

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.

What are the key findings from the data?

- 53% of businesses report they are innovation active - the same proportion as the UK as a whole
- Science, research, engineering and technology professionals account for 4.5% of the North East LEP's employment with a further 1.8% employed in science, engineering and technology associate professional roles. The North East had a smaller proportion of its employment in these occupations compared to England excluding London in 2016/17. The numbers employed in both occupations in the North

East LEP area have increased since 2013/14 and the proportion of total employment that is in science, research, engineering and technology professional roles has increased

- Business expenditure on R&D and patents granted per head are low compared with England excluding London but both have increased since 2014
- The North East region has a similar per capita spend on R&D undertaken by higher education institutions as England excluding London, but a lower per head spend on R&D undertaken by government bodies.

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 Sep2017)	Increased by 0.6 percentage points	87	Yes
% of employment in science, engineering and technology associate professional roles	1.8% (Oct2016 to Sep2017)	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 £4.8million 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

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.

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)

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.