

Supporting innovation

Why is this important?

By bringing forward new products and processes, innovation plays a key role in improving the North East's productivity and competitiveness.

Sources of data available on innovation are limited and focus on those aspects of innovation that are measurable, such as business expenditure on research and development (R&D) and patents approved.

There are limited data that capture the importance of networks, relationships and the diffusion of innovation. Most data on innovation is only available for the North East region.

Innovation in the North East LEP economy

| Indicator | Most recent data | Change since 2014 | NE as % of England excl. London | Gap closing with England excl. London |
|---|-----------------------------|---|---------------------------------|---------------------------------------|
| % of businesses that are innovation active | 53.0% (2012-14) | Not available | 100 (UK) | Not available |
| Business expenditure on R&D per 10,000 adult population | £1.4m (2016) | Increased by £0.1 million per 10,000 adult population | 29 | No change |
| Business employment in R&D per 10,000 adult population | 18 (2016) | Decreased by 0.1 jobs per 10,000 adult population | 42 | No - widened |
| Higher education expenditure on R&D per 10,000 adult population | £1.1m (2015) | Decrease of £0.1m expenditure per 10,000 adults | 95 | No - widened |
| Government expenditure on R&D per 10,000 adult population | £0.2m (2015) | Not available | 55 | Not available |
| Patents granted per million adult population | 23.1 (2016) | Increased by 2.6 patents per million adult population | 41 | No change |
| % employed in science, research, engineering and technology professional roles | 4.5% (Oct 2016 to Sep 2017) | Increased by 0.6 percentage points | 87 | Yes |
| % of employment in science, engineering and technology associate professional roles | 1.8% (Oct 2016 to Sep 2017) | Decreased by 0.2 percentage points | 90 | No - widened |

Sources: UK Innovation Survey (BEIS) Annual Population Survey Workplace Analysis (Nomis), Business Expenditure on R&D (ONS), Country and regional breakdown of expenditure on R&D in the UK (ONS) and Patents (Intellectual Property Office)

Wider commentary

Innovation activity in businesses

53% of North East businesses report they were innovative active between 2012 and 2014 – the same proportion as across the UK as a whole.

North East region businesses defined as 'broad innovators' are more likely than non-innovators in the region to:

- Export
- Employ science and engineering graduates
- Employ other graduates.

The North East region lags the UK on all

three measures.

North East region innovative businesses are more likely than UK innovators to employ individuals with following skills:

- Multimedia/web design
- Engineering/applied sciences
- Mathematics/statistics.

Business expenditure and employment on research and development

Expenditure on R&D by North East region business was £302 million in 2016.

This is 1.5% of total English expenditure on R&D by businesses

£1.4 million was spent on R&D by North East region businesses for every 10,000 adults in 2016. This compares to £4.8 million across England excluding London and is about a sixth of the rate of expenditure in the best performing region (East).

4,000 full-time equivalents were employed in R&D in businesses in the North East region in 2016.

This is 2.2% of total English employment in R&D in businesses

There were 18 individuals employed in undertaking R&D within businesses in the North East region for every 10,000 adults. This is lower than other regions and devolved administration and less than half of the English excluding London average of 44.

Expenditure (£ million) and employment by UK businesses on performing R&D by region, 2016

| | Expenditure (£ million) | Expenditure (£ million) per 10,000 adult population | Employment (000s) | Employment per 10,000 adult population |
|--------------------------|-------------------------|---|-------------------|--|
| East | 4,393 | 8.9 | 37 | 75 |
| South East | 4,693 | 6.4 | 42 | 58 |
| West Midlands | 2,303 | 4.9 | 19 | 41 |
| England | 20,237 | 4.5 | 186 | 42 |
| England excluding London | 17,941 | 4.8 | 166 | 44 |
| East Midlands | 1,655 | 4.3 | 17 | 44 |
| North West | 2,346 | 4.0 | 17 | 29 |
| South West | 1,500 | 3.3 | 18 | 40 |
| London | 2,296 | 3.3 | 20 | 29 |
| Northern Ireland | 481 | 3.3 | 7 | 47 |
| Scotland | 1,072 | 2.4 | 12 | 27 |
| Yorkshire and the Humber | 750 | 1.7 | 10 | 23 |
| North East | 302 | 1.4 | 4 | 18 |

Source: Business Expenditure on R&D (ONS)

Patents, trademarks and designs

North East region has amongst the lowest rates of:

- Patents granted
- Trademarks registered
- Designs registered.

The North East region has amongst the lowest rates of approvals for patents and designs but the variation between regions on this is more limited than for patents granted and designs registered, suggesting that the main reason for the North East's lower level of patents

Patents granted by region, 2016

| | Patents granted | Patents granted per million adult population |
|--------------------------|-----------------|--|
| East | 407 | 82.1 |
| South West | 321 | 70.6 |
| South East | 493 | 67.5 |
| West Midlands | 282 | 60.4 |
| London | 400 | 57.2 |
| England | 2,502 | 55.9 |
| England excluding London | 2,102 | 55.7 |
| North West | 241 | 41.2 |
| East Midlands | 152 | 39.5 |
| Yorkshire and the Humber | 156 | 35.5 |
| North East | 50 | 23.1 |

Source: Patents (Intellectual Property Office)

granted and designs registered is fewer applications.

Research specialisms

Analysis of funding distributed by the UK Research Councils and Innovate UK over the last 10 years has found that the research subjects for which the North East region has secured the most funding are energy, information and communications technologies, astronomy – observation, civil engineering and built environment and materials science.

Combined, the region has secured £165.2 million in funding in those five areas.

Looking at those subjects where the North East region has secured a disproportionate share of UK funding (measured using a location quotient), energy, astronomy – observation, civil engineering and built environment, geosciences, chemical synthesis, astronomy – theory, superconductors, magnetic and quantum fluids, and environmental engineering all have a location quotient of 1.5 or above. This means the North East region has 50% or more funding that would have been expected if funding was evenly distributed throughout the UK.

Top 20 research subjects by funding awarded, North East region, 2007 to 2017

| | No. of projects | Funding (£ millions) | % of UK funding | Location Quotient |
|--|-----------------|----------------------|-----------------|-------------------|
| Energy | 79 | 46.2 | 7.50 | 2.56 |
| Information and communications technologies | 134 | 40.5 | 3.14 | 1.07 |
| Astronomy – observation | 58 | 29.9 | 9.02 | 3.07 |
| Civil engineering and built environment | 46 | 28.7 | 10.51 | 3.58 |
| Materials sciences | 80 | 19.9 | 3.67 | 1.25 |
| Geosciences | 143 | 18.0 | 7.03 | 2.40 |
| Particle physics – experiment | 27 | 15.6 | 3.79 | 1.29 |
| Chemical synthesis | 52 | 11.5 | 4.56 | 1.56 |
| Atomic and molecular physics | 23 | 11.0 | 4.09 | 1.40 |
| Medical and health interface | 39 | 10.0 | 3.01 | 1.03 |
| Astronomy – theory | 17 | 9.4 | 20.38 | 6.95 |
| Optics, photonics and lasers | 21 | 8.1 | 3.11 | 1.06 |
| Superconductors, magnetic and quantum fluids | 23 | 8.0 | 4.52 | 1.54 |
| Process engineering | 33 | 7.5 | 3.91 | 1.33 |
| Tools, technologies and methods | 80 | 6.5 | 1.92 | 0.65 |
| Environmental engineering | 19 | 6.5 | 16.86 | 5.75 |
| Chemical measurement | 29 | 6.4 | 3.88 | 1.32 |
| Mathematical sciences | 45 | 5.7 | 1.43 | 0.49 |
| Catalysis and surfaces | 46 | 5.7 | 2.57 | 0.88 |
| Climate and climate change | 77 | 4.8 | 2.62 | 0.89 |

Source: Analysis by Technopolis based on RCUK Gateway to Research

What next?

Over half of businesses in the North East are innovation active and the proportion employed in science, research, engineering and technology professions is growing. In addition, the region has a number of research specialisms where it has been successful in securing funding. However, the North East continues to lag behind England excluding London on a wide range of more traditional 'hard' innovation indicators. Going forward, it will be important to:

- Grow investment from the public and private sectors in R&D and innovation in the North East. The North East LEP has participated in a number of Science and Innovation Audits to help build the case for investment in the North East's key specialisms and works with the Innovation SuperNetwork and is developing key projects such as 5GNE which aims to attract global R&D and Finance Camp for business
- Ensure appropriate infrastructure and ecosystems are in place to support innovative ideas to be developed and exploited. The North East LEP is supporting this through the development of sites, incubators and business support services such as the Innovation SuperNetwork and by attracting global R&D investment in 5G to develop new service models across a range of sectors
- Support the SEP areas of opportunity (Tech North East; Making the North East's future; Health Quest North East; and Energy North East) to develop and grow. These have been selected because they offer distinctive growth opportunities, often based on the innovative ideas being developed and implemented within the specialism. The North East LEP is working with industry partners in each area of opportunity to develop a strategy for growth.