

Research and innovation in Scotland

Scientific research and innovation drive the economy, create jobs and enrich and advance our society. In recognition of this, there is broad consensus across the political spectrum to increase total investment in UK research and development (R&D). The UK government has committed to ensure that total investment in UK R&D reaches 2.4% of UK GDP by 2027. The Royal Society is calling for investment in R&D to reach 3% of GDP by 2030. To achieve this, the UK must create a vibrant environment that fosters and encourages research

and innovation across public services, universities, colleges and business, as well as attracting global investment. But what does delivering this target look like for Scotland?

This document provides an insight into the current research and innovation landscape in Scotland to inform discussions over how people across Scotland can have the opportunity to contribute to and share the benefits of R&D investment in the UK.

How much is spent on R&D activity in Scotland?

FIGURE 1

R&D spend in Scotland¹.

8.2% of the UK's population is based in Scotland²

£2.7bn
in 2018

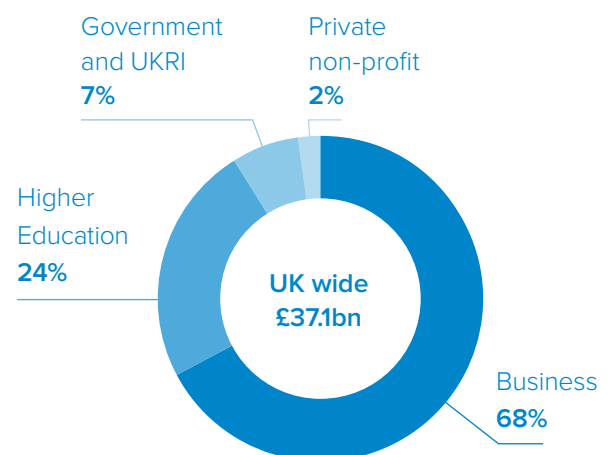
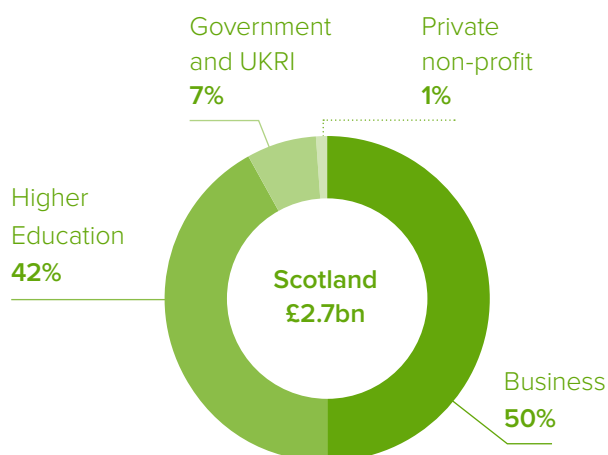
7% of
UK total

£498
per capita

Who performs R&D in Scotland?

FIGURE 2

Percentage distribution of R&D spend in Scotland and UK wide³.



Where does R&D take place in Scotland?

FIGURE 3

Map of R&D activity in Scotland⁴.

KEY

- Universities
- Science parks
- Business incubators and accelerators
- Innovation centres

35,560 workplaces in the science and technology sector⁵

19 universities⁶

27 colleges⁷

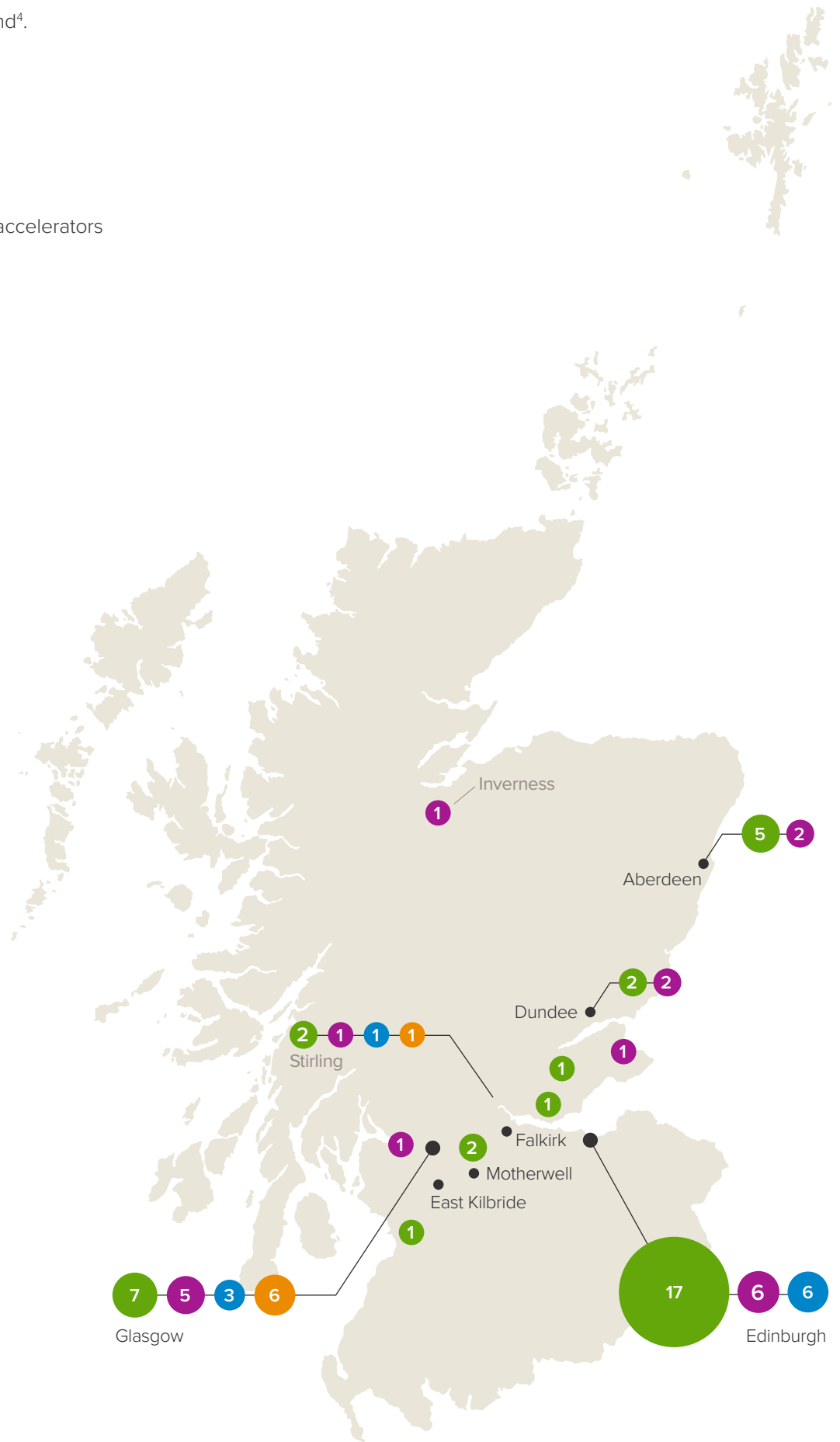
10 science parks⁸

15% of the UK's research infrastructures⁹

38 business incubators and accelerators¹⁰

11 research pools¹¹

7 innovation centres¹²



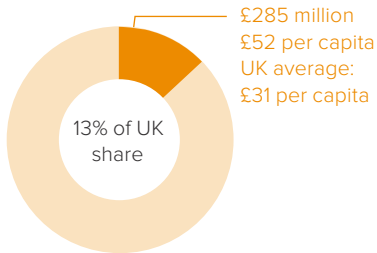
How is R&D in Scotland funded and supported?

R&D is funded and supported in many different ways. This includes direct investment from public, private, charitable and overseas sources, as well as indirect measures that encourage further private investment such as R&D tax credits.

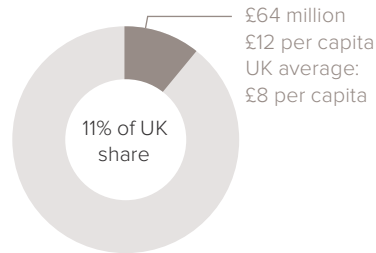
FIGURE 4

Examples of R&D funders in Scotland.

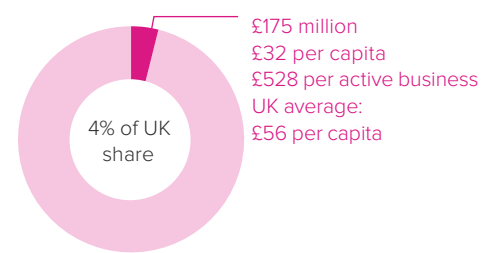
Higher education funding councils¹³ 2018 – 2019



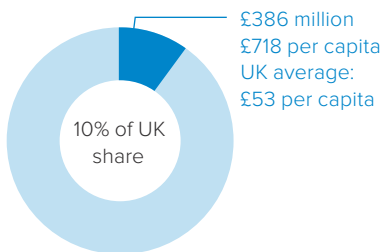
EU Framework Programmes¹⁴ Signed for in 2018



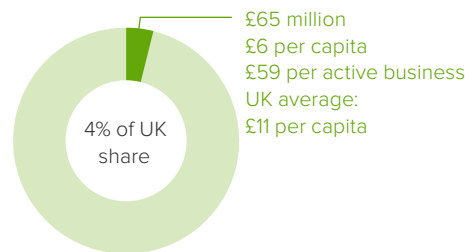
R&D tax credits¹⁵ 2017 – 2018



Research councils¹⁶ Awards started in 2018



Innovate UK¹⁷ 2018 – 2019



The Royal Society¹⁸ 2019 – 2020

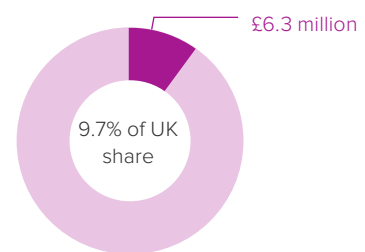
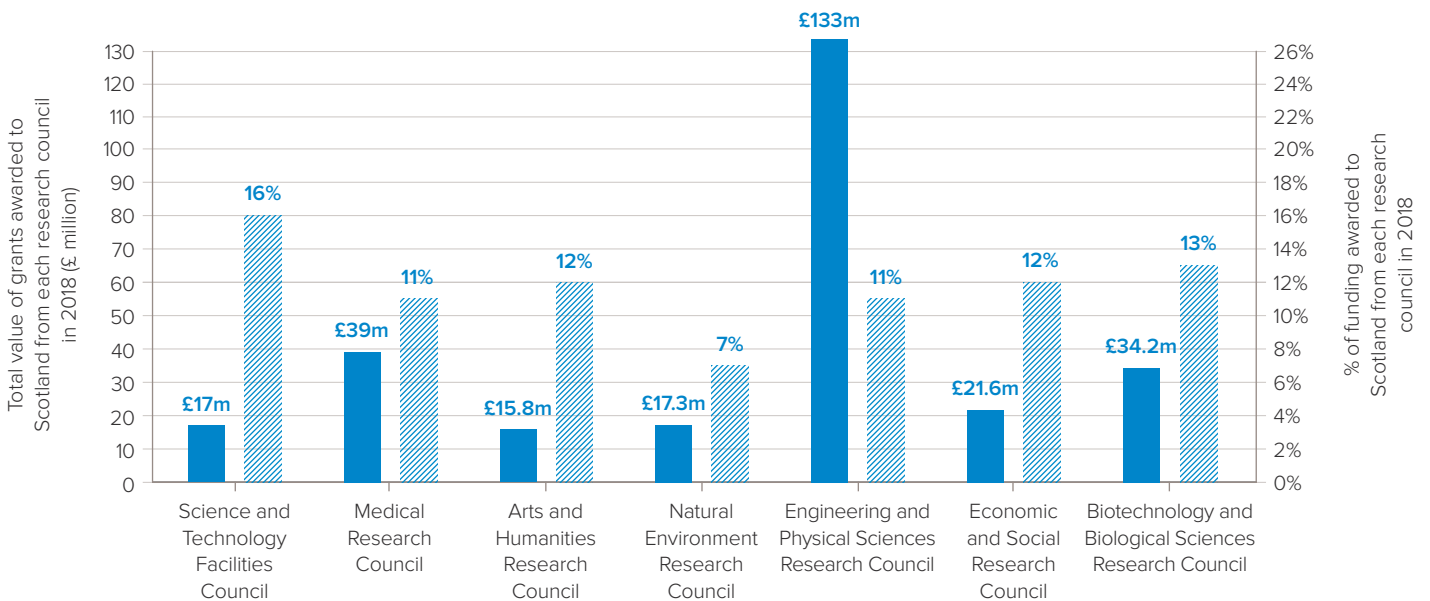


FIGURE 5

How much did each of the research councils invest in Scotland in 2018?¹⁹



There is no R&D without people

A thriving R&D environment in Scotland requires a talented workforce to perform research and young people in the pipeline who are equipped with the skills they will need in the future economy.

FIGURE 6

A snapshot of Highers being taken in Scotland²⁰.

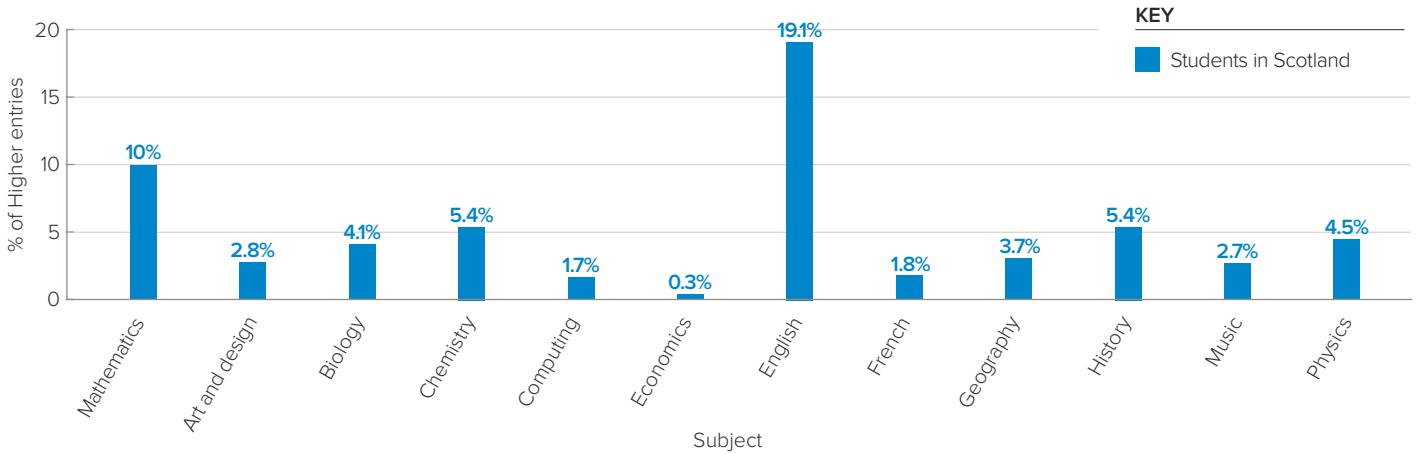
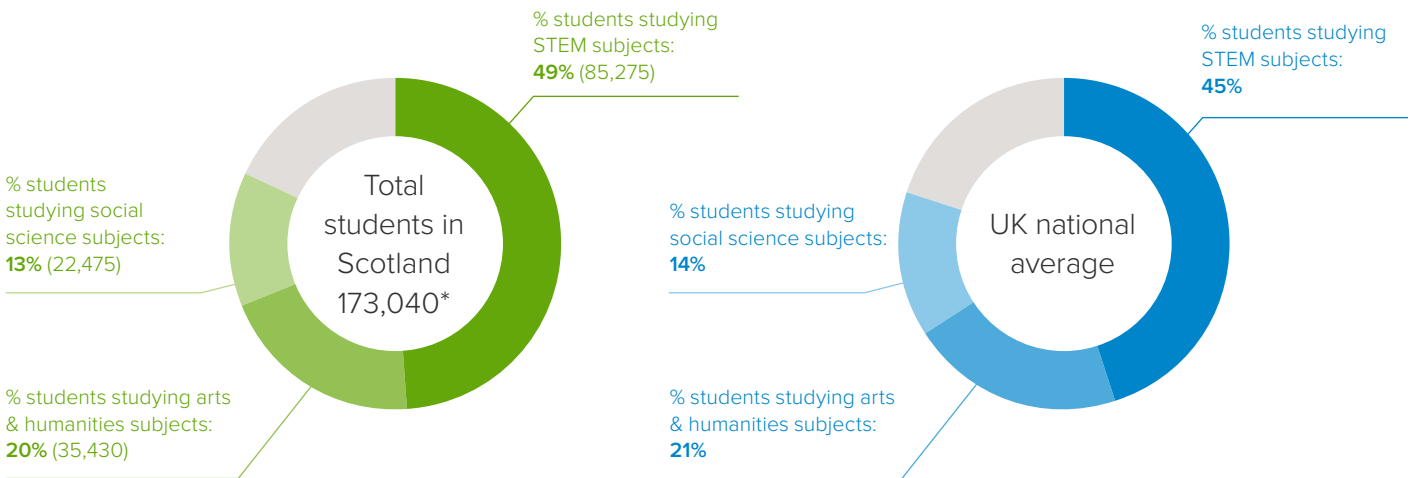


FIGURE 7

What are undergraduates studying at Scottish universities?²¹



* This number does not include students studying at the Open University who are based in Scotland.

Note: There is no single official definition of which subjects make up the categories of 'STEM' (science, technology, engineering and maths), 'arts and humanities', or 'social sciences'. The HESA science grouping includes subjects like medicine, nursing and agriculture that may not be included in other definitions of STEM. For the purpose of this analysis, 'social sciences' includes HESA subject codes B and C, and 'arts and humanities' includes subject codes F, G and H (<https://www.hesa.ac.uk/support/documentation/jacs/hesa-codes>).

FIGURE 8

How many people are employed in R&D in Scotland?

Scottish companies had **15,000** staff employed in R&D in 2018²².

Scotland had **15,425** research staff employed in its universities in 2018/19²³.

Research and innovation is international

Scotland's international collaboration has a slightly higher impact than the UK average.

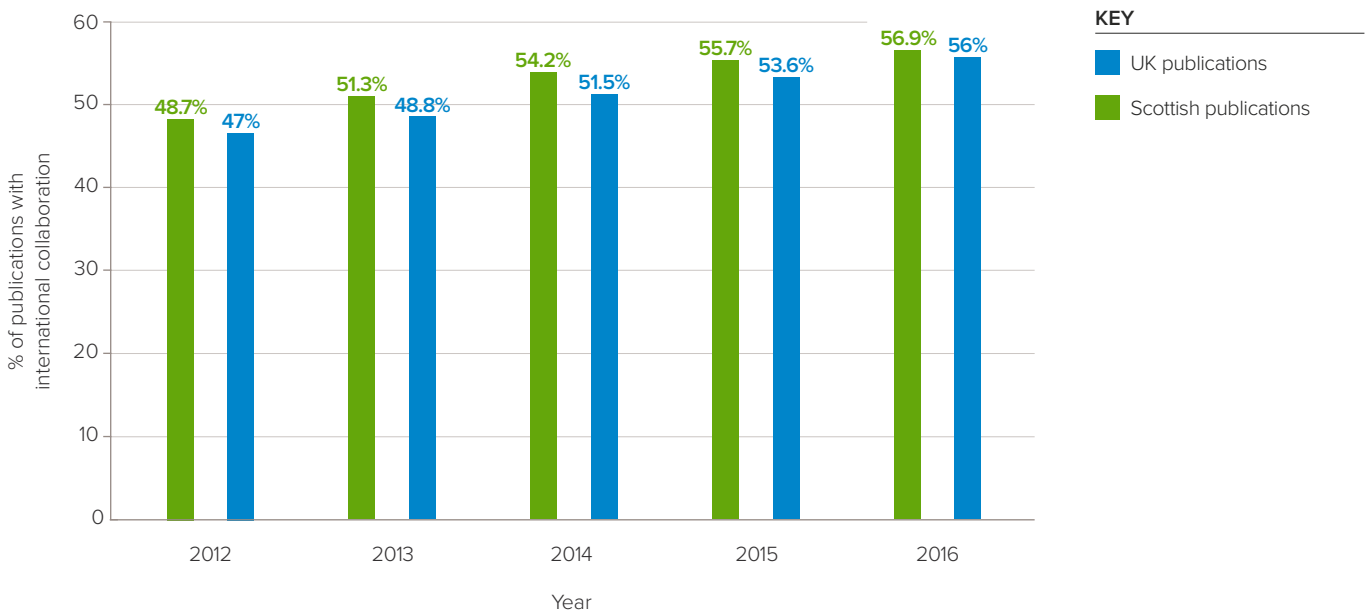
FIGURE 9

Top 5 collaborator countries²⁴.



FIGURE 10

Share of publications with international collaboration 2012 – 2016²⁵.



Find out more

Investing in UK R&D

Explore research and innovation in other areas of the UK and read our briefings on R&D investment in the UK produced together with the other UK National Academies. Find out more on royalsociety.org/uk-research-and-innovation

Industry programme

The Royal Society's Science and Industry programme connects industry with the Society and promotes the value of science to the economy by bringing together industry, academia and government. Find out more on royalsociety.org/industry

Promoting excellence in science

We promote excellence in science and support international collaborations by funding research in the life and physical sciences, including engineering, in the UK and internationally. Find out more about our grants programmes on royalsociety.org/grants

References

- 1 ONS (2020) UK gross domestic expenditure on research and development. 2018. Note - figures are rounded.
- 2 ONS (2020) UK population estimates for 2018 <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland> [accessed 23 March 2021]
- 3 ONS (2020) UK gross domestic expenditure on research and development. 2018. Note - figures are rounded.
- 4 The geographical areas used in this briefing are based on the ONS classification. List of major towns and cities from General Register Office for Scotland - <https://www.nrscotland.gov.uk/files/statistics/old/00settle.pdf>
- 5 Workplaces in the science and technology sector are from Office for National Statistics. 2017 Employees and workplaces in Science and Technology in Local Authorities of the UK, 2016 (user requested data). Data corresponds to figures for 2016. Data released on 17 January 2017. Workplace is defined as local units or branches of an organisation present in the region, and may belong to private, public or charity sector. Science and technology is defined based on SIC07 industrial classification codes.
- 6 Universities are from Higher Education Statistics Agency 2019. Higher education providers data retrieved on 26 March 2021. The term includes the Open University Scotland, which has an Edinburgh address. Institutions were linked to main campus site only. Postcodes obtained from web searches or UK Learning Providers. See <http://learning-provider.data.ac.uk/>) Research infrastructures are from Royal Society.
- 7 Colleges Scotland 2020, List of Colleges in Scotland <https://collegesscotland.ac.uk/Colleges-in-Scotland/collegesinscot.html> (accessed 26 March 2021). Note, colleges not shown on map.
- 8 Science parks are from UK Science Parks Association 2021. List of members accessed 26 March 2021 (includes full and associate members only). Postcodes obtained from web searches.
- 9 Royal Society. 2018. A Snapshot of UK Research Infrastructures. Report released on 22 January 2018.
- 10 Department for Business, Energy and Industrial Strategy 2020. Business incubators and accelerators: the national picture <https://www.gov.uk/government/publications/business-incubators-and-accelerators-the-national-picture> (Accessed November 2020) Data released on 20 June 2017. Last updated 14 May 2018. Data does not include virtual programmes with no geographical site.
- 11 The research pooling initiative was created by SFC in 2004 to encourage researchers across Scottish higher education to pool their resources and respond to increasing international competition. List available here <http://www.sfc.ac.uk/research/research-pooling/research-pooling.aspx> (accessed 26 March 2021). Note, not shown on map.
- 12 Innovation Centres <https://www.innovationcentres.scot/innovation-centres/> (accessed 26 March 2021).
- 13 Scottish Funding Council 2018. Outcome Agreement Funding for Universities – Final Allocations for AY 2018-19.
- 14 Value of Horizon 2020 funding awards signed for in 2018 (accessed 16/11/2020). See <https://webgate.ec.europa.eu/dashboard/sense/app/93297a69-09fd-4ef5-889f-b83c4e21d33e/sheet/PbZJnb/state/analysis> Values refer to total European Commission contribution to research projects Value in £GBP calculated using exchange rate of €1.1133 to £1 (Bank of England exchange rate on 16/11/2020).
- 15 HM Revenue and Customs. 2019 Research and Development Tax Credits 2017-18.
- 16 Research Councils UK. Gateway to Research. See gtr.rcuk.ac.uk. Data accessed on 16 November 2020.
- 17 Innovate UK. Data requested directly. Figures correspond to expenditure in 2018/19 financial year. This only accounts for funding received by the grant recipient in that single financial year, and therefore differs to the total value of grants awarded which may involve payments over multiple years.
- 18 The data provided captures grants expenditure in the 2019-20 financial year. This includes funding made to UK institutions as part of UK and international projects. To calculate the share given to UK institutions as part of international awards, the total award value was divided by the number of named collaborators on an application.
- 19 Research Councils UK. Gateway to Research. See gtr.rcuk.ac.uk (accessed 29 March 2021). This graph shows the total value of grants awarded with funding beginning in 2018. These may be spent over a number of years and outside Scotland via collaborations. Awards made in other years may also be spent in 2018 and are not included here.
- 20 Scottish Qualifications Authority. 2019 Results Services Report Statistical Tables 2019. Figures refer to number of Highers entries. Not all subjects shown - science and non-science subjects selected to provide comparison.
- 21 Higher Education Statistics Agency 2018/19 via Heidi Plus (accessed 26 March 2021) See <https://heidiplus.hesa.ac.uk>
- 22 Office for National Statistics. 2020. UK business enterprise research and development 2018.
- 23 Higher Education Statistics Agency. 2020 Staff (excluding non-academic atypical) in Higher Education 2018-19 via <https://www.hesa.ac.uk/data-and-analysis/staff/working-in-he> (accessed 19 November 2020). Figures refer to full-time equivalent staff. Research staff refers to those listed as academic and with functions in research only or both research and teaching.
- 24 Scottish Science Advisory Council (2019) A Metrics-Based Assessment of Scotland's Science Landscape 2007 – 2016.
- 25 *Ibid.*

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