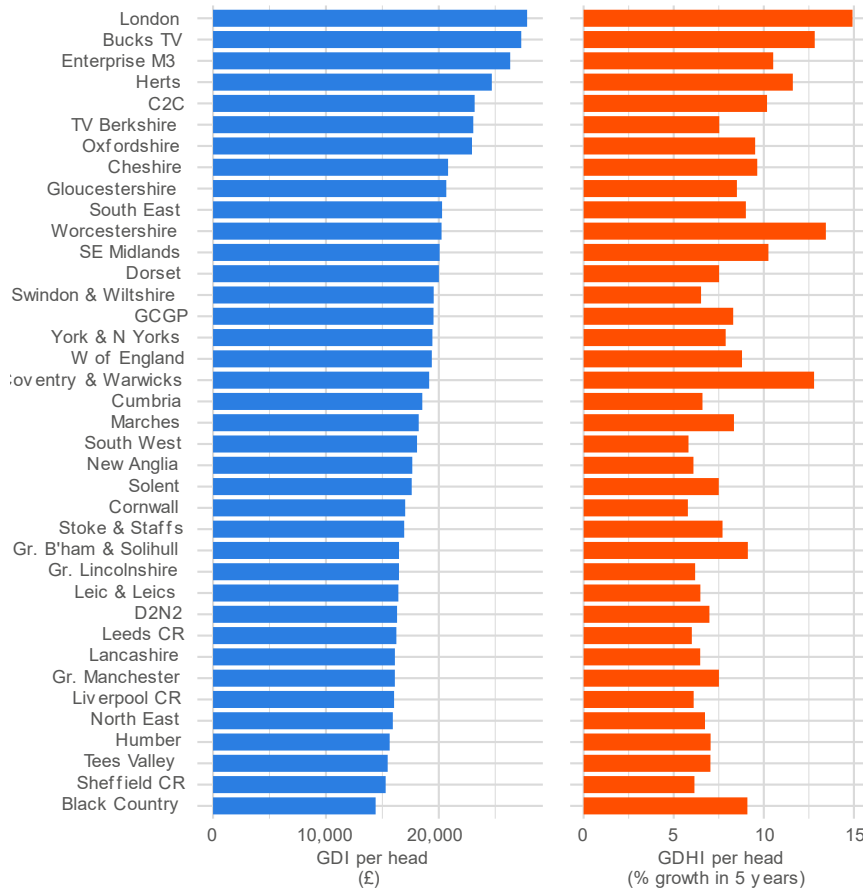
Figure 22 Earnings. Median annual pay (gross), total full-time, 2018

Source: NOMIS. Annual survey of hours and earnings - workplace analysis. Available at: https://www.nomisweb.co.uk/

Gross disposable household income per head (GDHI) is the amount of money that household units have available for spending or saving after income distribution measures (for example, taxes, social contributions and benefits) have taken effect. Figure 23 shows a noticeable north-south divide in the Gross Disposable Household Income measure. In general, southern LEPs also demonstrate greater growth in Gross Disposable Household Income over the five years to 2017 when compared to northern LEPs.

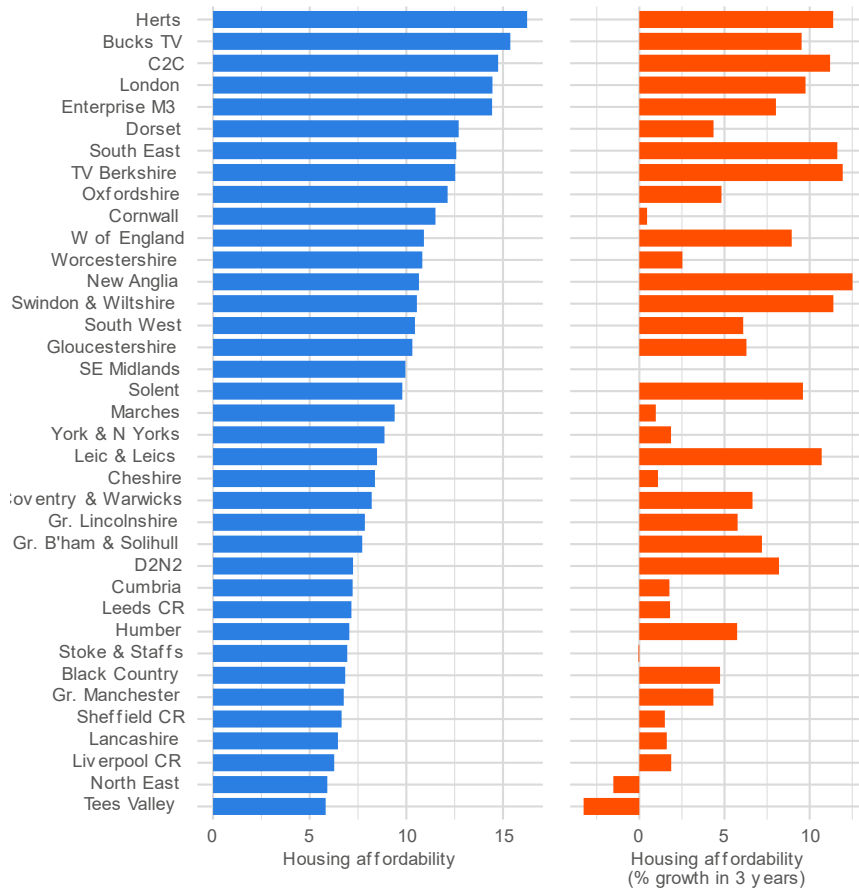**Figure 23 Gross Disposable Household Income (GDHI) per head, 2017 (£)**

Source: Growth in Gross Disposable Household Income per head Regional Gross Disposable Household Income (GDHI) by Local Authority (1997-2016) & Regional Growth in Gross Disposable Household Income per head by Local Enterprise Partnership (1997-2016). Available at:
https://www.ons.gov.uk/economy/regionalaccounts/grossdisposablehouseholdincome/bulletins/regionalgrossdisposablehouseholdincomegdhi/1997to2016 Link &
https://www.ons.gov.uk/economy/regionalaccounts/grossdisposablehouseholdincome/datasets/regionalgrossdisposablehouseholdincomegdhibylocalenterprisepartnership Link

The household affordability indicator is calculated by dividing house prices by gross annual workplace-based earnings. The indicator highlights to what extent local residents in an area are able to enter and remain in the property market, which is an important consideration for both attracting and retaining talent.

A high value in the ratio of median house prices to median gross annual salary indicates that housing is less affordable. Figure 24, below, highlights that many of the LEPs with less-affordable housing also demonstrate significant growth in this score, meaning that housing has become less affordable over this period. There is a noticeable north-south divide in this indicator.

Figure 24 Ratio of median house price to median gross annual workplace-based earnings by local authority district, 2018
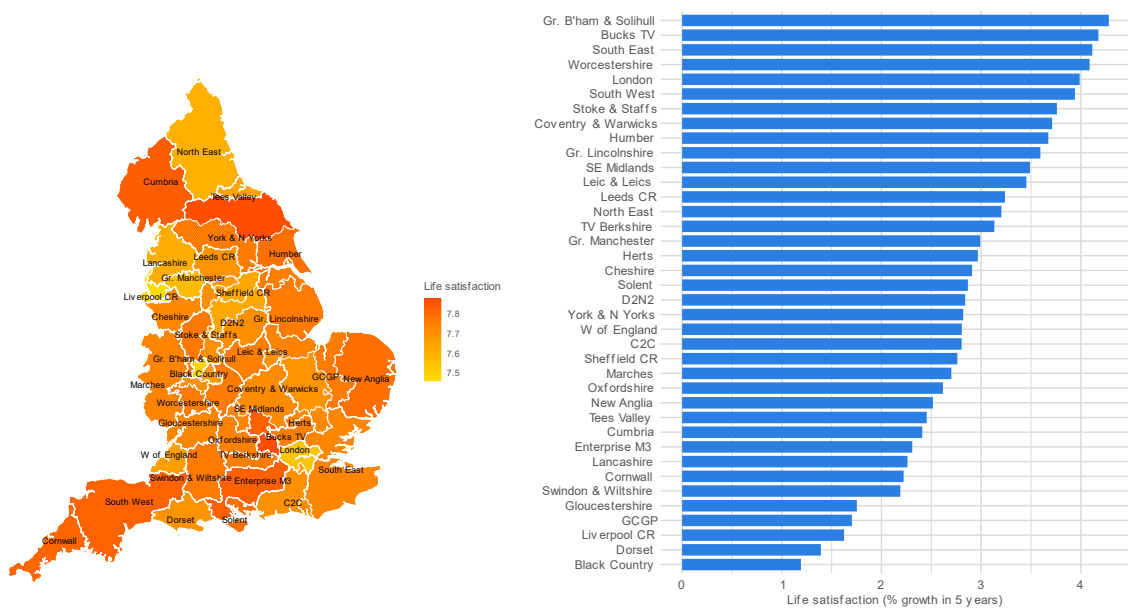

Source: ONS, People, population and community. Housing. House price to workplace-based earnings ratio. Available at:
https://www.ons.gov.uk/peoplepopulationandcommunity/housing/datasets/ratioofhousepricetoworkplacebasedear ningslowerquartileandmedian Link

Personal well-being represents people's thoughts and feelings about their own quality of life. This is an important aspect of national well-being and is part of a much wider initiative in the UK and internationally to look beyond Gross Domestic Product (GDP), and to measure what really matters to people. The estimates of personal wellbeing from the Annual Population Survey provide a self-reported measure of personal well-being.

Figure 25 shows that those LEPs with the highest mean score for life satisfaction are often predominantly or significantly rural (including Buckinghamshire Thames Valley, Cumbria, York, North Yorkshire and East Riding, Heart of the South West, Cornwall and the Isles of Scilly).

Figure 25 Life satisfaction Mean score. Extent of respondents' satisfaction with life, 2017 (scored between 0-10)

Source: Estimates of personal well-being from the Annual Population Survey (APS): for UK and constituent countries in the UK, for the time periods January to December from 2012 to 2018 England. Available at:
https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/datasets/headlineestimatesofpersonalwellbeing Link

Infrastructure

Improvements in physical infrastructure – roads, rail and airports – can play a significant role in increasing the productivity of local areas through time and logistic costs savings. Improvements in accessibility of more rural locations can also open up new opportunities for development and opportunities for productivity growth[19]. The size of any effects remains debatable, however. Essentially similar arguments apply to digital infrastructure such as broadband connectivity, mobile coverage and digital connectivity: evidence suggests a positive link to productivity but the scale of the that linkage is difficult to determine with any certainty[20]. Attention has also focussed recently on the role of environmental influences – sometimes called natural capital – on productivity. Effects are both direct and indirect. Direct effects may arise from the local availability of natural resources – minerals, forestry or hydro-power for example – and local productivity. Indirect effects may follow from the amenity benefit of the natural environment and its benefits for attracting and retaining high skilled workers and mental health[21]. As such, the indicators in the Infrastructure Foundation include both transportation and digital measures but also indicators of the quality of areas' natural environment. Naturally, there is a strong link between the infrastructure and place foundation, with many of the indicators selected having a strong place element.

The Industrial Strategy White Paper highlights infrastructure investment as a critical element to support long-term productivity. Infrastructure investment is referred to mostly from the point of view of addressing pinch points and solving issues where infrastructure is under pressure either from increased demand or lack of update. The whitepaper also puts emphasis on the fact that infrastructure investment needs to be more geographically balanced and needs to be used to connect people to essential services, jobs and opportunity. Key policies referenced deal with the provision of high-quality housing, clean and affordable energy, physical transport infrastructure, digital infrastructure (both fixed and wireless), and charging infrastructure for electric vehicles.

Table 3 Infrastructure indicator framework

Sub-dimension	Suggested indicator
Digital infrastructure	- Number and proportion of premises with full fibre Median download speed (Mbit/s) - 4G services, premises (indoor) - 4G services, geographic (outdoor) 🏃
Housing	- Housing stock: Dwelling stock, including vacant - Housing supply: Net additional new dwellings
Network / economic infrastructure	- Average minimum travel time to reach the nearest key services (i.e. medium sized centres of employment, primary schools, secondary schools, further education, GPs, hospitals, food stores and town centres) 🏃 - Average minimum journey times to nearest of selected airports 🏃

[19] Docherty, I and Waite, D (2018) 'Infrastructure – Evidence Review', Available at: www.productivityinsightsnetwork.co.uk
[20] Stryszowski, P. (2012) The Impact of Internet on OECD Countries. OECD Digital Economy Papers, No. 200. OECD Publishing.
[21] Kurniawan, R. and S. Managi (2019). "Linking Wealth and Productivity of Natural Capital for 140 Countries Between 1990 and 2014." Social Indicators Research 141(1): 443-462.

Sub-dimension	Suggested indicator
	- Average minimum journey times to nearest of selected rail stations 🏃
	- Rail crowding to Main city centre stations in standard class at busiest service point (Passengers in excess of capacity, PiXC). * Main city centre stations only 🏃
	- Air freight traffic: Total Freight (tonnes) including UK, EU and other overseas operators over monthly period 🏃
	- Port freight traffic: UK port freight tonnage, by port and year, major and minor ports - inwards and outwards on an annual basis (2000-2017) 🏃
Environmental and Natural Capital	- Local Authority CO2 emissions estimates (kt CO2, per capita)
	- Availability of public green spaces in the area (including registered parks and gardens) 🏃
	- Air pollution: Population-weighted annual mean PM2.5 data 🏃
	- Flood risk: Numbers of properties at risk of flooding taken from the risk of flooding from rivers and sea 🏃

Note: 🏃 indicator with particular relevance to the place foundation

Digital infrastructure

Nowadays, the quality of the digital infrastructure in an area is an important enabler of economic growth. Broadband connectivity is a key component of the digital infrastructure a locality can offer to business, entrepreneurs and residents. Broadband connectivity has been identified as having significant impact on firm productivity.[22] Moreover, research has found there is a correlation between broadband speed and economic growth within OECD countries.[23]
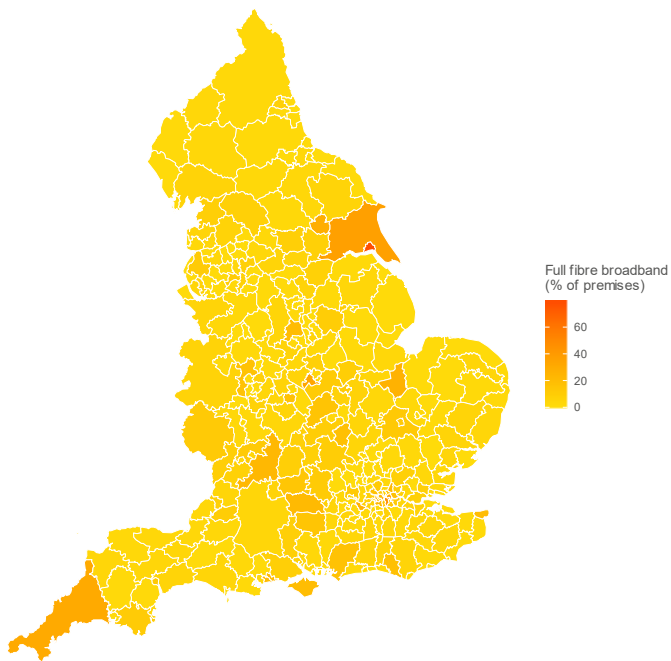
DCMS notes that "investment in fixed and wireless networks is vital for the UK to remain globally competitive in a digital world." Additionally, full fibre infrastructure is a component that will underpin the wider rollout of 5G coverage in the near future. Full fibre and 5G technologies are expected to unlock new markets and business models, especially in relationship to enabling Autonomous Vehicles and the Internet of Things. The rollout of full fibre networks began with six pilot areas (five in England: West Sussex, Coventry and Warwickshire, Bristol and Bath & North East Somerset, West Yorkshire and Greater Manchester) in September 2017.[24]

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[22] SQW (2013). UK Broadband Impact Study, Impact Report. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/257006/UK_Broadband_Impact_Study_-_Impact_Report_-_Nov_2013_-_Final.pdf Link

[23] Koutroumpis, P., (2018). The economic impact of broadband: evidence from OECD countries. Available at: https://www.ofcom.org.uk/research-and-data/telecoms-research/broadband-research/economic-impact-broadband Link

[24] See: https://www.gov.uk/government/news/six-areas-to-pilot-uks-fastest-broadband-as-part-of-200-million-project Link

Figure 26 Proportion of premises with full fibre broadband (%), 2018

Source: Ofcom. Connected Nations Report. Fixed local and unitary authority. Available at:
https://www.ofcom.org.uk/__data/assets/file/0014/131036/201809_fixed_laua_r02.zip Link

Figure 27 Median download speed (Mbit/s), 2018

Source: Ofcom. Connected Nations Report. Fixed local and unitary authority. Available at:
https://www.ofcom.org.uk/__data/assets/file/0014/131036/201809_fixed_laua_r02.zip Link

Currently, the UK has four providers of 4G speeds (EE, O2, Three and Vodafone). As with the availability of fixed-line broadband, access to high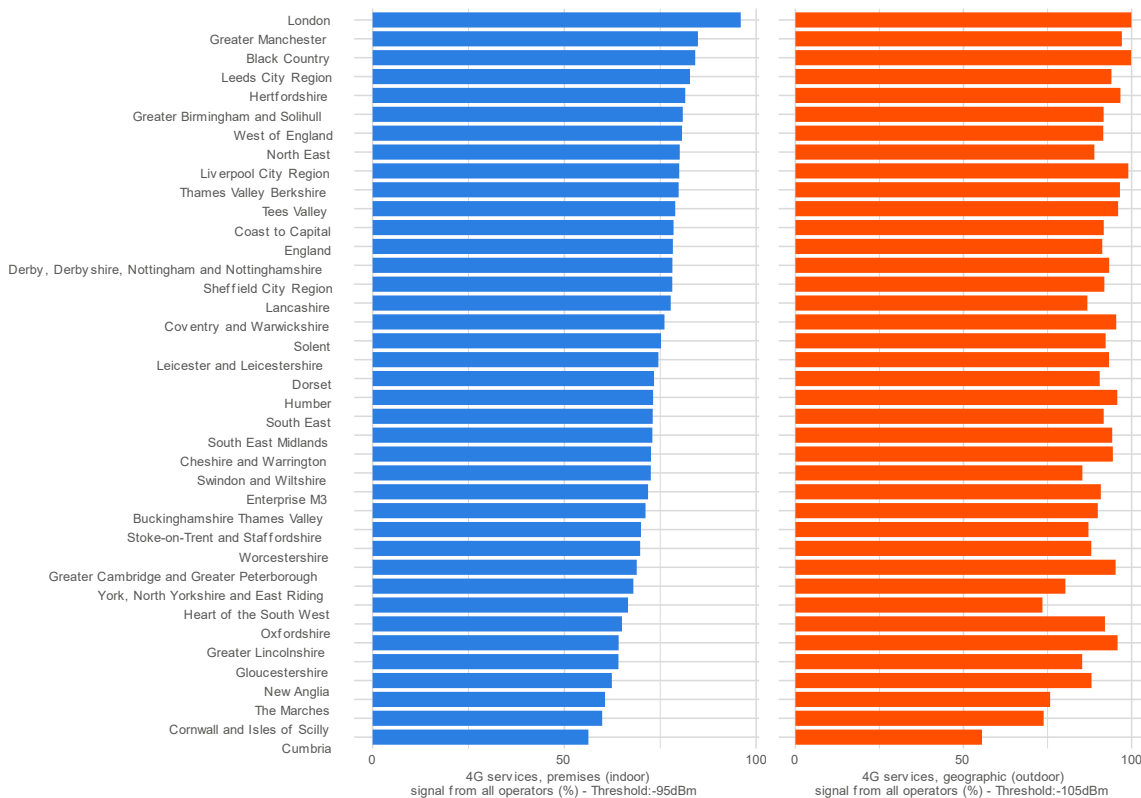-speed mobile data is an important enabler of productivity. Having access to more operators is expected to lead to cheaper prices as well as security of supply.

Data on the availability of 4G connectivity is available in a number of areas, including 4G connectivity in premises (indoors), and in outdoor areas (an indicator with a stronger place component). The data show that the majority of predominantly urban LEPs enjoy good levels of signal from all 4G operators in indoor premises (Figure 28). At the highest end, there is little gap between major economic centres such as London, Greater Manchester and the Leeds City Region. The availability of 4G in outdoor areas broadly follows.

There is an evident urban-rural divide. More rural and geographically-dispersed areas face a bigger challenge in ensuring connectivity throughout their geographies. This is an important aspect for industrial and retail applications that require constant and reliable connectivity, frequently in the field. As a matter of fact, this is one of the key promises that 5G aims to address.

Figure 28 4G services, premises (indoor): signal from all operators (%), Threshold:-95dBm, 2018(*) and 4G services, geographic (outdoor): signal from all operators (%), Threshold:-105dBm, 2018(*)
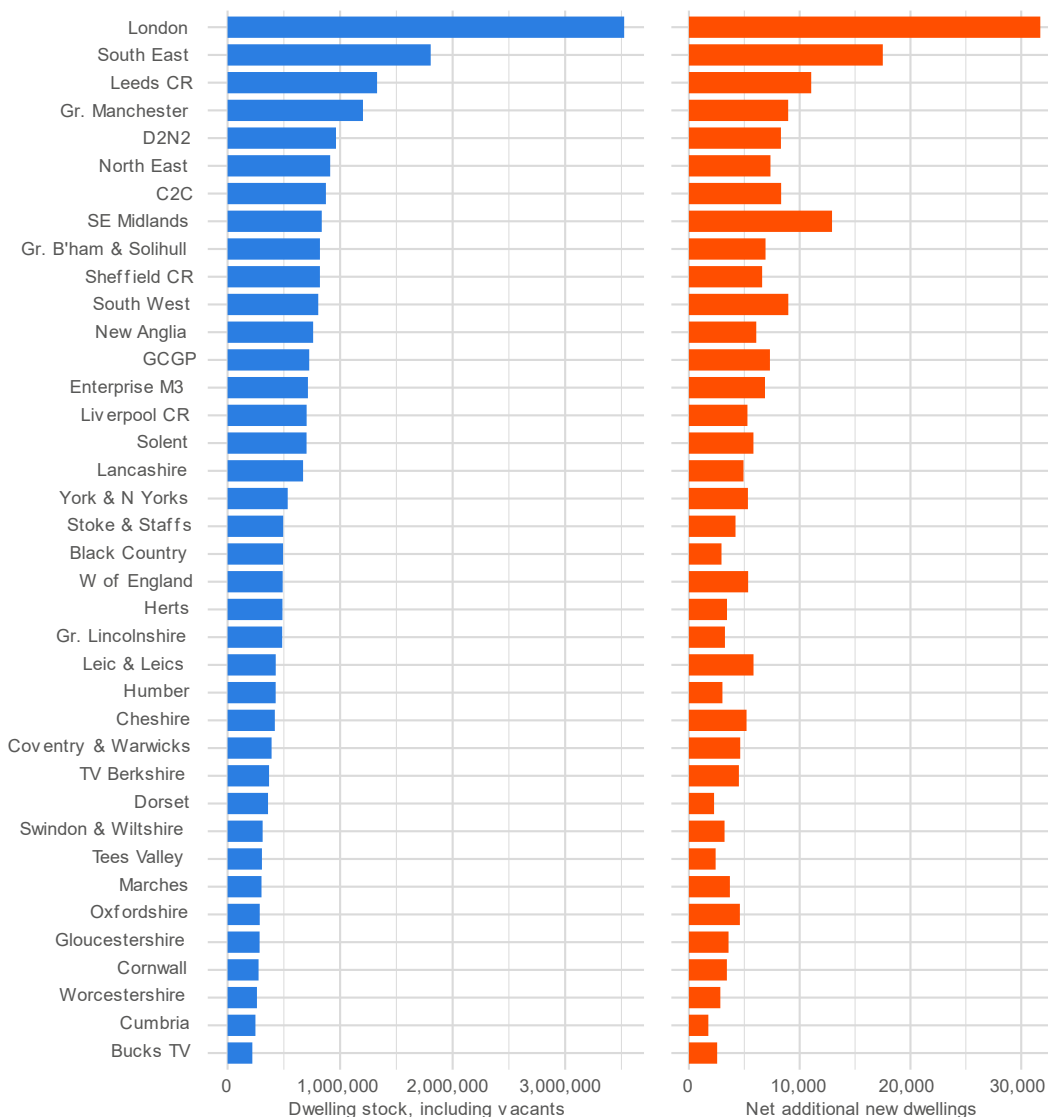

Source: Ofcom. Connected Nations Report. Mobile local and unitary authority. Available at: https://www.ofcom.org.uk/__data/assets/file/0009/131040/201809_mobile_laua_r02.zip Link (*) 2017 and 2018 LEP-level reaggregations done on the basis of ONS Standard area measurements

Housing

Housing indicators provide insight into how subnational economies are performing. Housing stock reflects the pool of available domiciles, which in turn corresponds to population size (see Figure 29). A more dynamic indicator is the flow of housing, which helps us to understand how an area is experiencing and addressing the supply and demand for housing. Net new domiciles can be a result of new builds, changes of use and conversions (e.g. between houses and flats). A drop in (new) housing activity tends to correlate with a drop in GVA and, on a macro level, in GDP. The data show that in addition to being most populous and thus having higher housing stock, London, the South East, Leeds City Region, Greater Manchester are also among those LEPs with the highest number of net additional dwellings (see Figure 29).

Figure 29 Dwelling stock, including vacants, 2017 and Net additional new dwellings, 2018

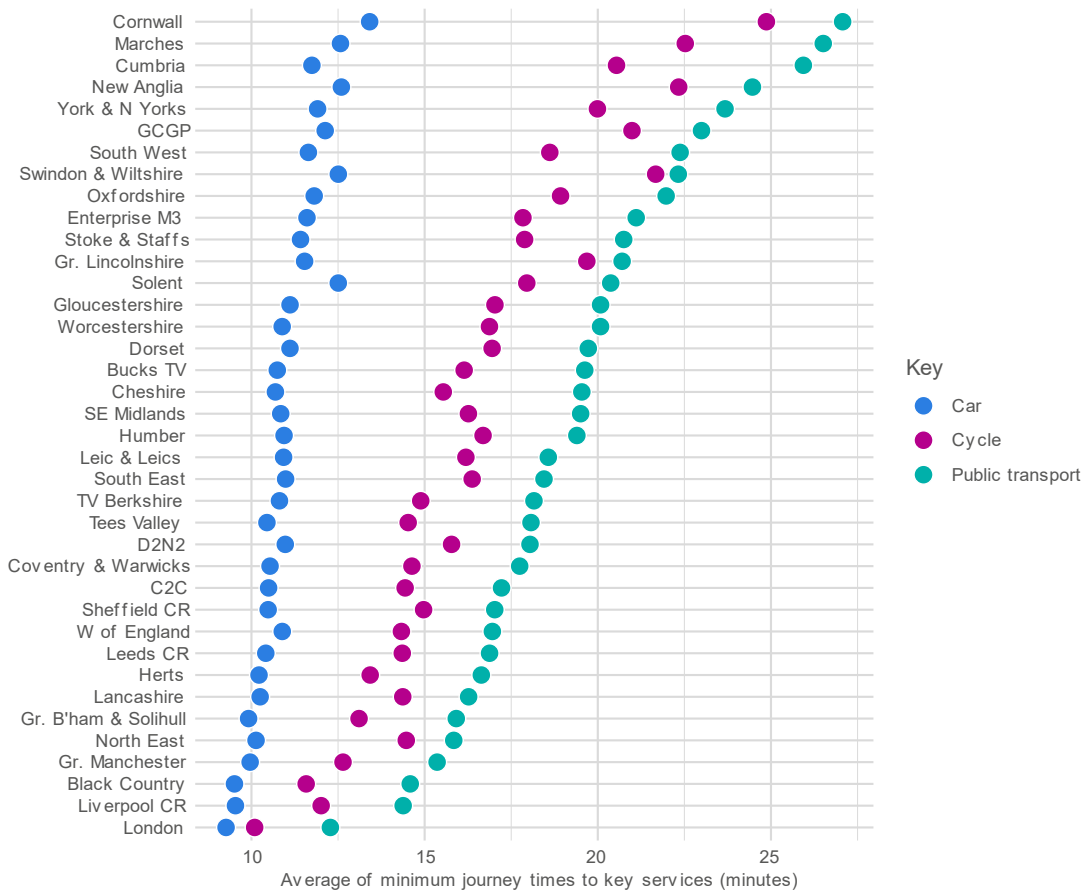Source: MHCLG. Live tables on dwelling stock (including vacants). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/710128/LT_100.xls Link and Live tables on housing supply: net additional dwellings. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/756094/Live_Table_122.xls Link

Network / economic infrastructure

Average travel times to key services and transport links give an overall idea of the transaction costs involved when moving people and goods through a specific area. This is related to productivity inasmuch as it affects the overall cost of doing business, as well as perceptions on how attractive a specific region is in terms of being well connected to amenities, basic facilities (e.g. schools, healthcare facilities), and centres of employment.

Figure 30 shows the average minimum journey time to key services (including: Medium-sized centres of employment, primary schools, secondary schools, further education, GPs, hospitals, food stores and town centres). More rural areas demonstrate higher average journey times, particularly when considering public transport, which may reflect both overall distances and levels of investment in transport infrastructure. Notably, London demonstrates significantly shorter minimum average journey times by public transport than the next best-performing LEPs.

Figure 30 Average of minimum journey times to key services (minutes), by car, by cycle, and by public transport, 2016

Source: DfT. Journey time statistics: data tables (JTS) . Available at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/747771/jts0101.ods Link

A high rate of rail crowding indicates a shortage of (rail) capacity and a stress point in transport infrastructure. This reflects high usage of the rail network, though it also may be regarded as unproductive time that impacts adversely on productivity. Figure 31 shows significant rail crowding across most core cities. London boroughs are particularly visible here, which likely

relates to the volume of peak-time commuters to central London, with Manchester, Bristol, Leeds and Leicester also close. It is interesting to note that Liverpool and Newcastle – both among those with the shortest journey times by public transport (Figure 30) - are also shown here to have no rail crowding (Figure 31).

Figure 31 Rail crowding to main city centre stations in standard class at busiest service point (Passengers in excess of capacity %, PiXC)

Source: DfT. Rail passenger numbers and crowding on weekdays in major cities in England and Wales. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/633151/rail-passenger-crowding-2016.zip Link

Freight traffic serves as an indicator for a region's level of international trade and trade capacity, both of which are drivers of economic growth with positive correlation with productivity. This is of course contingent on major transport hubs being present in a specific region. Frequently the impact of these infrastructures goes beyond the immediate area and are major national assets in their own right. For this reason, the strategies of local areas in the vicinity of these infrastructures are often heavily influenced by the effect and further attraction potential of these infrastructures. Figure 32 shows total air and port freight in tonnes. As may be expected, Humberside, Greater Lincolnshire, London, the South East, Solent and Liverpool City Region all demonstrate high port freight volumes while London, the South East, Greater Manchester, and Coast to Capital demonstrate high air freight volumes[25].

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[25] Leicester might be capturing the East Midlands airport.

Figure 32 Total (Air) Freight (tonnes) including UK, EU and other overseas operators

Source: Civil Aviation Authority. Freight by Type and Nationality. Available at: https://www.caa.co.uk/ and ONS. Port freight annual statistics. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/739802/port0301.ods Link

Environmental and Natural Capital

There is a bidirectional causality that exists between economic growth and CO_2 emission trends. While air quality has been found to correlate with job satisfaction and productivity, the level of CO_2 emissions can be an indicator for strong industrialisation or indeed the progress of advanced technologies and more efficient energy usage. In context with other indicators, one can test the "greening" of the economy and the distinct patterns between economies based mostly on services and those based on a larger industrial manufacturing component. Figure 33 shows on balance lower CO_2 emissions per capita in the south, including London. Meanwhile, Humber, Greater Lincolnshire, Tees Valley and Cheshire and Warrington have among the highest CO_2 emissions per capita.
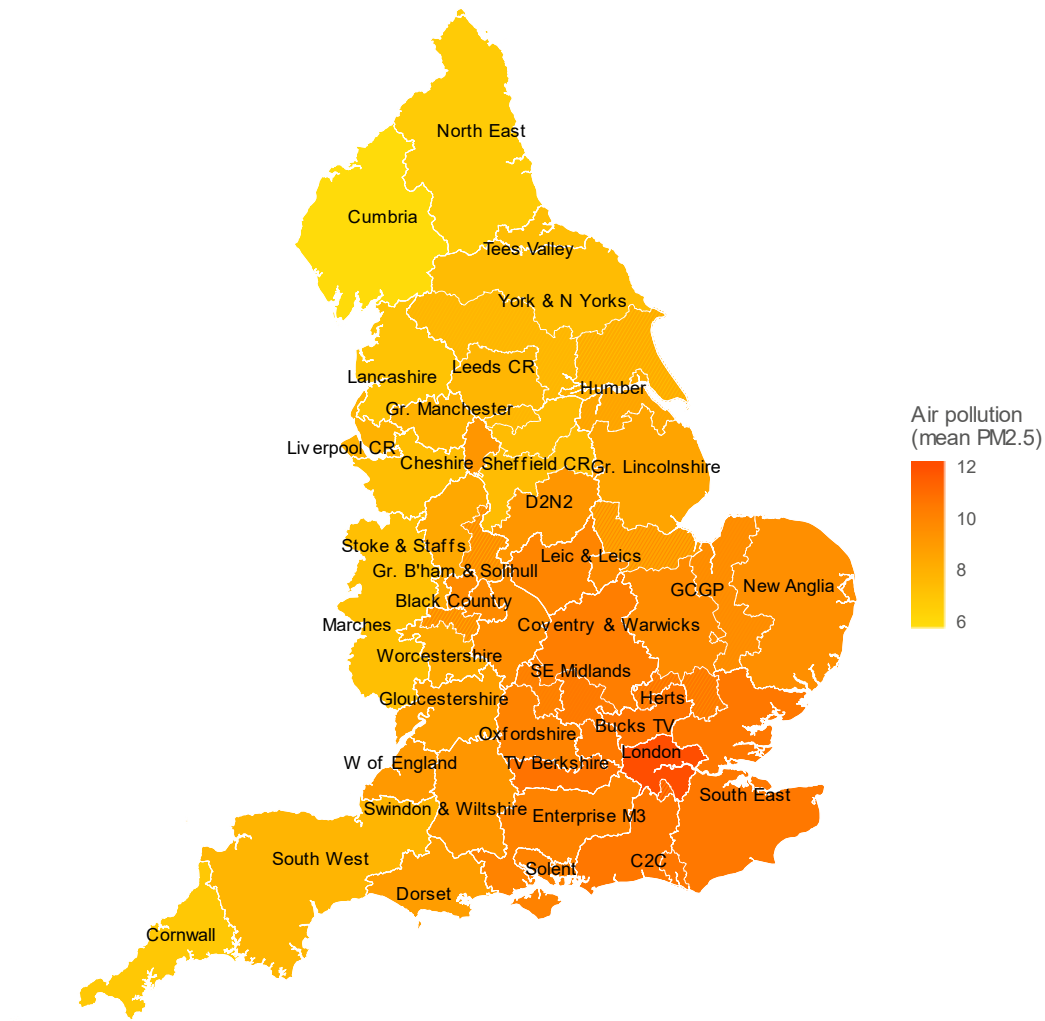
Figure 33 Local Authority CO2 emissions estimates (kt CO2, per capita)

Source: DEFRA. UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2016. Available at: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2016 Link

Air quality serves as a rough indicator for residential / living environment satisfaction. A number of studies suggest a correlation between air quality and subjective wellbeing[26] and living quality and job satisfaction which, in turn, is a significant driver of productivity. In addition, negative air quality is a health risk factor correlating with missed working time due to sickness. Conversely to the above, the data shows lower air quality in the south (excluding Cornwall and the Isles of Scilly).
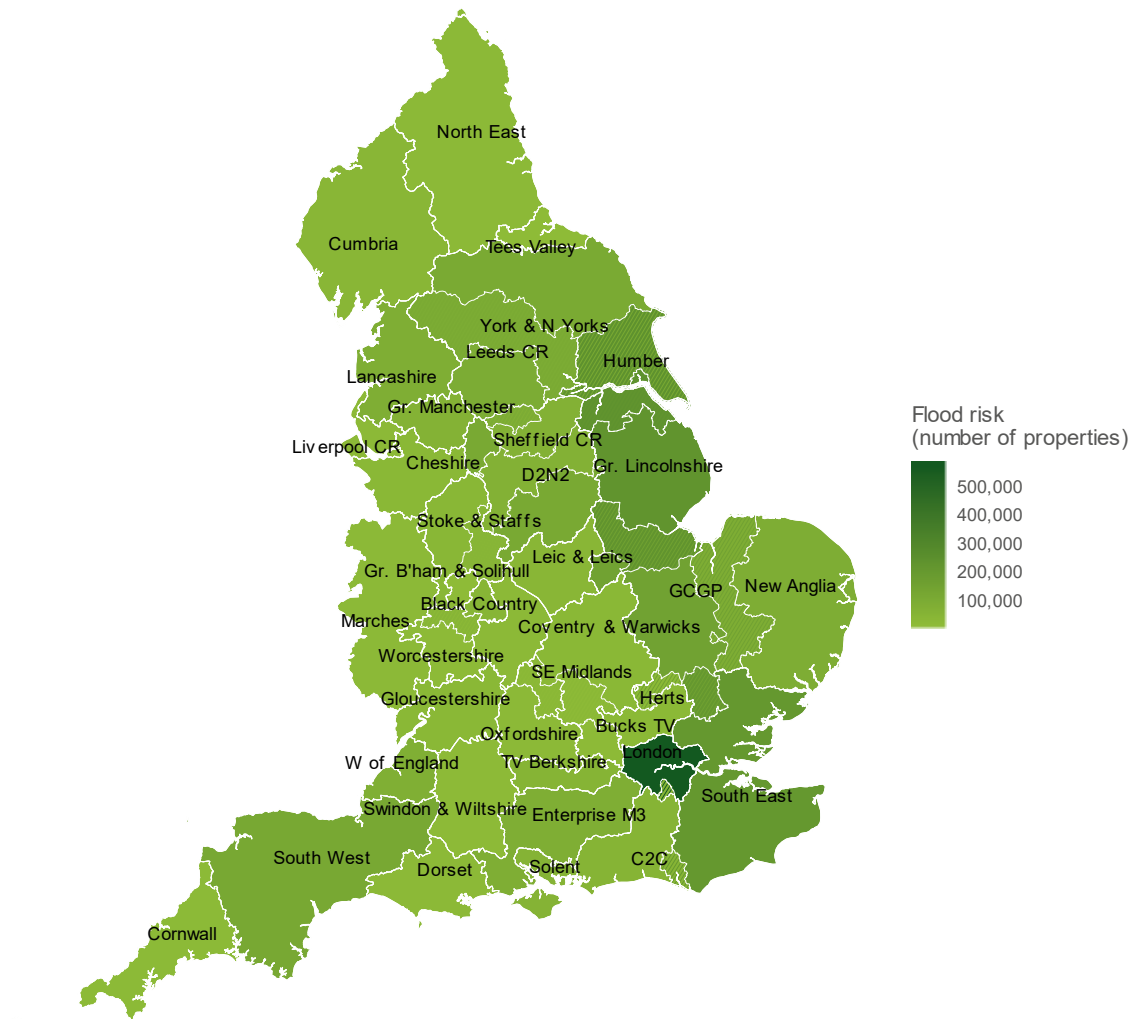
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[26] Li, Y., et al (2018) A review of air pollution impact on subjective well-being: Survey versus visual psychophysics. Journal of Cleaner Production 184 (2018) 959-968

Figure 34 Population-weighted annual mean PM2.5 data

Source: DEFRA. UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2016 . Available at: https://uk-air.defra.gov.uk/data/pcm-data Link
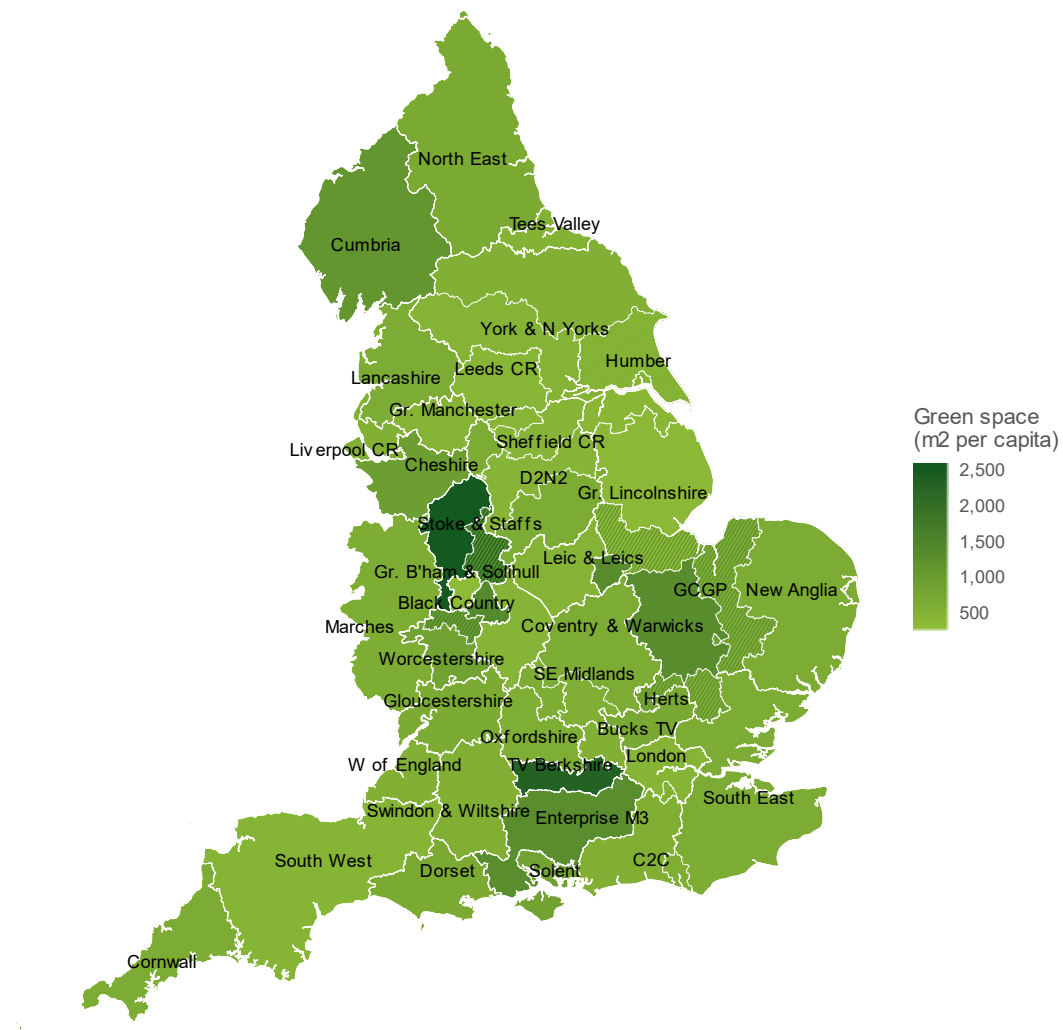
The number of properties at risk of flooding is an indicator for the level of resources potentially absorbed dealing with flood risks and of areas potentially excluded from future development purposes. This is largely defined by coastal locations or a high concentration of waterways in more populous areas (see Figure 35).

Figure 35 Number of properties at risk of flooding, from rivers and sea, 2019

Source: Environment Agency. Risk of Flooding from Rivers and Sea. Available at: https://data.gov.uk/dataset/4d606c86-00ab-4dd7-911d-c691bbef0e52/risk-of-flooding-from-rivers-and-sea-postcodes-in-areas-at-risk Link

The availability of green spaces serves as a rough indicator for residential / living environment satisfaction. Access to greenspace is a contributor to life satisfaction which, in turn, is a significant driver of productivity, and plays an important role in talent attraction and retention. The data reveal no significant north/south divide, and in many cases even LEPs with a high concentration of predominantly urban areas demonstrate high values of available green space per capita.

Figure 36 Availability of public green spaces, m2 per capita (or ha per 10,000 population), 2019

Source: Calculated by Technopolis based on data from Ordnance Survey. Greenspace OS Maps. Available at: https://www.ordnancesurvey.co.uk/opendatadownload/products.html Link

Business environment

This section presents data on a number of aspects of the business environment including productivity and business growth and innovation. Each of these indicators is linked to long-term prosperity and dynamism in the local economy and therefore form key barometers of local competitiveness. It is important to note, however, that productivity and the other indicators described in this section vary significantly between industries, and the industrial composition of the business sector within an area is therefore an important determinant of productivity (larger businesses, for example, are also typically more productive). Aspects of business dynamism – entrepreneurship – also have a positive link to productivity[27]. The evidence on the relationship between business growth and productivity is less clear with few firms which are achieving high growth also growing their productivity[28]. Clustering and specialisation have also strong theoretical links to regional growth and productivity, although the evidence remains less clear in terms of the size of any effects[29]. Some recent studies have suggested that clustering may benefit smaller firms but have less significant beneficial effects for larger firms[30]. The indicators included in the Business Environment dimension therefore include compositional measures (sector, size) but also indicators of business dynamism related to current growth and clustering. Any indicator may be influenced both by the industrial structure of each locality as well as the quality or dynamism of local businesses.

The Industrial Strategy White Paper focuses strongly on some aspects of the business environment such as local enablers for starting and growing businesses, access to talent and finance, and an open economy. Key policies mentioned include the Sector Deals, £20bn of investment in innovative and high potential businesses (which includes the £2.5bn Investment Fund run by the British Business Bank) and actions targeted to improve productivity in the 'long tail' of SMEs.

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[27] Erken, H., et al. (2018). "Total factor productivity and the role of entrepreneurship." Journal of Technology Transfer 43(6): 1493-1521.

[28] Du, J and Vanino, E (2019) Fast growth firms and their wider economic impact the UK evidence. Available at: https://www.enterpriseresearch.ac.uk/wp-content/uploads/2019/01/ERC-ResPap73-DuVanino-Final-1.pdf.

[29] Kemeny, T. and M. Storper (2015). "Is Specialization Good for Regional Economic Development?" Regional Studies 49(6): 1003-1018.

[30] Cainelli, G., et al. (2018). "Spatial agglomeration, Global Value Chains, and productivity. Micro-evidence from Italy and Spain." Economics Letters 169: 43-46.

Table 4 Business Environment indicator framework

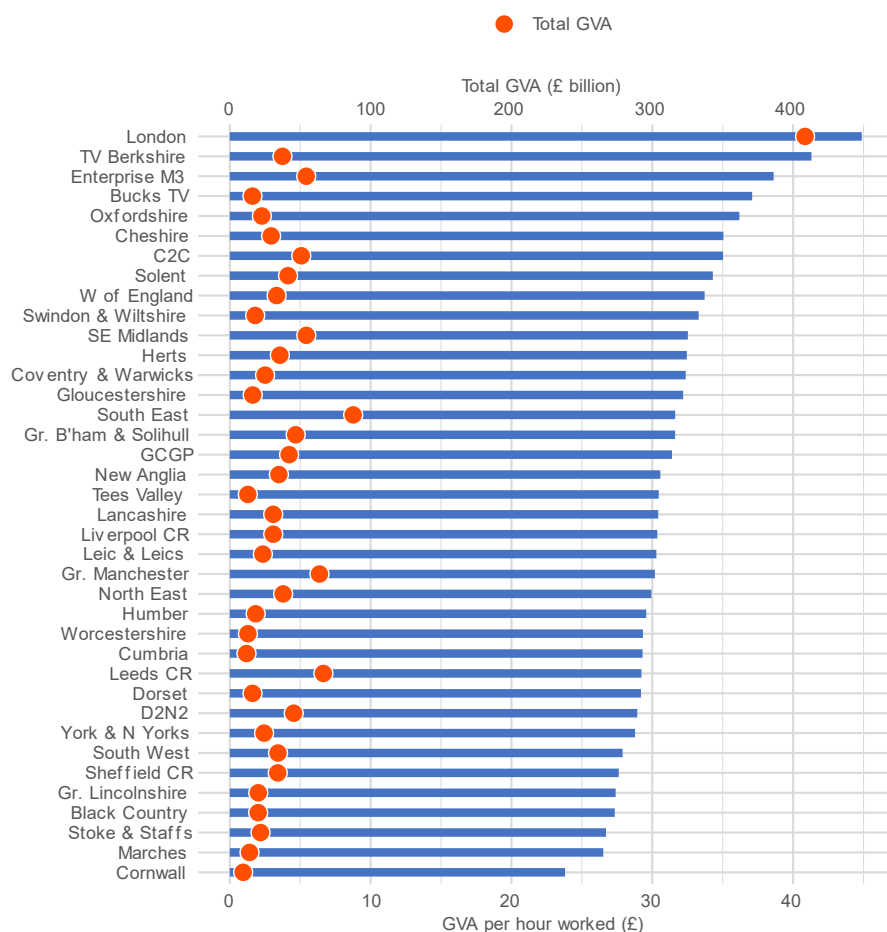| Dimensions	Sub-dimension	Suggested indicator
Businesses	Business productivity	- GVA per hour worked - Balanced (total) GVA by local authority, by broad industrial group
	Business population	- Business Counts - number of local units - Business demography, net change (births - deaths)
Economic dynamism	Start-ups and high growth firms	- Start-ups per 10,000 population - Private-sector job growth - Start-up 3-year survival rates - Proportion of start-ups that reach £1m turnover - Proportion surviving start-ups growing to £3m turnover
	Firms that innovate	- Proportion of firms that are product or service innovators (UK Innovation survey) - Proportion of firms that are process innovators (UK Innovation survey)
	Trade balance	- Regional trade in goods balance: Value of regional Imports & exports ⛲ - Regional trade in goods balance: Number of Importing and exporting businesses ⛲ - Regional Estimates of service exports (NUTS3) ⛲
	Economic specialism	- Location quotient analysis of SIC sectors (local units and employment) ⛲

Note: ⛲ indicator with particular relevance to the place foundation

Total Gross Value Added (GVA) in any area captures the value of the products and services produced within an area. Or, put another way the level of wealth creation in an area. It is an important measurement for the size and productivity of the economy of any area and a driver of long-term local economic growth. Comparing Total GVA across LEP areas emphasises the dominance of London on this measure (Figure 5.1, top axis). London has annual Total GVA more than four times that of any other LEP area. Among LEPs outside London there is also significant variation in the Total GVA in different LEPs with some of the more rural LEPS having relatively low levels of Total GVA.

Total GVA provides an indication of the overall ability of a LEP area to create wealth and reflects both the number of people working in an area and their productivity per hour. Looking at Gross Value Added (GVA) per worked hour itself captures the value of the hourly produced products and services within an area. It represents an essential measurement of the productivity of a locality and driver of long-term local economic growth. Here, London again tops the LEP league table (Figure 39, lower axis), although the difference with other LEP areas is much less pronounced than that in total GVA due to the size of the Capital. In general terms the data shows something of a North-South and urban-rural split in GVA per hour with more urban and more Southerly LEP areas tending to have higher GVA per hour worked.
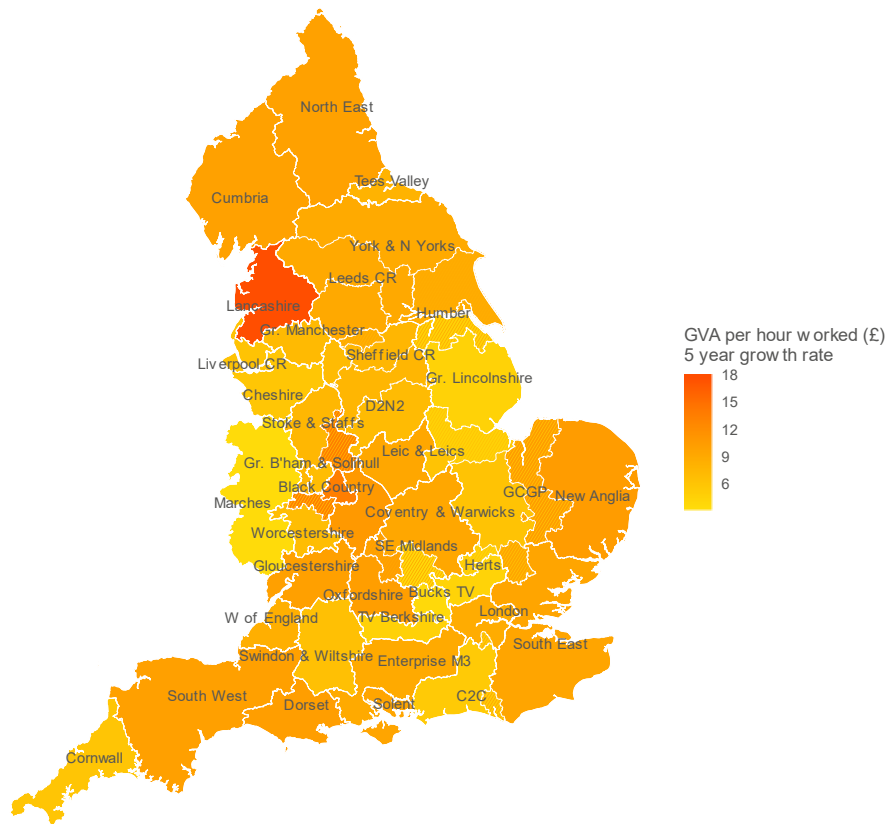
Figure 37 Balanced (total) GVA (£ million), all industries, 2016 and GVA per hour worked (£), 2017 (LEPs)

Source: ONS. Sub-regional productivity: labour productivity indices. Available at: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/datasets/subregionalproductivitylabourproductivitygvaperhourworkedandgvaperfilledjobindicesbyuknuts2andnuts3subregions Link; ONS. Regional gross value added (balanced) by local authority in the UK. Available at: https://www.ons.gov.uk/file?uri=/economy/grossvalueaddedgva/datasets/regionalgrossvalueaddedbalancedbylocalauthorityintheuk/current/regionalgvabbylainuk.xlsx Link

Also interesting is to consider how GVA per hour worked (i.e. productivity) has changed over the last five years (Figure 38). This indicator provides a medium-term perspective on the productivity trend in any area – the faster the growth the greater the productivity improvement. The fastest growth in GVA per hour over this period was achieved by Lancashire followed by Black Country LEP. Otherwise growth rates of GVA per hour does not show a clear regional trend. There is perhaps an observable pattern of more rural LEPs (e.g. Cornwall, the Marches, Lincolnshire) having slower growth in GVA per hour than other areas.

Figure 38 Productivity. GVA per hour worked (£), 2017 (LEPs)

Source: ONS. Sub-regional productivity: labour productivity indices. Available at:
https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/datasets/subregionalproductivitylabourproductivitygvaperhourworkedandgvaperfilledjobindicesbylocalenterprisepartnership Link
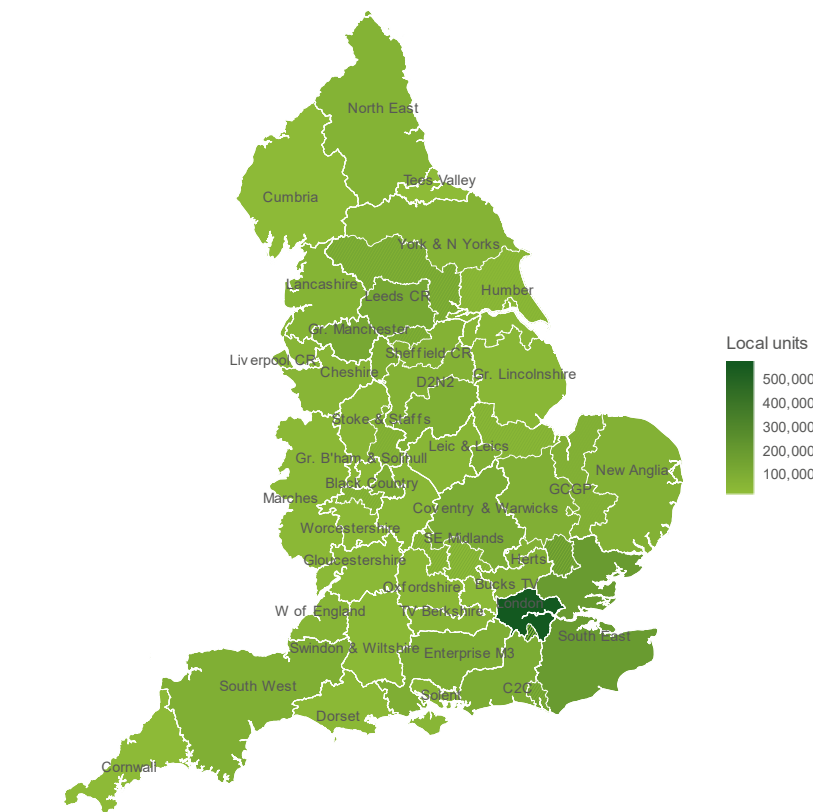
Business Population

Local economies are mainly driven by their businesses. The overall number of businesses in an area, as well as the net change in the number of business units (i.e. start-ups less closures) is a broad indicator of the overall capacity and dynamism of the regional/local economy. Both indicators – and particularly the net change in the number of business units – provide an indication of the health of the local economy. Comparisons with other similar LEPs may be particularly useful here, however, as cyclical factors affecting the whole UK economy may cause a fall in business birth rates or an increase in business closures across many LEP areas.

The distribution of the business population across LEP areas and the net change in business units are illustrated in the figures below. Overall, the data shows the large relative size of the London economy with by far the largest number of local business units (over 0.5m). The next largest LEP in terms of the number of business units is the South East with around 0.2m business units. At the other extreme Swindon and Wiltshire and Worcestershire LEPs have less than 50,000 active businesses (Figure 40).
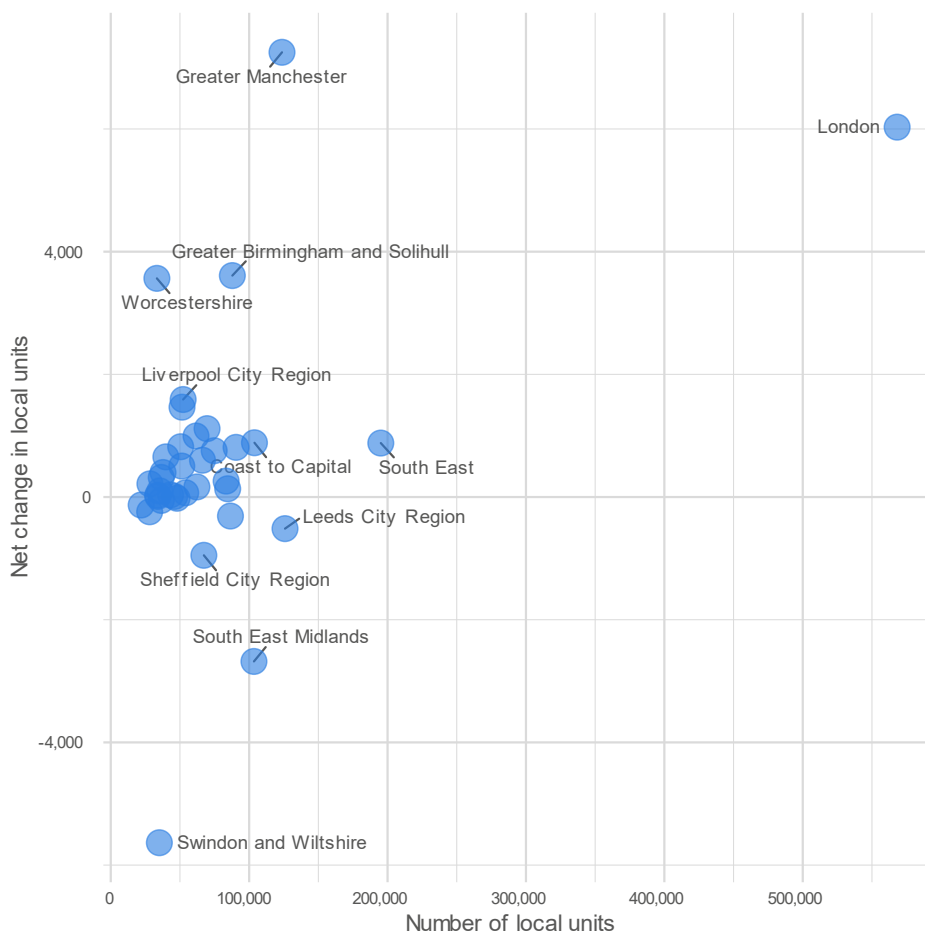
Comparing the net change in the number of business units provides some indication of changes in business populations across LEPs. Note that the zero-horizontal axis in Figure 40 denotes a situation where the net change in business population is zero, i.e. the number of business births and deaths are the same. Positive situations that are above the line represent situations where the number of business births are greater than the number of closures. London and Manchester both experienced net growth in the number of business units over this period although in both cases this represented only a small increase on what was already a large business stock (Figure 40). More striking changes are evident for the smaller LEP areas with Worcestershire experiencing a sharp net rise in its (relatively small) stock of businesses and Swindon and Wiltshire experiencing a sharp net fall in its business stock.

Figure 39 Business population (number of local units), all sectors, 2018

Source: NOMIS Business counts UK. Available at: https://www.nomisweb.co.uk/

Figure 40 Business population (number of local units), all sectors, 2018, Business demography, net change (births - deaths), number of firms 2017

Source: NOMIS Business counts UK. Available at: https://www.nomisweb.co.uk/; ONS. https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/bulletins/businessdemography/2017 Link
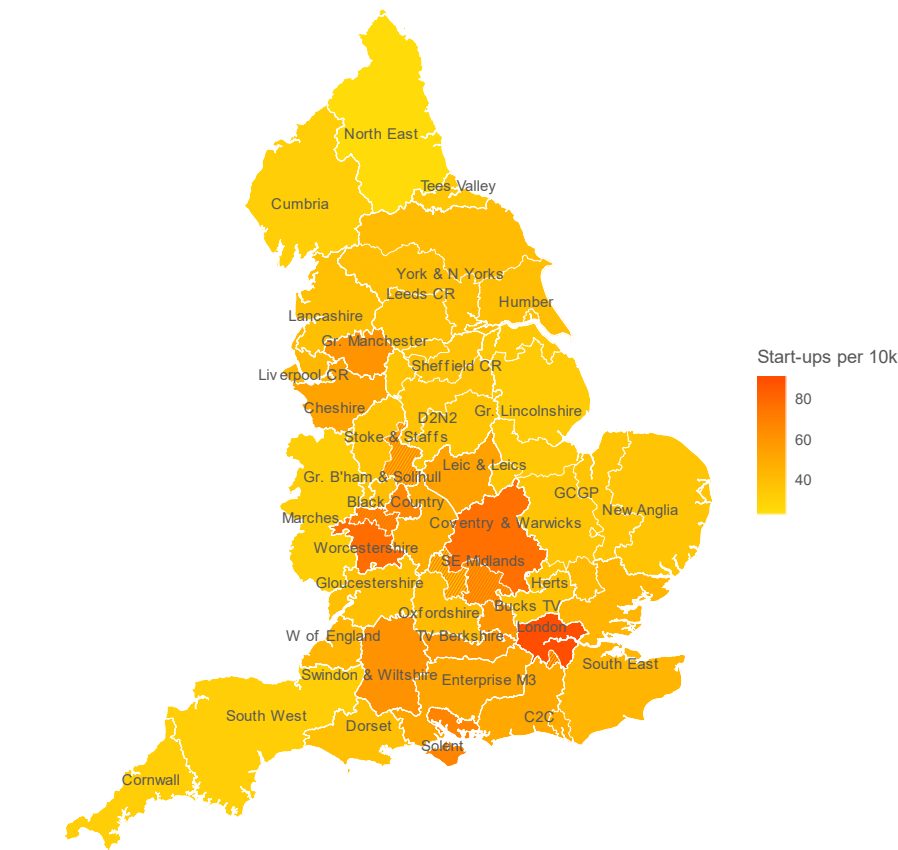
Business start-ups and High Growth Firms

The ratio of new business start-ups to population is an indicator of the dynamism of a local economy. Many start-ups will not succeed and grow but the wider evidence is clear that young, start-up firms create a high proportion of new jobs in an area and can provide a stimulus to innovation and future productivity. Start-ups also provide the basis for future scale-up, developing a pipeline of high quality companies – or attracting other high quality start-ups into an area – which can lay a strong foundation for future growth. Conversely, a low rate of start-up activity may be suggestive of fewer local market opportunities and/or a local climate which is not conducive to business establishment and development.

One caveat is necessary about this measure which may overstate the relative dynamism of urban areas. In particular this measure compares where people start their businesses with the population in an area. Where businesses are concentrated in a city to which people commute this may suggest a higher rate of business start-up in the city and (by implication) a lower rate in surrounding areas. Looking across England suggests start-up rates are highest in London

and other core regions of England with lower start-up rates in more costal and peripheral areas. Exceptions to this general rule, however, are Solent and Cheshire LEPs (Figure 41).

Figure 41 Business start-ups (firms per 10k population), 2017

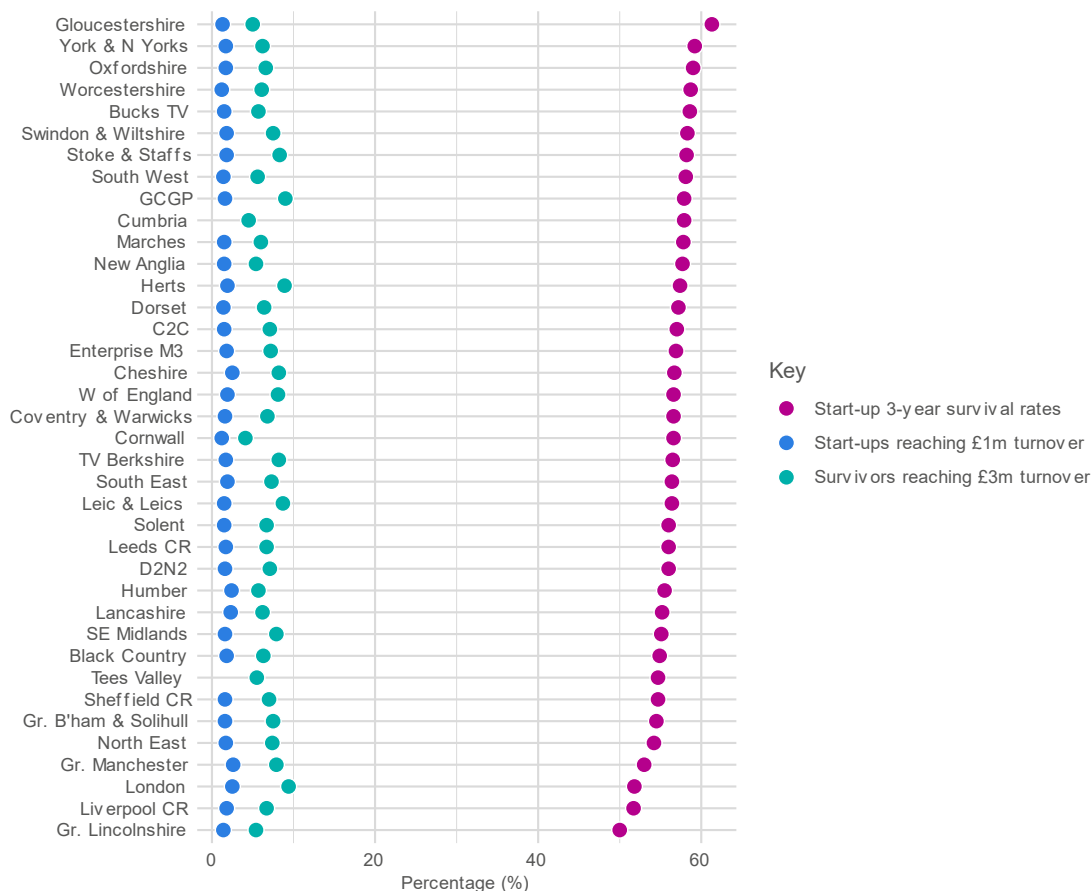Source: ERC Local Growth Dashboard Reports. Available at: www.enterpriseresearch.ac.uk

Business start-ups are a key driver of employment, economic growth and productivity. However, many start-ups fail within the first three to five years. The three-year survival rate is therefore an important indicator for start-ups' chances of long-term survival and sustainable business growth (i.e. long-term economic growth). Many start-ups that do survive their initial years also remain small. The ratio of start-ups reaching higher levels of turnover (£1m or £3m) is thus a broad indicator for the long-term economic growth prospect. Both the survival of start-ups and the growth measures also provide an indication of whether the business environment in a locality is conducive to business survival and growth.

Business survival rates are generally stable through time for any given LEP. The two business growth measures can be more volatile however due to the relatively small number of firms achieving growth in any given year. These measures are therefore better considered over a range of years in comparison to other LEPs.

Over three years around 55 per cent of start-ups survive in England (Figure 42). This survival rate varies significantly between LEP areas, however, although there is little clear relationship between the type of LEP area (i.e. rural v urban) and firms' survival rate. Gloucestershire has the highest survival rates with some of the lowest in London, Liverpool and Greater Lincolnshire. Less than 5 per cent of start-ups achieve £1m turnover over three years in each LEP (Figure 42). Note the implication here that over 95 per cent of start-ups across England

have turnover of less than £1m after three years. The proportion of surviving firms reaching turnover of £3m over the three-year period 2014-2017 is also below 10 per cent in all LEP areas and – like the proportion of start-ups reaching £1m turnover – has little clear relationship to the survival rate.

Figure 42 Start-up 3-year Survival Rates (%), 2014-2017, Start-ups reaching £1m turnover (%), 2014-2017, and Survivors reaching £3m turnover (%), 2014-2017

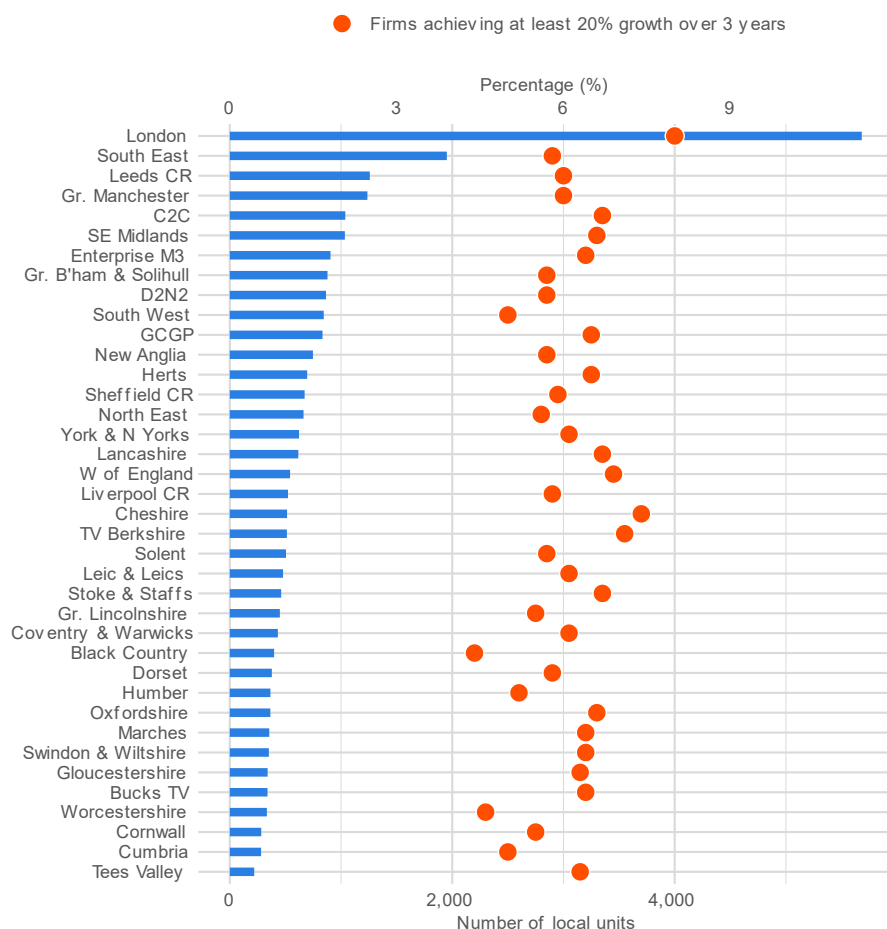Source: ERC Local Growth Dashboard Reports. Available at: www.enterpriseresearch.ac.uk;

Among those firms that survive into the medium term, a proportion achieve what is called 'High Growth'. This term was developed by the Organisation for Economic Cooperation and Development (OECD) to provide an internationally comparable measure of business growth. It relates only to firms with more than 10 employees in any period, with a 'high growth' firm achieving annualised average employment growth of at least 20% over a three-year period. Previous studies have suggested that while high growth firms account for only a small proportion of the stock of all businesses they create a disproportionate number of new jobs over any given period. High growth or 'scale-up' businesses in a local area therefore have the potential to make a significant difference to the local business landscape and have been the focus of a number of national business initiatives such as those supported by the Scale-up Institute[31].

The proportion of firms in each LEP area (compared to the local business population) is illustrated in Figure 43. In the three years to 2018, London had the highest scale-up rate with around 8 per cent of the eligible business stock achieving high-growth. This proportion of high-growth firms was significantly above that in some other LEPs, particularly the Black Country

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[31] See http://www.scaleupinstitute.org.uk/.

and Worcestershire. Recent analyses have suggested that although high growth firms do occur in every sector they are significantly more common in services than in manufacturing suggesting the potential importance of sectoral composition in shaping these results[32].

Figure 43 Business population (number of local units), all sectors, 2018 and High Growth Firms (%), 2014-2017

Source: NOMIS Business counts UK. Available at: https://www.nomisweb.co.uk/;ERC Local Growth Dashboard Reports. Available at: www.enterpriseresearch.ac.uk;

Firms that innovate

Innovation – new products or services or upgrades to firms' business models or systems - are an important determinant of productivity and long-term economic growth. Research suggests that more than half of nations' total economic growth can be attributed to the implementation of new technologies through innovation. Moreover, finding better ways of making goods and delivering services improves the performance of businesses which in turn increases wages and the capacity of local economies.
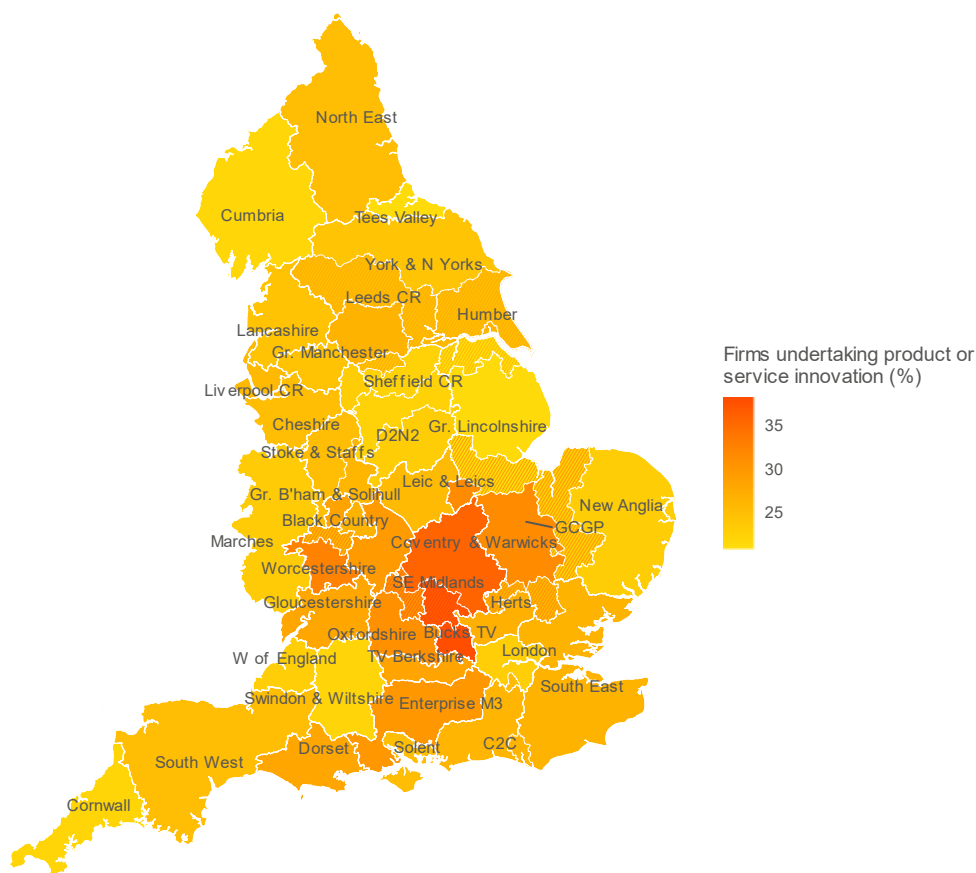
The analysis focuses on two measures of innovation activity, which reflect the proportion of firms in a locality engaging in product or service innovation and/or process innovation over a three-year period. As with the measures of business growth and productivity discussed earlier,

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[32] https://www.enterpriseresearch.ac.uk/wp-content/uploads/2019/06/02114-State-of-Small-Business-Britain-Report_June-2019-Final.pdf Link

these indicators reflect both the industrial composition of each locality as well as the propensity to innovate of individual firms.

Looking first at the proportion of innovating firms that are developing products or services (Figure 44), the data shows a strong concentration or arc of the most innovative LEP areas through the South Midlands area to the North of the M25. Other central LEPs also tend to have a higher proportion of more innovative firms than those in more rural and peripheral areas (Figure 44).

Figure 44 Percentage of firms undertaking product or service innovation (%), 2019
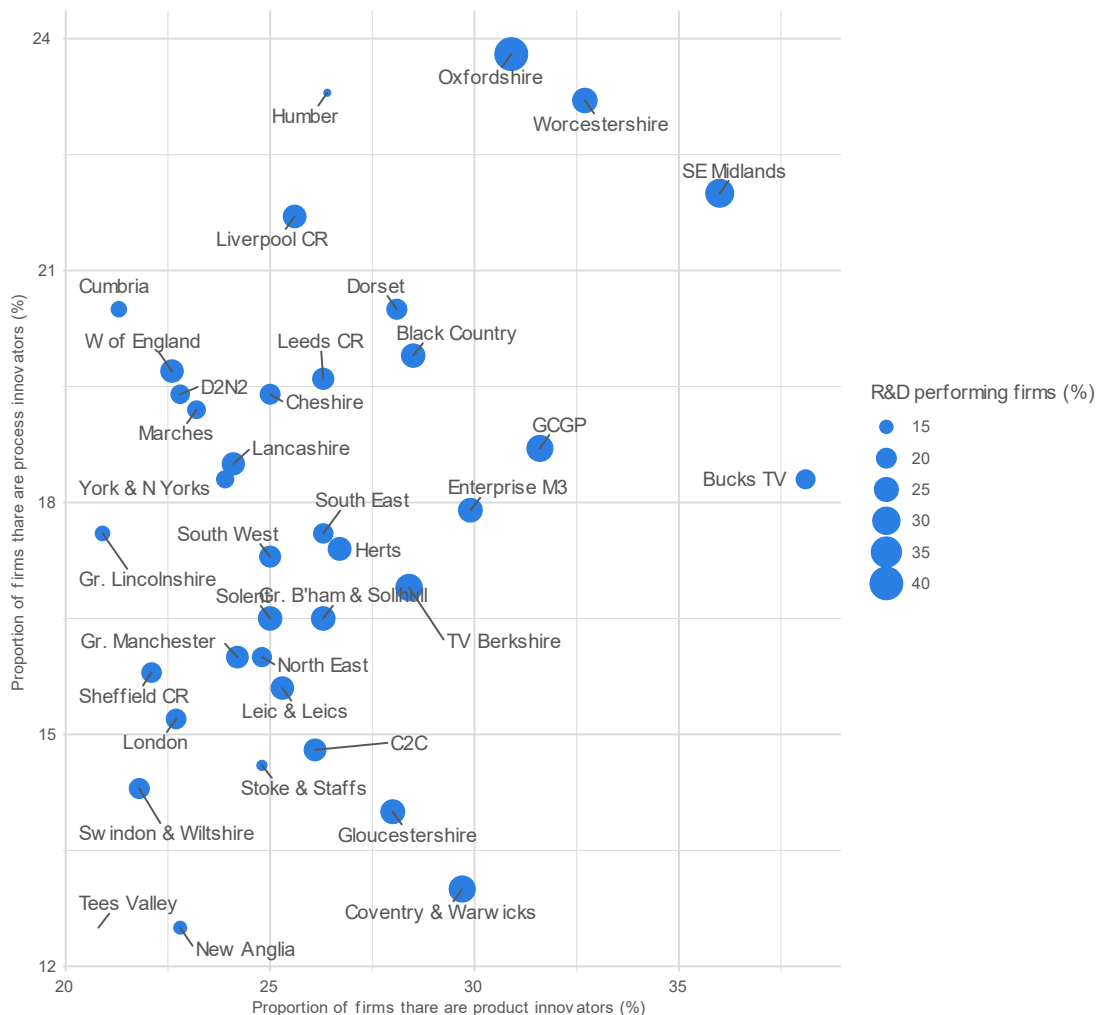

Source: ERC Local Growth Dashboard Reports. Available at: www.enterpriseresearch.ac.uk;

Product or service innovation may be accompanied by related process innovation although this is not always the case. This is illustrated in Figure 45 which relates the proportion of firms undertaking process and product innovation in each area. In each LEP the size of the dot indicates the proportion of firms reporting undertaking research and development, one of the key inputs to innovation. Three LEPs stand out as having particularly high levels of both product/service and process innovation as well as substantial proportions of firms undertaking R&D: Oxfordshire, Worcestershire and South East Midlands. Other areas (e.g. Tees Valley, New Anglia) report significantly lower levels of both types of innovation and smaller proportions of firms undertaking R&D.

Figure 45 Percentage of firms undertaking product or service innovation (%), 2019 and Percentage of firms undertaking process innovation (%), 2019

Source: ERC Local Growth Dashboard Reports. Available at: www.enterpriseresearch.ac.uk;
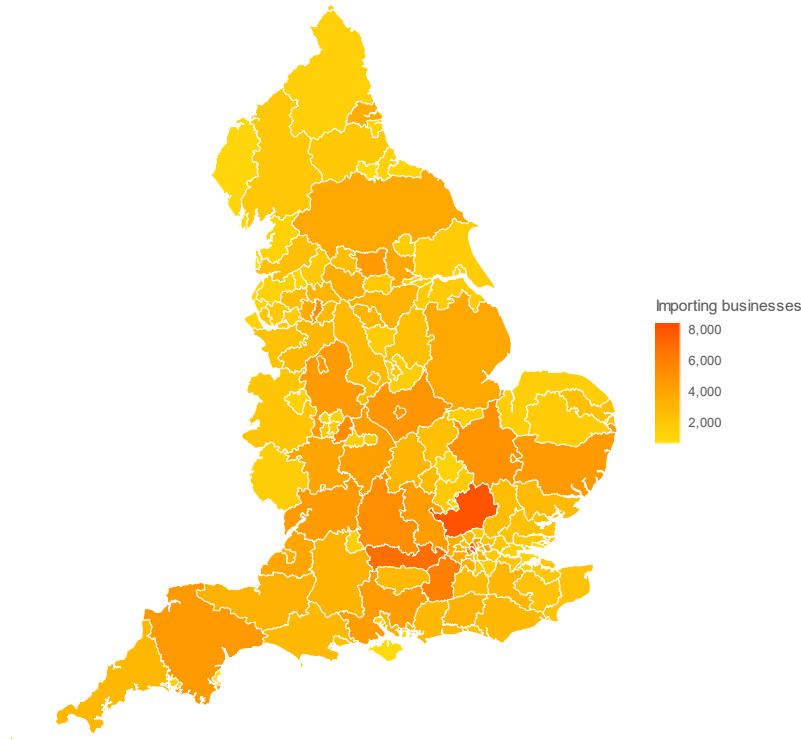
Importing, exporting and the trade balance

Like innovation, exporting has also been shown to be strongly linked to productivity at the level of the firm. Some debate continues about the direction of causality between exporting and productivity, but studies have found that businesses which declare goods exports or imports have approximately 20% higher productivity than non-traders[33]. The number or proportion of firms engaging in international trade in an area is therefore important for local productivity.

Here, the analysis focuses on four indicators of firms' engagement with international trade: the number of importing and exporting firms and the value of firms' exports and imports. In each case, the data is presented by NUTS3 area as this is how HMRC reports regional trade data.

The number of importing and exporting businesses by Local Authority are reported in the figures below. Unsurprisingly the largest concentration of both importers and exporters are in

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[33]
https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/articles/uktradeingoodsandproductivitynewfindings/2018-07-06 Link
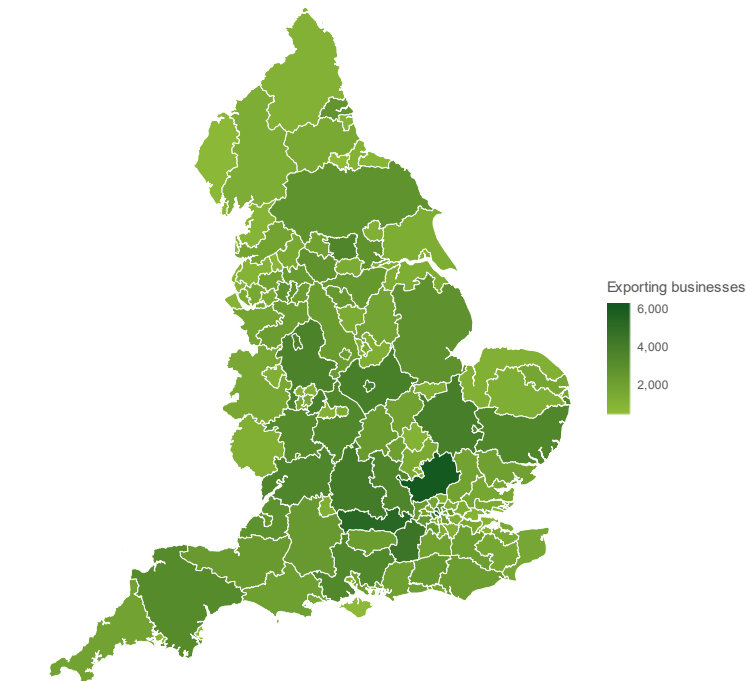
and around London (where the business count is also highest) with no very consistent pattern across most other Local Authority areas in England. Local Authorities closest to the Scottish border have notably lower levels of international engagement than more Southerly areas.

Figure 46 Number of importing businesses (business counts), NUTS3 2017
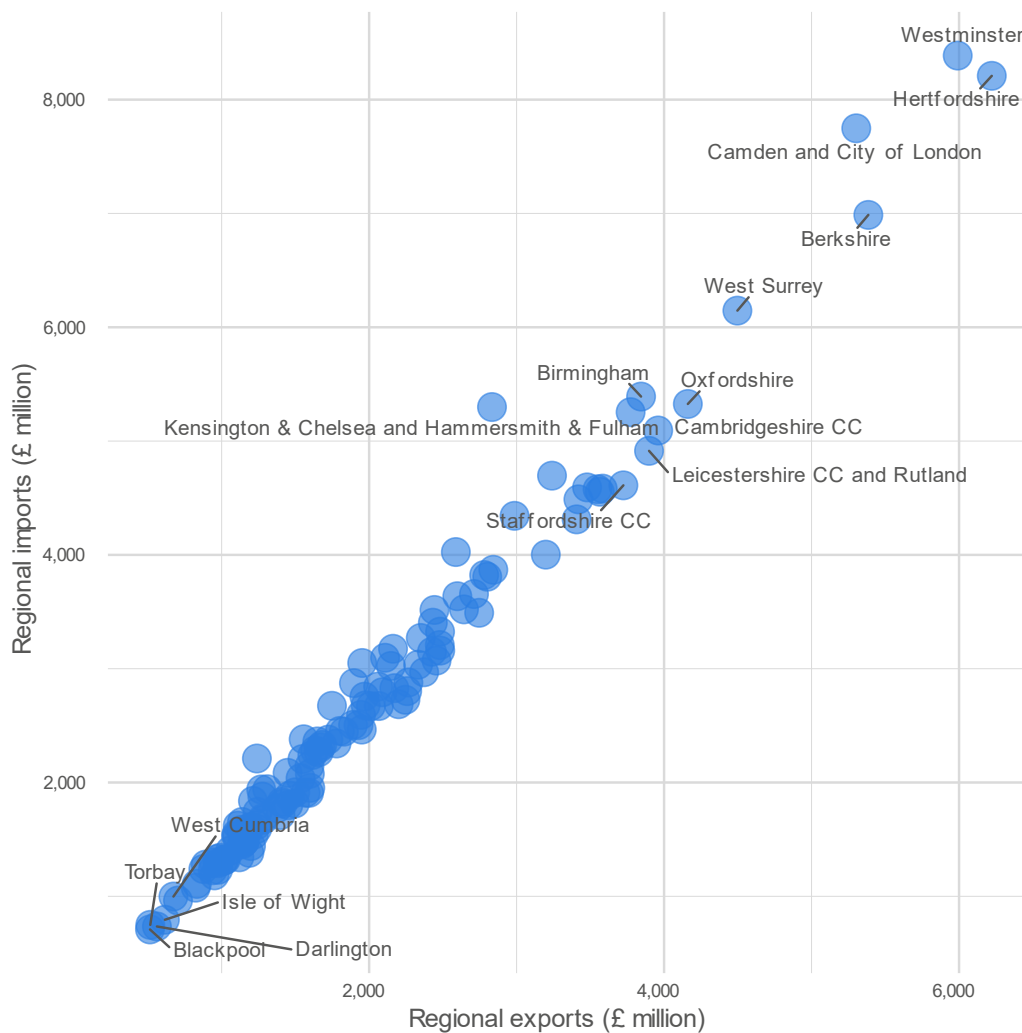

Source: HMRC. Regional Trade Statistics. Available at: https://www.uktradeinfo.com/Statistics/RTS/Pages/default.aspx Link

Figure 47 Number of exporting businesses (business counts), NUTS3 2017

The value of local imports and exports are plotted against each other in Figure 48 with each dot representing one NUTS3 area. In general, this suggests a strong correlation between import and export volumes by area – those areas active in exporting are also active importers. Perhaps more interesting is that the diagonal line marked out by the Local Authority points lies above the 45-degree line. In other words, imports are larger for most areas than exports, reflecting the general UK trade deficit.

Figure 48 Value of sub-regional imports (million £), NUTS3 2017 and Value of sub-regional exports (million £), NUTS3 2017

Investment and Access to Capital

The percentage of companies finding the finance they need is an important indicator for productivity and long-term economic growth, while the amount and type of finance sought corresponds strongly with the status and stage of development of the business. The implication is that the local availability of external finance is positively associated with the number of start-ups and may also influence their potential for growth. For existing firms, external finance can

be important in enabling the business to exploit growth and investment opportunities and achieve scale.

New start-ups with high growth potential may use grant funding from Innovate UK for example to develop a new product/service before moving onto equity funding from business angels, venture capitalists or banks. Debt finance from banks or other lenders may be more suitable for established lower-risk businesses. Equity finance (especially venture capital) is for higher risk businesses at an early stage.
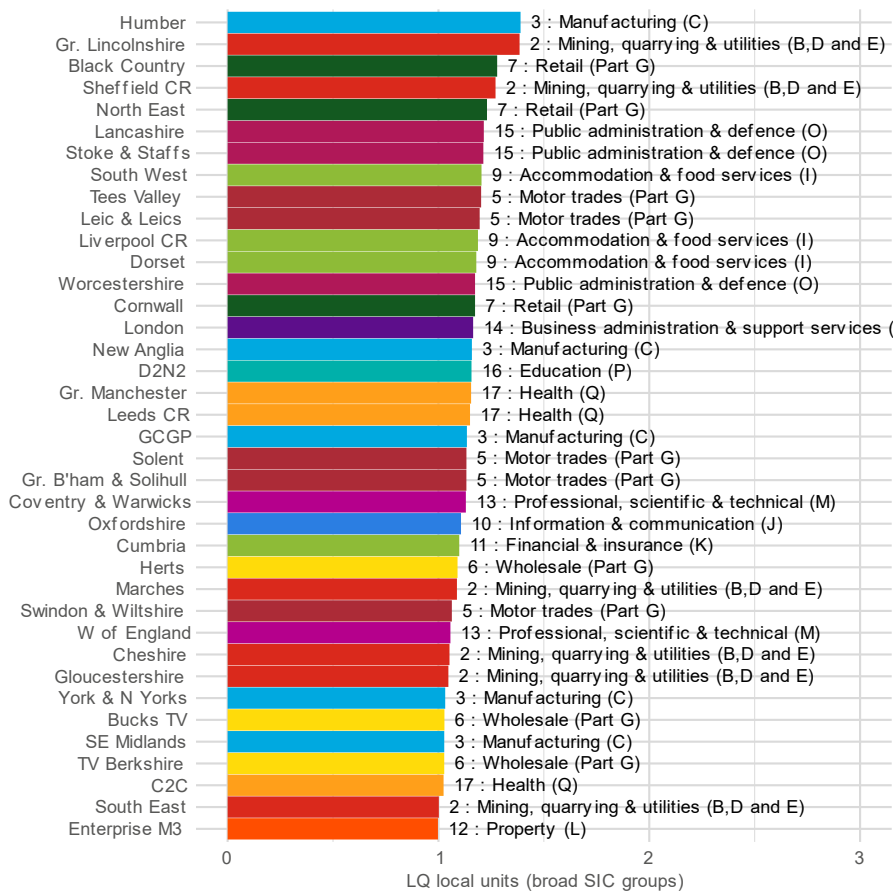
Despite its importance limited information is available in the public domain regarding the local availability of finance. This is particularly the case with regard to risk capital provided by business angels, venture capital investors and/or private equity investors. Proprietary data is available on some aspects of venture investment; however, this is relatively costly and due to potential quality issues is not included in this Outlook Report.

Economic Specialism

Previous sections have emphasised the contribution of industrial structure to determining the level of innovation and productivity in each locality. One useful indicator of the industrial specialisation of a particular are is the location quotient (or LQ). A location quotient over 1.0 indicates that a particular sector is more important in a particular locality than nationally. LQs can be constructed on the basis of either the number of business units in an area or their employment. The interpretation in each case is slightly different and the results of each comparison can be very different particularly where some sectors include a number of larger employers. In many cases it will therefore be important to consider both LQ measures to get a rounded perspective on local economic activity.

Figure 49 and Figure 50 present the sectors that take the highest LQs in each LEP area, based on number of local units and employment, respectively. Humberside, for example, shows a strong specialism in the area of Manufacturing in terms of the number of local units (Figure 49) but Public Administration and Defence proves most important in terms of employment (Figure 50). In contrast Business Administration and Support Services prove dominant in London on both measures.

Figure 49 Location Quotient in terms of Local Units, sector with highest LQ by LEP (2017)

Source: Calculated from data in NOMIS Business counts UK. Available at: https://www.nomisweb.co.uk/

Figure 50 Location Quotient in terms of Employees, sector with highest LQ by LEP (2017)

Source: Calculated from data in NOMIS. Business Register and Employment Survey : open access. Available at: https://www.nomisweb.co.uk/

Places

A key Industrial Strategy policy relevant to the Places foundation and this Outlook is that Government will agree Local Industrial Strategies with LEPs. The Places foundation also focuses on the role and impact that prosperous communities have in shaping the economic future of the country. Economic growth does not exist in isolation from the places in which it happens. Each area has its own strengths and weaknesses, but there are common attributes that generate attractive environments for growth to occur.

The Place foundation sits as a standalone dimension. However, given the nature of this outlook (prepared at LEP level), it is also covered by indicators that fall into the other four productivity foundations and have a strong place element. Indicators can have a strong place element either because the exact location of what they measure or their geographical dispersion is of special relevance, or because these are measures that aim to capture the flows in and out of a place (i.e. how a particular place relates to others and to the rest of the country). Together they partially capture the dynamism of the local economy and the extent to which some of the key attributes that define good places to live and conduct business are present. These are for example indicators about migration flows (people and place), housing and green space availability (infrastructure and place), or flow of goods and services (business environment and place).

The table below provides a summary of the dimensions and indicators available in the place foundation, as well as a reference to the relevant section of the Outlook report.

Table 5 Place indicator framework

Sub-dimension	Indicator	Section of the report
Diffusion of knowledge, community activities and development	- Social, community and cultural engagement. Total number of attendees, all events - Contribution(s) to economic development. Total income from regeneration initiatives (£)	Intellectual Capital
Population flow	- Long-Term International Migration Internal Migration (within UK)	Demographics
Graduates flow (attraction / retention)	- UK domiciled higher education leavers taking employment in the region (number of students) - Ratio of UK domiciled higher education leavers in the region and higher education leavers taking employment in the region (percentage)	Workforce qualifications
Housing affordability	- Ratio of median house price to median gross annual workplace-based earnings - Ratio of lower quartile house price to lower quartile gross annual workplace-based earnings	Wellbeing and earning power
Mobile broadband coverage	- 4G services, geographic (outdoor)	Digital infrastructure

Sub-dimension	Indicator	Section of the report
Travel times	- Average minimum travel time to reach the nearest key services (i.e. medium sized centres of employment, primary schools, secondary schools, further education, GPs, hospitals, food stores and town centres) - Average minimum journey times to nearest of selected airports - Average minimum journey times to nearest of selected rail stations	Network / economic infrastructure
Rail crowding	- Rail crowding to Main city centre stations in standard class at busiest service point (Passengers in excess of capacity, PiXC). *Main city centre stations only	Network / economic infrastructure
Flow of goods	- Air freight traffic: Total Freight (tonnes) including UK, EU and other overseas operators over monthly period - Port freight traffic: UK port freight tonnage, by port and year, major and minor ports - inwards and outwards on an annual basis (2000-2017)	Importing, exporting and the trade Balance
Trade balance	- Regional trade in goods balance: Value of regional Imports & exports - Regional trade in goods balance: Number of Importing and exporting businesses - Regional Estimates of service exports (NUTS3)	Importing, exporting and the trade balance
Environment and Natural Capital	- Local Authority CO2 emissions estimates (kt CO2, per capita) - Availability of public green spaces in the area (including registered parks and gardens) - Air pollution: Population-weighted annual mean PM2.5 data - Flood risk: Numbers of properties at risk of flooding taken from the risk of flooding from rivers and sea	Environmental and natural capital
Economic specialism	- Location quotient analysis of SIC sectors (local units and employment)	Economic Specialism

Appendix A LEP geography Profiles

What follows are 38 LEP geography Profiles, one for each LEP Area. These covering a selection of indicators about the foundations of People, Ideas, Infrastructure, Business Environment and (implicitly) Place. Each profile is laid out as a two-page spread, showing these indicators together with visualisations providing additional breakdowns of interesting datasets. This underlying data will be released as part of the Outlook and is available for further analysis.

For each of the indicators in the profiles the value for the LEP Geography is shown, together with the % growth over the last three years (unless otherwise stated). Growth rates over multiple years smooth out some of the volatility found in year-on-year changes and allow for better trend identification. The England figures are shown as a comparator and to provide context. The information on growth rates, and the way it has been presented, allows the reader to spot trends across multiple indicators. It also allows readers to focus the analysis on the evolution of LEP areas over time and the comparison of LEP geography trends with trends in England, rather than on benchmarking LEP areas against others.

Using all the indicators in the framework, the LEP geography profiles also show (in blue text) the indicators that stand out positively or negatively for each LEP geography. These have been algorithmically determined by using the top-5 indicators on the positive and negative side for each LEP geography, on the basis of each's indicator Z-Score. The Z-score measures the indicator value's relationship to the values of the same indicator for other geographies at the same level (i.e. how many standard deviations a particular data point differs from the mean value of what is being observed or measured). By taking all indicators for a particular geography, and sorting them by Z-score, it is possible to identify those that "stand out" the most for that particular geography (i.e. any LEP geography will be more or less of an outlier in different indicators).

A note of caution should be given about the experimental nature of this approach. This information is provided as additional food for thought and may present additional interesting aspects emerging from the data. However, each LEP geography will have its own already recognised set of strengths and weaknesses, which may or may not mirror those of the data presented here. It is essential to not take single data points and indicators at face value, and always triangulate the information gathered from multiple indicators with the local knowledge and narratives around growth and productivity of local areas.

Appendix B Data sources

The following datasets have been used throughout this report. These are subject to the data licences below:

- Data from the UK Higher Education Statistics Agency: Creative Commons Attribution 4.0 International Licence[34], except where otherwise stated.

- ONS and ONS-NOMIS Data: Open Government Licence and UK Government Licensing Framework[35]

- Geography lookups and national statistics: Contains National Statistics data © Crown copyright, 2019

- Digital boundaries, reference maps, and OS Open Data used throughout the study: OS data © Crown copyright and database right, 2019; Royal Mail data © Royal Mail copyright and database right, 2019; National Statistics data © Crown copyright and database right, 2019;

- Trade data collected by HM Revenue and Customs (HMRC): Contains National Statistics data © Crown copyright, 2019

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[40] More details available at: https://www.enterpriseresearch.ac.uk/wp-content/uploads/2018/07/ERC-Data-Resource-Guide-2018.pdf Link

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