

Delivering on the UK's plan for growth

How research and innovation at universities helps support the UK's ambitions.



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Executive summary

University research and innovation activities will play a key role in supporting the UK's economic and social recovery from the Covid-19 pandemic.

How universities are supporting the UK's plans for growth

Supporting places and levelling-up

- Universities support the government's UK science and tech superpower ambitions by attracting inward investment, making world-leading discoveries, generating knowledge, and creating and nurturing new and innovative businesses.
- They support existing businesses of all types by utilising their infrastructure, facilities and expertise to drive local collaboration leading to greater innovation.
- Universities develop skills and re-skill the workforce through flexible learning methods and by working in partnership with businesses.

Attracting, retaining, and developing talented researchers

- Universities produce talent and develop high level skills according to national and local needs, and impact directly on local economies as large employers.
- They attract global talent and investment, playing a critical role in trade, exports and support for international business and research collaboration.

Leading the transition to net zero

- Using a range of multidisciplinary expertise, universities support industry, international relations, technological development and social, economic and behavioural responses.

Leveraging private sector investment

- Universities encourage private sector investment into research and development (R&D) by developing collaborative relationships with businesses that de-risk investment in new areas of research, provide access to skills and facilities, and build capacity and capabilities for R&D.

How the government can support

To maximise economic activity and effective engagement between universities, businesses and government, universities need a supportive research and innovation policy environment that incentivises partnership and collaboration at a local, national, and global level.

We ask that the following steps are taken to achieve this:

- A pro-innovation ecosystem requires stable and sustainable funding, and a clear pathway to reach the government's investment targets, including an **increase in public spending on R&D to £22bn per year by 2024–25, and R&D investment reaching 2.4% of GDP by 2027**. It is important that the UK matches competitor spend to become a science superpower.
- Research funders need to support the research base's sustainability by meeting more of the costs of research and increasing investment in excellence-driven, low-bureaucracy, flexible research funding (known as quality related or QR research).
- Developing **regionally focused research and innovation hubs led by institutions and businesses to pool regional strengths and drive innovation in the local economy**. These would focus on addressing local challenges by co-producing research and innovation activity to deliver research-led solutions, knowledge exchange activities, and targeted skills development.
- To enhance the impact of university innovation activity **the government should grow the Higher Education Innovation Fund in England, and work with the devolved nations to grow similar funding streams in those administrations**.

In England, changes should include removal of lower thresholds in the HEIF to enable small, research-active universities to drive growth and innovation support economic recovery in their localities.

- The UK Shared Prosperity Fund (UKSPF) and Levelling Up Fund should be used to **support university collaborations in research and innovation, skills training, and business support with existing and new partners across the private and public sector.**
- In line with previous commitments by the UK Government, **the UK Shared Prosperity Fund and Levelling Up Fund should provide, at a minimum, equivalent levels of funding provided by EU Structural Funds, including to the devolved nations.**
- To sustain and grow UK's position as a global science superpower **universities need long-term, stable funding for global collaboration in research and innovation with both developed (through Horizon Europe and otherwise) and developing (low-middle income) economies** which will ensure the UK's leadership in excellence driven global challenges research and give partners the confidence that they can work with UK universities with complete faith that legal commitments will be met.



Introduction

UK universities inspire, attract, develop and collaborate globally with talented and innovative researchers across multiple disciplines.

Their research and innovation activities support businesses, industry, science and academia through the skills, expertise and entrepreneurship of their people, which in turn supports economic growth and tackles societal challenges.

Excellent research supports excellent innovation, and vice-versa. Public funding for research lays the foundation of the UK research and innovation system through support for knowledge creation, development of talent, researchers and innovations and the provision of national equipment and facilities.

Sustainable funding also creates the conditions for effective collaboration and high-risk innovation activities that can lead to transformational breakthroughs – the Covid-19 vaccine being one significant example.

The UK government's Innovation Strategy outlines ambitions to deliver innovation-led growth and boost private sector investment, and its research and development (R&D) People and Culture Strategy sets out a vision to create a more inclusive, productive and sustainable R&D sector.^{1 2} These strategies, as part of the government's broader plans to 'Build Back Better', provide a unique opportunity to reach science superpower status. Further, the government's new Office for Talent will help to encourage world-leading researchers to come to the UK.

We commend these ambitions and the UK's universities have significant and diverse roles to play in supporting them. To maximise universities' contributions, however, they need to be operating in a supportive environment, that incentivises partnership and collaboration between universities, businesses and industry, building on the key role of universities as anchor institutions in their communities.

¹ BEIS (2021) UK Innovation Strategy: Leading the future by creating it. At: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1009577/uk-innovation-strategy.pdf

² BEIS (2021) R&D People and Culture Strategy: People at the heart of R&D. At: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004685/r_d-people-culture-strategy.pdf

We have published a high-level submission to the Comprehensive Spending Review 2021, which along with Universities Scotland's submission, provides further details on the important role of university research and innovation and how government can maximise these contributions .

How university research and innovation supports the UK's ambitions

UK universities are diverse and make significant contributions to government priorities through research and innovation (R&I) activities. This includes supporting the government's UK science and tech superpower ambitions by attracting inward investment, making world-leading discoveries, generating knowledge, creating and supporting new and innovative businesses.

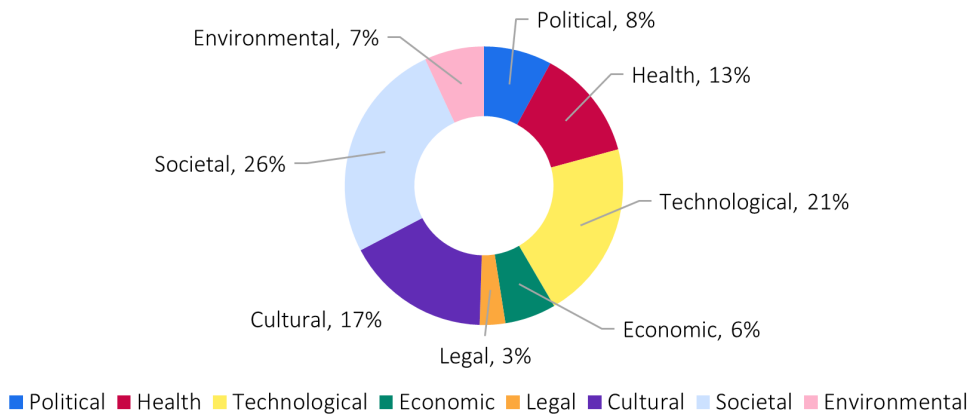


The government's R&D People and Culture Strategy notes that:

'the UK's research organisations, particularly universities and research institutes, have been highly effective in utilising diverse funding streams'

Long term investment in science and research has allowed universities to build capacity – which has included preparing the response to the Covid-19 pandemic – and public innovation funding has allowed universities to work with business, public and third-sector organisations, to exchange knowledge and increase economic and societal benefit from their work. Figure 1 provides an example of how university research impacts a range of disciplines.

FIGURE 1: CASE STUDIES - SUMMARY IMPACT TYPE (REF 2014)



Source: REF 2014. At: <https://impact.ref.ac.uk/casestudies/Search1.aspx>. Case studies are assigned to a single 'summary impact type' by text analysis of the 'summary of the impact' (section one of the summary impact template). This is an indicative guide to aid text searching and is not a definitive assignment of the impact provided.

Supporting places and levelling-up

Universities are uniquely placed to address geographical inequalities through their multi-faceted roles, providing opportunities for people of all backgrounds, across deprived local areas be they urban or local and engaging with local industry, employers and communities.³ They connect local authorities, businesses and organisations to ensure innovation activities are tailored to each area's strengths, challenges, economy, environment and culture.

The Innovation Strategy recognises that the research universities provide support the innovation process in several ways, 'from basic research though to applied and translational research'.

Our work with the Industrial Strategy Council outlined that universities provide different roles and services to businesses, and support staff and student entrepreneurship in various ways. An institution's knowledge exchange processes are also complex and influenced by several factors, including areas of expertise and the innovative capacity of surrounding businesses.⁴

Universities engage and support regional businesses in several ways and collaborate according to the needs of industries. Foundational research can lead to industry-applied outputs, while informal university-business relationships are widespread and seen as valuable to non-academic stakeholders.

For example, universities engage with small and medium enterprises (SMEs) through consultancy and contract research, which allows businesses without research departments to build their capacity, develop new processes and produce innovative outputs. Evidence shows that SMEs in the UK are less likely to be innovation active

³ UUK (2021) Getting results campaign. At: <https://www.universitiesuk.ac.uk/facts-and-stats/impact-higher-education/Pages/gettingresults.aspx>

⁴ Industrial Strategy Council (2020) Universities and Colleges and the Industrial Strategy - Exploring data on knowledge exchange, research and skills. At: <https://industrialstrategycouncil.org/universities-and-colleges-and-industrial-strategy-exploring-data-knowledge-exchange-research-and>

(37% of SMEs) compared to large businesses (50%), with the support that many universities provide critical in improving innovation and growth.⁵

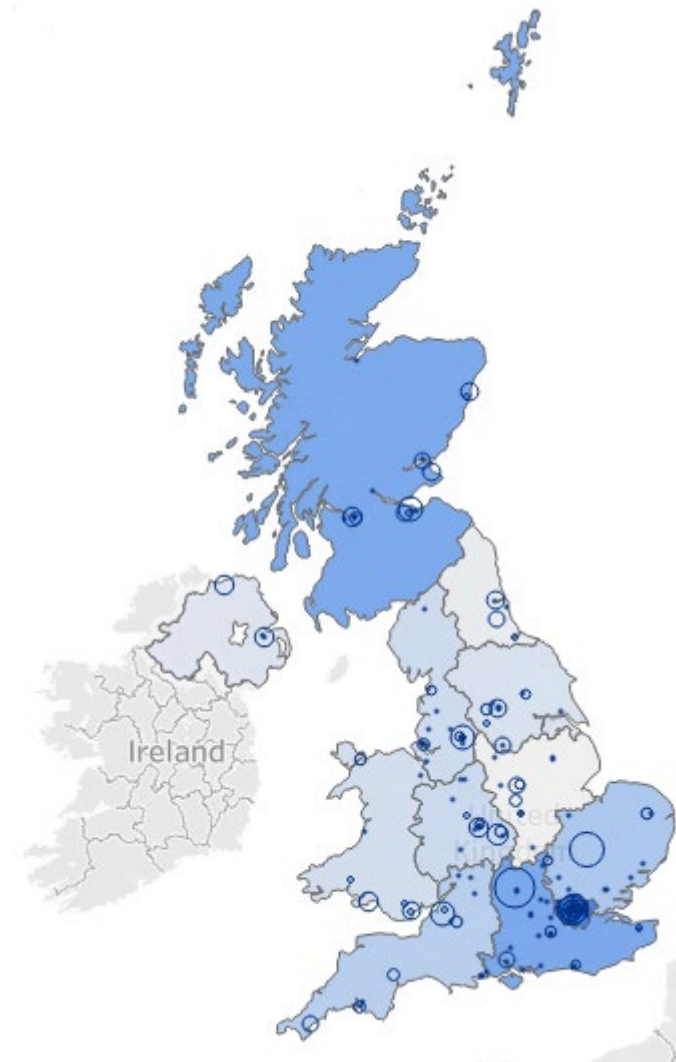
In some cases universities develop their own businesses to support their regions. **Figure 2** demonstrates that universities provide services to SMEs across the UK, while **Figure 3** shows that universities with active spin-outs are distributed across all regions of the UK.

FIGURE 2: NUMBER OF CONTRACT RESEARCH SERVICES PROVIDED TO SMES BY HIGHER EDUCATION PROVIDERS AND REGION 2019–20



⁵ BEIS (2020) UK Innovation Survey 2019: Main Report covering the survey period 2016 – 2018. At https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/903582/UK_Innovation_Survey_2019_Main_Report.pdf#:~:text=This%20publication%20is%20the%20main%20report%20from%20the,to%20this%20are%20not%20included%20in%20this%20publication

FIGURE 3: NUMBER OF ACTIVE SPIN-OUTS WITH SOME HEP OWNERSHIP BY HEP AND REGION OF HEP, 2019–20



Source: HESA HE Business and Community Interaction Survey 2019–20

Universities also partner and support SMEs and start-ups through enterprise incubators⁶ and accelerators⁷ which can boost local job creation and increase competitiveness of businesses taking part. An interim evaluation of University Enterprise Zone (UEZ) Programme, found that 800 gross jobs, 90 new products and 12,500m² of incubator space is expected to be created. Additional funding equating to £4.50 for every £1 of Research England Development (RED) UEZ funding was

⁶ Incubators help start-ups to develop by providing a range of services, training, physical space and specialist equipment.

⁷ Accelerators typically invest in growing and scaling up businesses over a shorter period.'

leveraged.⁸ Research shows that collaborating with universities in this way leads to substantial gains in terms of new-to-the-market innovation for small businesses.⁹ University affiliated accelerators and incubators are also associated with faster sales and job growth in participating businesses than those not connected to a university¹⁰ and have a positive effect on business survival.¹¹

The UK's Innovation Strategy notes that 'the interaction between universities and business is [...] vitally important for innovation'. Universities are committed to strengthening partnerships across higher education, business and the community.

Through the Knowledge Exchange Concordat, universities are supported along with their staff and students, to exchange good practise and set out a clarity of mission and support for the knowledge exchange activities they perform.

Support for universities means support for businesses and jobs. It means support for levelling up the UK's towns and regions. The innovation ecosystem should continue to support, and maximise opportunities for universities to use their infrastructure, facilities, and expertise to drive local collaboration. It should drive the support they provide to businesses of all types, which will lead to greater innovation. It's forecast that this would allow UK universities to provide over £11.6 billion of support and services to small enterprises, businesses and not-for-profits over the next five years, including specialist advice, access to the latest facilities and equipment to develop innovative products and support in carrying out bespoke research projects.¹²

⁸ Hatch (2020) Interim Evaluation of the RED UEZ Programme. At <https://re.ukri.org/documents/2021/interim-evaluation-of-the-red-uez/>

⁹ Hewitt-Dundas, N and Roper, S (2016) University-SME engagement: the geography of connectivity across England and the effects on innovation. At: https://dera.ioe.ac.uk/26434/1/2016_unisme.pdf

¹⁰ Lasarado et al (2016) Do graduated University Incubator firms benefit from their relationship with university incubators

¹¹ Amezcua et al (2010) Performance analysis of Entrepreneurship policy: which business incubators generate the highest levels of economic performance?

¹² UUK (2021) Universities and the economic recovery: an analysis of future impact. At: <https://www.universitiesuk.ac.uk/facts-and-stats/impact-higher-education/Documents/uuk-getting-results.pdf>

Attracting, retaining, and developing talented researchers

Universities produce talent and develop high level skills according to national and local needs. They also impact directly on their local economies as large employers.

The latest data from the Higher Education Statistics Agency shows that over 28,000 postgraduate research students qualified in 2019–20.¹³ The same academic year, more than 50,000 staff at higher education providers were appointed on research-only contracts; a figure that has grown year-on-year since the data was first collected.¹⁴



These researchers support collaboration across regions, as well as internationally. In 2019, 57.2% of UK publications were the result of international collaboration.¹⁵

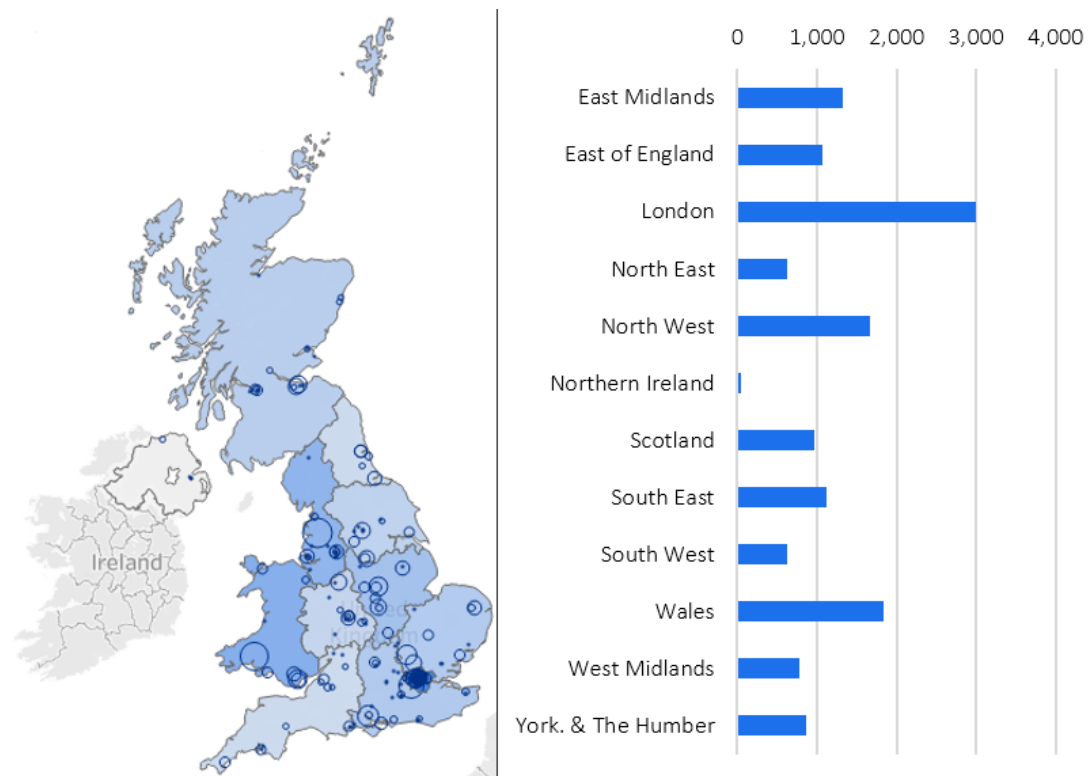
¹³ HESA Student record [2019–20]. At: <https://www.hesa.ac.uk/data-and-analysis/sb258/figure-15>

¹⁴ HESA Staff record [multiple years]. At: <https://www.hesa.ac.uk/data-and-analysis/staff/chart-4>

¹⁵ UUKi (2020) International Facts and Figures 2020. At: <https://www.universitiesuk.ac.uk/universities-uk-international/insights-and-publications/uuki-publications/international-facts-and-figures-2020>

Further, as **Figure 4** shows, some graduates use their research to develop start-ups, which provide a range of regional services.

FIGURE 4: NUMBER OF ACTIVE GRADUATE START-UPS BY HIGHER EDUCATION PROVIDER AND REGION OF HIGHER EDUCATION PROVIDER, 2019–20



Source: HESA HE Business and Community Interaction Survey 2019–20. At: <https://www.hesa.ac.uk/data-and-analysis/providers/business-community/table-4e>

Leading the transition to net zero

University research and innovation has a key role to play in achieving net zero and addressing wider sustainability challenges. The higher education sector has a range of multidisciplinary expertise which can support industry, international relations, technological development and social, economic and behavioural responses.

Universities' activities in this space have been supported by funding from the Official Development Assistance (ODA) R&D schemes, which have helped universities to engage with global challenges. Universities are also leading global efforts to drive change and adaptation within the wider context of the [UN Sustainable Development Goals](#).

An innovative environment can help universities to support sectors with these challenges, however universities must also lead by example and develop their own strategies accordingly. The [COP 26 Universities Network](#) has identified key research priorities in the 2020s to achieve net zero, which include researching efficient, low-carbon and carbon-negative solutions for sectors with difficulties decarbonising.

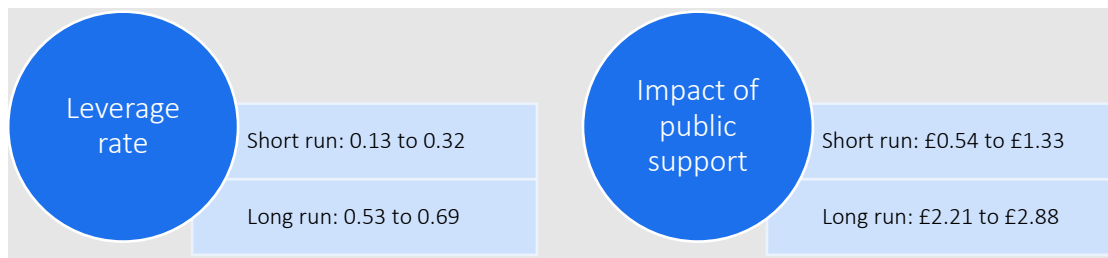


Leveraging private sector investment

Universities encourage private sector investment into R&D by developing collaborative relationships with businesses that de-risk investment in new areas of research, provide access to skills and facilities, and build capacity and capabilities for R&D.¹⁶

Research undertaken by Oxford Economics on behalf of BEIS (2020) found that an extra £1 of public funding for R&D given direct to universities and research councils gives rise to an increase in private funding of between £2.21 and £2.88.¹⁷ The same research also suggested that public investment is required in the short term, as the impact of public support takes time to grow. To maximise private sector growth and leverage in private investment, government should not delay or destabilise R&D expenditure. It has been estimated that a three-year delay in the government reaching its £22bn target for R&D investment, would result in the UK losing out on over £11bn of private R&D investment between now and 2027.¹⁸

FIGURE 5: ESTIMATES OF UK LEVERAGE RATES – UNIVERSITIES AND RESEARCH COUNCILS



¹⁶ Dowling et al (2015) The Dowling review of business-university research collaborations. At: <https://www.gov.uk/government/publications/business-university-research-collaborations-dowling-review-final-report>

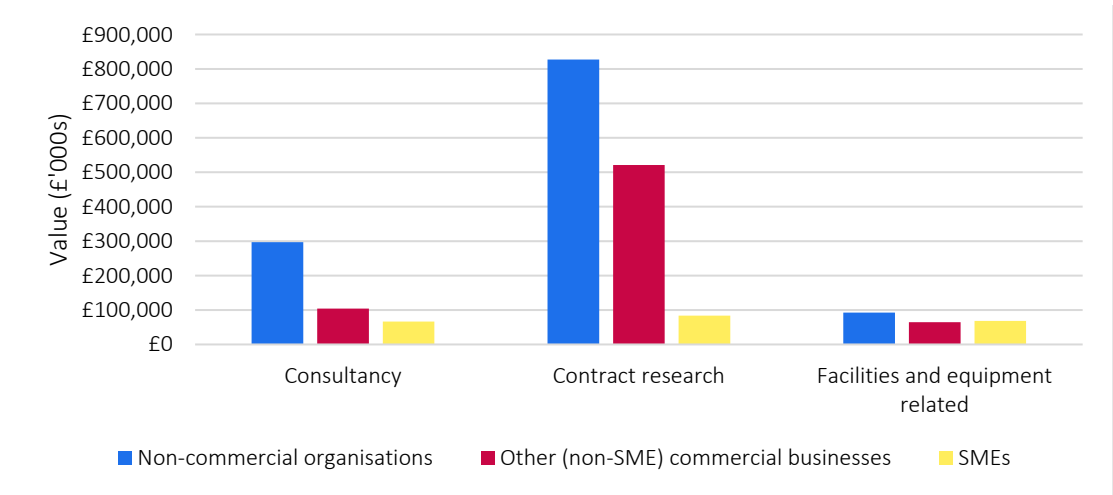
¹⁷ Oxford Economics (2020) The relationship between public and private R&D funding. At: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/897470/relationship-between-public-private-r-and-d-funding.pdf

¹⁸ Campaign for Science and Engineering, Delaying R&D target would cost UK billions in private investment (2021) at: <https://www.sciencecampaign.org.uk/news-media/case-comment/delaying-r-d-target-cost-uk-in-private-investment.html>

Source: Oxford Economics (2020) The relationship between public and private R&D funding. At: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/897470/relationship-between-public-private-r-and-d-funding.pdf

Figure 6 shows that in 2019–20, higher education providers generated over £2.1 billion from consultancy contracts, contract research and facilities and equipment related services.

FIGURE 6: HIGHER EDUCATION PROVIDER INCOME FROM BUSINESS AND COMMUNITY SERVICES, 2019–20



Source: HESA HE Business and Community Interaction Survey 2019–20. At <https://www.hesa.ac.uk/data-and-analysis/providers/business-community/table-2a>

Maximising universities' research and innovation activities to Build Back Better

To maximise economic activity and facilitate effective engagement between universities, businesses and government, universities need a supportive research and innovation policy environment – including approaches to funding, regulation and taxation – that incentivises partnership and collaboration at a local, national and global level.

We ask that the following steps are taken to achieve this:

The UK as a research and development superpower

The UK's position as a global research superpower is underpinned by our university-based research. University-based research is also critical to innovation and driving recovery across the regions and nations of the UK.

- **To develop a pro-innovation ecosystem, R&D funding must be stable.** Stable baseline public funding is vital for fundamental research to take place. Stop-start investment does not support a sustainable system, as research projects can span decades. Once lost, research and innovation capacity takes time to re-build and the UK will lose ground to competitor countries.

Policies on research funding should be mindful of the long-term health, dynamism and sustainability of the higher education research base. Investment in R&D should be viewed as a way to support the UK's economic and social recovery, rather than something to return to when the fiscal situation improves.¹⁹

- **To enhance the UK's world-leading research base, R&D funding must be sustainable.** To be sustainable in the long-term universities need to cover the

¹⁹ The government plans to return to the 0.7% Official Development Assistance spend 'when the fiscal situation allows'. See House of Commons Library (2020) Spending Review: Reducing the old 0.7% aid commitment. At: <https://commonslibrary.parliament.uk/spending-review-reducing-the-aid-commitment/>

'full economic costs' (FEC)²⁰ of conducting research. However, the research income received by universities from government and other sources is not enough to be sustainable. In 2019–20, the FEC recovery of universities' research activities was 69.7%, which has fallen by nearly six percentage points in the last five years.²¹

Research funders need to support the research base's sustainability by meeting more of the costs of research and increasing investment in excellence-driven, low-bureaucracy, flexible research funding (known as quality related or QR research). QR funding is crucial to leveraging funding, providing long-term investment in research infrastructure, responding quickly to research opportunities and providing researcher career stability.²²

- To sustain our position as a science and tech superpower, we need government to invest significantly more in R&D. Despite universities' excellent research outcomes, the UK 'punches above its weight' when it comes to important research metrics.²³ UK government's Innovation Strategy highlighted that a key marker of the UK's slowing rate of innovation is the decline in the rate of growth in R&D spending. In 2018, total UK expenditure on R&D was 1.74% of GDP, representing very small growth over time and notably below the OECD average.²⁴ We urge the government to deliver on its stated commitment to spend 2.4% of GDP on R&D by 2027 and reach £22 billion in public investment in R&D by 2024–25.²⁵ Although R&D expenditure is growing, it may not be at the rate necessary to reach the target.²⁶
- In the longer term, it is imperative that the UK aims to at least match the levels of investment in R&D realised by international peers and competitor economies. This will be vital to retaining our relative competitor advantage. The government should also provide clarity on how it will progress towards its

²⁰ All UK higher education institutions are required to report Transparent Approach to Costing data annually. 'Full economic cost' is total expenditure derived from financial statements, plus a sustainability adjustment. For more information see: <https://www.officeforstudents.org.uk/media/fd84abb4-49fe-4191-bc3a-6b5cae9b66fe/annual-trac-2019-20-sector-summary-and-analysis-by-trac-peer-group.pdf>

²¹ Office for Students (2021) Annual TRAC 2019–2020: Sector summary and analysis by TRAC peer group. At: <https://www.officeforstudents.org.uk/media/fd84abb4-49fe-4191-bc3a-6b5cae9b66fe/annual-trac-2019-20-sector-summary-and-analysis-by-trac-peer-group.pdf>

²² UCL (2019) The Impact of QR Funding for UK Research. At https://www.ucl.ac.uk/research/sites/research/files/the_impact_of_qr_funding_for_uk_research_feb_2019.pdf

²³ BEIS (2019). International comparison of the UK research base, 2019. At: <https://www.gov.uk/government/publications/international-comparison-of-the-uk-research-base-2019>

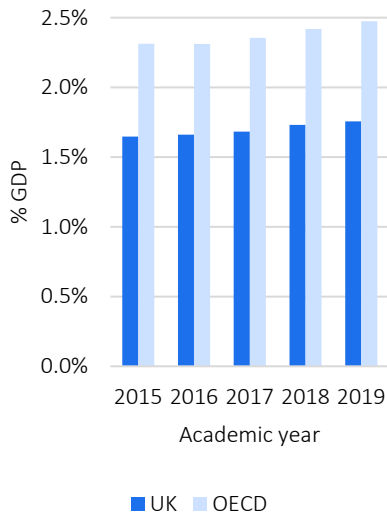
²⁴ ONS (2021) Gross domestic expenditure on R&D, UK: 2019. At: <https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/ukgrossdomesticexpenditureonresearchanddevelopment/2019>

²⁵ See a letter signed by UUK and more than 30 other organisations on meeting the R&D targets: <https://acmedsci.ac.uk/file-download/34451588>

²⁶ NCUB (2021) 2019 R&D expenditure data analysed: Are we on track to reach 2.4%? At: <https://www.ncub.co.uk/wp-content/uploads/2021/08/Gerd-v2-1.pdf>

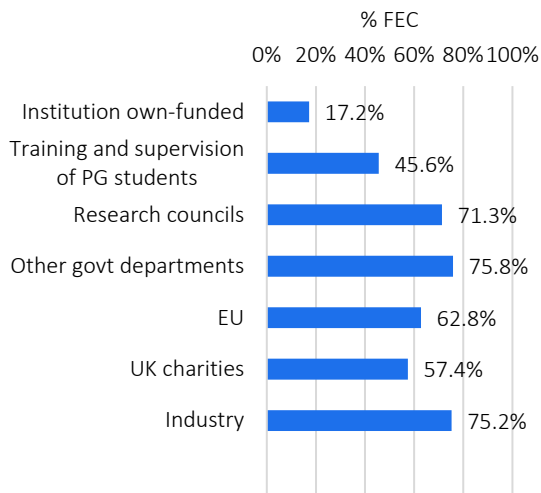
target to increase public spending on R&D to £22bn per year by 2024–25, which is an important step to meeting the 2.4% target.

FIGURE 7: GROSS DOMESTIC SPENDING ON R&D, 2015 TO 2019



Source: Organisation for Economic Co-operation and Development (OECD) (2021) Gross domestic spending on R&D (indicator). doi: 10.1787/d8b068b4-en (Accessed on 26 August 2021)

FIGURE 8: RECOVERY OF FULL ECONOMIC COSTS BY SPONSOR TYPE (UK HIGHER EDUCATION INSTITUTIONS), 2019–20



Source: Office for Students (2021) Annual TRAC 2019-2020: Sector summary and analysis by TRAC peer group. At: <https://www.officeforstudents.org.uk/media/fd84abb4-49fe-4191-bc3a-6b5cae9b66fe/annual-trac-2019-20-sector-summary-and-analysis-by-trac-peer-group.pdf>

Supporting and developing people with potential

The impact of research and development funding to rebalance and level-up needs to be enhanced through developing local skills provision and routes into employment that better connect to opportunities for local people.

- The UK government should support university collaborations in skills training, business support, and research and innovation with existing and new partners across the private and public sector. These vital partnerships need to be underpinned by dedicated funding, through programmes such as the UK Shared Prosperity Fund and Levelling Up Fund.
- Increased flexibility and development of technical education provision provides a pathway of opportunity. A 'reach out' fund should be developed so that universities can target left behind areas for technical skills opportunities and the flexi-job model of apprenticeship provision should also be developed to support this.
- The Help to Grow Scheme should be developed to help SMEs achieve high value, high productivity growth through support for a flexible graduate placement/internships programme.

Creating an effective innovation ecosystem

The Innovation Strategy recognises the important role of innovation funding such as the Higher Education Innovation Fund (HEIF) in England – and similar funding streams in the devolved nations – in supporting and incentivising universities to engage and work with business, public sector and others, as well as supporting entrepreneurial activities of academics and students. In England the £250 million HEIF delivers a strong return on investment generating around £10 for every £1 of funding.²⁷

²⁷ Ulrichsen (2020) Assessing the Gross Additional Impacts of the Higher Education Innovation Fund (HEIF) Table 8. Estimate based on return on investment from core KE activities, Hard to monetised KE activities and Formal spinouts / staff & graduate start-ups.

Recent uplifts in this funding have been used by universities to focus on commercialisation, including technology transfer, and by smaller institutions to take innovative, new directions, particularly linking creativity and technology.²⁸

The strategy also notes that 'innovation does not flow neatly in one direction from research to application'. The UK, therefore, needs to develop an innovation ecosystem that creates a more permeable boundary between academia and innovators in businesses and industry.

- The government should support development of regionally focused research and innovation hubs. Involving local authorities, businesses, HE and FE institutions – these university led hubs would focus on co-producing research and innovation activity to deliver research-led solutions, knowledge exchange activities, and targeted skills development to address local challenges.
- To make the process from research, development, demonstration, scale up, and ultimate deployment of innovative ideas as seamless as possible, and mitigate elements of risk, options for funding support through initiatives such as the UK Shared Prosperity and Levelling Up Fund which can be leveraged by hubs should be explored.
- To enhance the impact of university innovation activity the government should grow the HEIF in England, and work with the devolved nations to grow similar funding streams in those administrations.

In England, changes should include removal of lower thresholds in the HEIF to enable small, research-active universities to drive growth and innovation support economic recovery in their localities.

- We ask the government to design R&D investment to better support our creative economy. The government should review R&D definitions to make sure the UK's internationally strong creative industries – which have been hit hard by Covid-19 measures – are included.

²⁸ Research England (2019) Universities delivering the Industrial Strategy

Levelling up the UK through research and innovation

The successful contribution of research and innovation activity to the levelling up agenda relies on engaging with partners and stakeholders across regions and localities. We also need to recognise the different strengths, needs and contexts across the nations and regions of the UK.

These vital partnerships need to be underpinned by dedicated funding and encouraged in programmes such as the UK Shared Prosperity Fund and Levelling Up Fund, with a focus on targeting efforts on addressing economic disparities in regions. Smaller companies will have a crucial role in rebalancing the economy in regions where there are fewer large employers, and the convening power of universities should be harnessed to help connect them to business support.

- In line with previous commitments by the UK Government, the UK Shared Prosperity Fund and Levelling Up Fund should provide, at a minimum, equivalent levels of funding provided by EU Structural Funds, including to the devolved nations.²⁹
- Local and combined authorities should bring universities into economic and social planning to ensure a wide-reaching and long-lasting recovery. Partnering on, for example, enterprise incubators and accelerators which support start-ups and boost local job creation, and working together on innovation programmes that increase small and medium-sized enterprise (SME) competitiveness.
- Universities should make themselves available for new partnerships and seek novel ways of engaging with potential partners so they can develop even stronger collaborations and have greater impact locally and nationally.
- Government support for more university projects that drive economic growth in local areas, through consortia of research organisations, businesses, and local leadership. Initiatives such as the Research Partnerships Investment Fund will play a critical role in creating the conditions and infrastructure for these partnerships.

²⁹ Clarke, S (2020) Information on the UK Shared Prosperity Fund. At <https://committees.parliament.uk/publications/1581/documents/15052/default/>

- Government stimulus could help significantly increase the level of university local procurement, especially with SMEs and link this to providing local opportunities for skills development and employment.

Creating a Global Britain through research and innovation

UK research, development, and innovation (RDI) is global in its scope, reputation, and impact. Through our universities, the UK produces 6.5% of all research outputs and 16.5% of the world's most cited publications.³⁰

It is this reputation for excellence and impact that ensured the government recognised the potential for UK science and research to play a leading role in their ambitions for Global Britain. To maintain our status as a 'Global Science Superpower'³¹ it is critical that domestic RDI funding for universities is stable, predictable and sustainable. However, this alone is not enough. It is also essential that our universities can collaborate internationally and attract global talent.

The success of the UK's research base is built on universities that are globally engaged. More than half our research outputs (57.2%) are produced in collaboration with an international co-author, reflecting a global trend for high-value, high-impact RDI activity to involve bi- and multilateral collaborations.³² While it is vital that the UK realises its ambitions to significantly increase domestic investment in RDI, this must include resources that enable UK institutions and researchers to work and collaborate internationally. International collaboration and globally engaged and mobile researchers are strongly correlated with enhanced research excellence and impact.³³

The UK's research base also benefits from being highly attractive to global talent. In 2018–19, 67,645 non-UK academic faculty worked in UK universities. In engineering and technology, international staff make up nearly half of academic faculty (46%).³⁴ In terms of future talent, more than 57% of all postgraduate taught students are from outside the UK, as are almost 45% of postgraduate research students.³⁵ While the UK

³⁰ UUK International (2020) International Facts and Figures 2020. At: <https://www.universitiesuk.ac.uk/universities-uk-international/insights-and-publications/uuki-publications/international-facts-and-figures-2020>

³¹ Cabinet Office (2021) Global Britain in a Competitive Age, the Integrated Review of Security, Defence, Development and Foreign Policy. At <https://www.gov.uk/government/publications/global-britain-in-a-competitive-age-the-integrated-review-of-security-defence-development-and-foreign-policy>

³² UUK International (2020) International Facts and Figures 2020.

³³ Digital Science (2016) The Implications of International Research Collaboration for UK Universities. At: <https://www.digital-science.com/resource/implications-of-international-collaboration>

³⁴ UUK International (2020) International Facts and Figures 2020.

³⁵ UUK analysis, based on HESA data (2019-20). HESA Student Data available at: <https://www.hesa.ac.uk/data-and-analysis/students>

must grow domestic academic talent in line with the aims of the R&D People & Culture strategy, for the RDI ecosystem to be competitive, the UK must remain among the most attractive places for the next generation of academic researchers.

Beyond the direct benefits of training the next generation of research leaders, this helps to grow the UK's soft power, building long-term relationships and networks that form the basis of future international collaborations in the future. Our research found that 77% of UK-educated international graduates wanted to build business relationships with the UK, and nearly 8 out of 10 international postgraduate research students wanted to build research collaborations with UK institutions.³⁶

To maximise the scale, scope and impact of our international collaboration and engagement in R&I, government should:

1. **Ensure that UKRI and other funders have the resources to meet legal commitments.** Cuts to ODA-funded Global Challenges Research Fund and Newton Fund projects created significant reputational harm to UK research and to universities. While we recognise the challenging funding environment, it is critical that that researchers and partners overseas know that the UK will meet its future obligations in their entirety.
2. **Provide a plurality of funding streams that support a broad range of strategic international collaborations with the capacity to enhance the quality, impact, and global reputation of UK RDI.** This should include:
 - a. Additional and sustainable funding for the UK's participation in Horizon Europe (recognising the full costs of association over the whole three-year spending review period).
 - b. Support for strategic bilateral relationships through an enhanced fund for International Collaboration and enhanced fellowship funding.
 - c. Stable funding that enables excellent research with diverse partners to address global challenges.

Further, as set out in the R&D People and Culture strategy, the UK's offer to attract and retain international talent should be refined and strengthened. This should include prestigious grants for world-leading academics, as well as more opportunities for short-term inbound and outbound research mobility. We have set out detailed

³⁶ UUK International (2019) International Graduate Outcomes 2019: What Do International Graduates Do? Medium-term destinations and career outcomes of EU And Non-EU Graduates from UK universities. At: https://www.universitiesuk.ac.uk/sites/default/files/field/downloads/2021-07/international_graduate_outcomes.pdf

proposals in this space as part of the *Future International Partnerships* research project undertaken with BEIS.³⁷

The role of Horizon Europe in maintaining our position as a Global Science Superpower

The case for participation

UK participation in Horizon Europe will contribute significantly to the government's key policy agendas. The programme funds collaboration with scientists and researchers in 160 countries, well beyond the geographical confines of the EU, and provides a platform which is unique in the world for large-scale, bottom-up collaboration across the full range of scientific disciplines, with minimum friction. It plays a central role in contributing to UK scientific leadership, identified as a priority in the Integrated Review.

Moreover, collaboration is happening in key strategic areas for the UK. The ability to work with international experts at scale is not merely a bonus for academic researchers, but a necessity if the UK wants to lead the world in crucial emerging technologies. Through previous framework programmes, UK researchers have built up extensive, long-running networks whose existence is dependent on EU funding.

Even more critically, Horizon Europe will be a central element in sustaining the UK's international attractiveness as a destination for world-leading research talent, as well as for retaining researchers who are already working in the UK system.

Many hundreds of global academics relocated to the UK to take up Horizon 2020 grants. Thousands more were spurred on to move here because they know they will be eligible for these prestigious awards if they base themselves in the UK.³⁸ Our attractiveness as a destination for top research talent is dependent on the nature of the funding and research environment in the UK. The risk of losing access to EU funding has been frequently cited by academics who have left UK universities in recent years. Not participating in the Horizon programme would fundamentally weaken our appeal to highly mobile scientists.

³⁷ UUK International (2020) *Future International Partnerships: Putting the UK at the heart of global research and innovation collaboration*. At: <https://www.universitiesuk.ac.uk/sites/default/files/uploads/UUKi%20reports/Future-international-partnerships.pdf>

³⁸ There were 2590 UK participations in MSCA Individual Fellowships in Horizon Europe, 2014-2020 UUKi analysis.

The budget for association

We recognise that the cost of association to the Horizon programme is significant but believe that its value to the UK cannot only be measured in monetary terms. The opportunity to collaborate on a large scale with researchers from 160 countries in multi-country teams is as important as the money UK researchers receive. Previously the cost of our participation was met through the UK's contribution to the EU budget. Post Brexit, the costs will appear within the science budget, and should be supported by an equivalent increase in that budget. Association to Horizon should not be achieved at the expense of domestic research budgets.

We previously estimated that paying for funding for association to Horizon Europe for the current financial year out of the existing science budget would amount to a cut of over £1 billion. This is equivalent to 18,000 full-time academic research posts, which would grow throughout the programme if the annual budgets were to increase. At the same time, the People and Culture Strategy recognised that the R&D sector needs to recruit at least 150,000 additional researchers by 2030 to meet its 2.4% GDP R&D investment target.

Negotiations

While we fully expect our association to the Horizon Europe programme to be confirmed in the near future, our status remains uncertain until the relevant protocol has been adopted by the joint UK-EU committee responsible for UK participation in EU programmes. If UK association is either indefinitely delayed or taken off the table, the UK needs to be ready to implement alternatives to sustain investment in research on a stop-gap basis. However, we strongly believe government should continue to pursue the aim of association, even if funding to bridge any short-term gaps is required.

Case studies

Supporting places and levelling up

University of Leicester – Space Park Leicester

Space Park Leicester is a world-leading cluster for innovative research, enterprise and education in Space and Earth observation. Formed in collaboration with the University of Leicester, industry partners and the local community, Space Park is forecast to create 2,500 jobs and provide £750m gross value added (GVA) and is situated in one of the governments levelling-up priority areas. It provides a place for research and innovation, an incubation centre for SMEs, laboratory space, school outreach, and continuing professional development (CPD) opportunities.

University of Hertfordshire – Hertfordshire Science Partnership

The Hertfordshire Science Partnership is an innovative collaboration between the University of Hertfordshire and Hertfordshire Local Enterprise Partnership with a focus on supporting small and medium-sized enterprises (SMEs). It leverages the state-of-the-art facilities and academic expertise at the university to boost the dynamic agri-technology and life sciences sector in Hertfordshire. So far, the partnership has brought eight new products to market, established 15 research contracts giving local SMEs access to the university's facilities and expertise, 25 new research collaborations and supported 31 businesses.

University of Dundee – Biomedical Cluster project

The Biomedical Cluster will build on Dundee's existing expertise in biomedical sciences with an innovation hub to house spinout companies, and a multidisciplinary R&D centre to develop innovative and disruptive technologies for the healthcare industry. With initial funding of £25m from the Scottish Government, it is predicted that the cluster will bring £190m benefit to the local economy and 800 new biomedical jobs by 2053.

Leading the transition to net zero

Biorefining Centre of Excellence (BEACON)

Led by Aberystwyth University

In collaboration with partners at Bangor and Swansea universities, BEACON was launched in 2010 with £30m+ of EU Regional Development funding.

It supports Wales-based companies to develop renewable energy products and services, assisting the transition to a low carbon economy. Biorefining expertise at Aberystwyth, Bangor, and Swansea universities supports research and development at SMEs. Facilities located at the three universities are used to create integrated supply chains involving growers, processors (industry and academia) and end users (industrial partners). BEACON also supports the creation of highly skilled jobs by allowing SMEs to develop intellectual property into products and increase profitability.

Leveraging private sector investment

University of Oxford - The Oxford Foundry (OXFO)

The Oxford Foundry aims to build and support ventures that better society. The ventures in the Foundry's portfolio have raised over £43m in investment (with 75% attracting investment from Europe and the US) and have created more than 170 jobs. The Foundry was also able to rapidly respond to the Covid-19 pandemic providing a £120,000 start-up grant that scaled four solutions including a GP-to-patient remote consultation platform that supported 10 million patients, and an innovative eco-laundry company that laundered NHS PPE equipment.

University of Sussex – Universal Quantum

The University of Sussex spin-out company, Universal Quantum, aims to build the world's first large-scale quantum computer – one of the technologies identified as a key area of opportunity in the Innovation Strategy. As well as funding from Innovate UK, the spin-out has attracted £3.6m in seed-funding from investors such as Hoxton Ventures and Village Global.

Creating a Global Britain

Durham University – Transport Africa

The Transport Africa project is developing ways to use local materials for the construction of rural roads and railway embankments. The techniques and technologies arising from the project bring significant cost savings and environmental benefits, and are now being applied in Sudan, Tanzania, South Africa, Malaysia, Turkey, and by the UK Environment Agency. The project, funded through the Global Challenges Research Fund, has established Durham University as a global leader in the climate impacts of infrastructure.

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