



CaSE 
Campaign for Science and Engineering

Universities: A crucial component of UK R&D



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Briefing**



Universities: A crucial component of UK R&D



Universities are a crucial component of the research and development (R&D) ecosystem. A thriving research system generates significant benefits for the UK, driving not only economic growth but also societal advancements.

Universities are under significant financial pressure, with substantial gaps in their current R&D funds, stemming from short falls in both public and charitable funding provisions. To deliver their role in the R&D ecosystem effectively, universities must be supported to achieve long-term financial sustainability.

CaSE has drawn on the breadth of expertise of our membership to capture the diverse benefits that university-led R&D brings to both the research landscape and to society more broadly. In this briefing, we highlight key themes and case studies, expanding the evidence base on the value university R&D brings across the UK, and ultimately supporting the sector's advocacy for these vital institutions.

Benefits of University R&D

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CaSE heard overwhelmingly from stakeholders within the sector that universities are so intertwined in our research ecosystem that we can't begin to predict the full cost of losing their R&D contribution at the regional and national level. These six benefits, although not always easily measured nor necessarily accompanied with clear and direct financial returns, underpin all UK R&D and its associated benefits to society and the economy.

Companies and service providers that rely on the supply of R&D and innovations universities provide will simply go and find it elsewhere rather than stay in the region, or even in the country, and lose it. To retain this vital resource, it is imperative that the new Government supports UK universities to achieve long-term financial sustainability.



The challenge

Higher education institutions conduct around [25% of the total R&D taking place in the UK](#) each year (£14.9 billion in 2021). This contribution is vital to the functioning of the wider research ecosystem in both tangible and intangible ways. [Existing work and economic modelling](#) by the sector have built a strong case for the value universities bring to society and the economy as a whole, with proven returns on public investment in university-led R&D.

The financial pressures facing universities

Universities are under [significant financial pressure](#), with [substantial gaps](#) in their current R&D funds, stemming from [short falls in both public and charitable funding provisions](#). As has long been the case, cross-subsidy of research from university teaching budgets is common among UK universities, [especially from international student fees](#).

However, [recent changes to UK immigration policy](#) are serving as a [deterrent](#) to international students, and we are already seeing a [reduction in overseas student numbers](#). A diminishing international student population will exacerbate existing shortfalls in university research budgets. In addition, some university-affiliated R&D institutes do not have the same teaching activities and budgets to cross-subsidise their research, and so are particularly vulnerable to the shortfalls in the UK's current research funding model.

These losses in cross-subsidy from teaching budgets and the real-terms stagnation in charitable research support funds are already reducing the amount of money available for research conducted in UK universities. This would be a substantial sum: [universities invested £5.6bn into their research in 2021](#).

To deliver their role in the R&D ecosystem effectively, universities and university-affiliated research institutes must be supported to achieve a sustainable financial model across both their teaching and research activities. Interventions must go beyond simply addressing falling international student numbers, with a holistic review of the funding mechanisms for university-led R&D (and universities more broadly) urgently needed to increase 'end-to-end' coverage of the costs of research activity.

About CaSE

The Campaign for Science and Engineering (CaSE) is the UK's leading independent advocate for science and engineering.

We represent over 110 scientific organisations including businesses, universities, professional bodies, and research charities as well as individual scientists and engineers. Collectively our members employ over 336,000 people in the UK, and our industry and charity members invest around £32.2bn a year globally in R&D.



The benefits of university R&D

The following sections capture some of the more intangible ways that university R&D feeds into and supports the research system, benefits that the UK stands to lose if the quantity and variety of university-led research is reduced because of financial pressures.

1

Knowledge and Expertise

Universities are home to a vast and interdisciplinary base of knowledge and expertise as well as being a disseminator of research skills and best practice. R&D taking place within universities benefits from this multi- and interdisciplinary research environment, allowing open exchange and flow of ideas across research disciplines locally, nationally and globally.

The breadth of the university research environment, encompassing R&D in social sciences and humanities alongside science, medical, and technology subjects, allows varied perspectives to be combined and research teams to develop solutions that would not have been possible with a single discipline alone, as can be the case in companies conducting R&D. Universities also provide the pioneering, basic research that allows a region, or the country, to become the 'home' of that research specialism, offering a strategic advantage in attracting inward investment.

A unique element of university R&D in the UK is that its research stems from an integration of multiple funding streams, including public funds, charities, and industry. This variety enriches the breadth and scope of university research outputs, upon which the rest of the R&D ecosystem can build. The contribution of non-commercial funding sources to university R&D also allows institutes to conduct mission-led research that can bring enormous societal benefits without necessarily yielding direct economic returns for the organisation, such as research into repurposing existing, licenced drugs for the treatment of other conditions or epidemiological follow up on the value of medical interventions (Case Study A).

The capacity of universities to nurture and retain broad, world-class academic capability is also crucial in allowing the UK to respond to future challenges. The UK needs to retain a strong foundation of basic research to be ready for unanticipated global challenges, as we saw in the vaccine response needed for the Covid-19 pandemic. If our university-led R&D is diminished, we risk losing this vital 'future currency'.

Case Study A) Repurposing an existing drug as a life-saving treatment - London School of Hygiene & Tropical Medicine (LSHTM)

Researchers from the Clinical Trials Unit at LSHTM found innovative ways to [repurpose an existing drug, tranexamic acid \(TXA\), as a life-saving treatment for major blood loss](#). Drawing on their international network of clinicians they ran two, large global randomised trials each with over 20,000 participants. They found that early treatment with tranexamic acid reduced deaths from traumatic and postpartum bleeding by one third and without any serious adverse effects. The LSHTM team also used innovative analysis methods to show the importance of urgent treatment and the impact of treatment delay in using TXA.

This resulted in the drug being included in the World Health Organization Essential Medicines List for both trauma and post-partum haemorrhage and the WHO recommending its use on a global scale. Subsequent implementation efforts by the lead researchers led to it being used to prevent haemorrhage in the NHS in Britain, the UK and US militaries, and by international health bodies worldwide. Economic analyses show that the drug is highly cost-effective in high, middle- and low- income settings.



The benefits of university R&D

2

Infrastructure and Facilities

Research equipment and facilities are often highly expensive and not easily affordable by businesses, particularly small start-ups and scale ups. In recent years, there has also been a scaling down of R&D capability within some larger businesses, creating a growing need for access to university facilities and equipment to support business R&D. As a result, there is a crucial role for universities in establishing regional industry clusters through housing and maintaining bespoke facilities and equipment that draw in new companies, as we have seen in the development of the Net Zero Centre in Teesside (Case Study B).

In addition, universities offer specialist facilities and expertise that can be crucial to the development pipeline of industry research. For example, in the pharmaceutical industry, a small business may have the chemical expertise for drug discovery but lack the epidemiological facilities to work with live forms of infectious diseases they seek to treat.

Case Study B) Net Zero Industry Innovation Centre – Teesside University

The [Net Zero Industry Innovation Centre \(NZIIC\)](#) at Teesside University is designed to forge robust connections between industry, research facilities, and higher education. The NZIIC serves as a driving force behind the regions ambitious goal to establish itself as the most expansive decarbonised industrial cluster by 2040.

The centre is a hub of innovation, connecting businesses with the tools, expertise, and resources they need to thrive in the era of net zero. The multidisciplinary research and development centre houses six labs: Hydrogen Lab, Circular Economy Lab, Smart Energy Lab, Carbon Capture, Storage & Utilisation Lab, Digitalisation Lab, and Innovation Lab.

3

Convener and Arbitrator

Universities play a crucial role, especially in regional settings, as a focal point and anchor for regional research institutions and clustering of expertise. In establishing a network of research organisations, universities can help bring in funding to collaborative endeavours that individual companies would otherwise be unable to access. Universities also have a vital role as a neutral arbitrator in supporting local businesses to collaborate rather than compete (Case Study C). The neutrality of universities can be a further asset to industry research, through their capacity to corroborate research without commercial conflict of interest constraints. Universities, and the collegiate mindset they bring, can support the growth of research supply chains across enterprises, helping to establish regions of research strength, retain businesses of all sizes in the area, and allow research ideas to become outcomes.



The benefits of university R&D

Case Study C) Space South Central - University of Portsmouth, University of Southampton, University of Surrey

Space South Central is a partnership between industry and academia, including more than 120 innovative and entrepreneurial companies. The partnership links together the research, expertise and facilities of key space research companies, with the universities in the cluster serving as a neutral arbiter in establishing these relationships and coordinating supply chains. Through facilitating and developing collaborative projects between partners in the area, the universities in the south-central region have been able to identify and attract inward investment opportunities.

For example, [the RemoveDEBRIS mission](#), which aimed to demonstrate technology that could capture waste from low Earth orbit, involved a consortium led by Surrey Space Centre at the University of Surrey. This consortium included Space South Central partners Surrey Satellite Technology Ltd (SSTL) and Airbus, alongside an international team of collaborators and brought in more than €15.3 million in combined funding from the European Commission and ten other partners.

For further detail on this case study and others see: [Space South Central](#)

4

Civic and Cultural Contributor

Universities have a vital role in enriching local communities at the civic and cultural level, as well as through integrating R&D in local initiatives. The UK risks losing these local, societal benefits if it loses its university-led R&D. These benefits are not always accompanied with clear and direct financial returns, nor are their impacts easily measurable in the short term, if at all. However, these local benefits indirectly support the research system in the form of societal improvements such as improved health, education and wellbeing of the population.

The research conducted by universities can directly benefit communities, through yielding research outcomes that are both locally and globally relevant. For example, with environmental research, initiatives carried out in collaboration with the local area can deliver research outcomes that support bespoke and relatable recommendations for local communities and councils (Case Study D). When it comes to supporting public health, studies conducted with local residents can also lead to health interventions that are applicable to, and reflect, the ethnic diversity of the region as well as having global impact.

On top of being a major employer in their communities, universities also support their local region in other, essential ways that are difficult to put an immediate economic value on but enrich and support our research system and wider society. Some essential activities university R&D enables are outreach, engagement, and regenerative initiatives with local areas in collaboration with other anchor institutions and local councils. Through educational outreach and offering placements in research facilities, university R&D promotes social inclusion and mobility, encouraging students from more socioeconomically diverse backgrounds to consider careers in research. Universities also support local cultural and wellbeing initiatives that reduce poverty and health inequalities in their region, providing the R&D they need to succeed (Case Studies E & F). These R&D-led activities are often most at risk of budget cuts and can be hard to champion when they fall between the remits of different Government departments.



The benefits of university R&D

Case Study D) WellHome Study – Imperial College London

The [West London Healthy Home and Environment Study \(WellHome\)](#), led by Imperial's Environmental Research Group and co-designed with the local community in White City, focuses on the air quality in 100 homes, half of which has a child with asthma.

The study aims to identify air pollution exposures across both indoor and outdoor environments, and the continuum between indoor and outdoor pollution within vulnerable and diverse urban communities, to identify behavioural changes that can reduce this exposure and improve health outcomes.

WellHome's fieldwork is deeply embedded within the homes of local communities and uses innovative methods to raise awareness and understanding of air pollution through educational sessions, workshops, panel discussions and interactive science activities.

The Environmental Research Group is based at Imperial's White City Deep Tech Campus, the major anchor institution to the White City Innovation District. It is part of the Imperial WestTech Corridor, a world-leading hub for innovation, entrepreneurship and technological advancement, and a powerful engine for investment, inclusive economic growth and job creation.

Case Study E) Supporting and inspiring the next generation of scientists – Edinburgh BioQuarter and Castlebrae Community Campus

Edinburgh BioQuarter, a campus of University of Edinburgh, runs an educational outreach programme with neighbouring primary and secondary schools including Castlebrae Community Campus. Located in Craigmillar, an area high on the Scottish index for multiple deprivation, the programmes support the ongoing regeneration of the area. What began as a partnership between the Centre for Regenerative Medicine and Castlebrae High School the programmes now extend to the wider BioQuarter and includes a variety of engagement initiatives:

- Mentorship by staff and students for local school students in science and maths
- Visits to BioQuarter to offer insight into the diversity of scientific careers
- [Castlebrae Superlab](#), a 60-seater science lab used for engagement activities, based in the heart of the community
- Annual 4 week [paid summer internships](#) in scientific labs
- Innovative engagement for groups of young people, for example, [creation of a board room table for the Institute for Regeneration and Repair](#)

The programme has had mutual benefits for all involved and a measurable impact on STEM education in the area. Attainment in STEM subjects has improved, shown by an increase in the number of young people achieving higher grades in National 5 and Higher qualifications. Young people that may not have previously considered careers in science have gained hands-on work experience in the sector since the initiative began in 2015.



The benefits of university R&D

Case Study F) Health innovation neighbourhood – Newcastle University

Newcastle University is working with local partners to develop the UK's first '[Health Innovation Neighbourhood](#)', a living test-bed focussed on health and care, digital enablement and the environment. The neighbourhood aims to improve lives at local, regional and global levels.

This collaborative venture between public and private sectors on a 29-acre brownfield site to the west of Newcastle city centre is where housing, green spaces, healthcare, and educational spaces will sit alongside research and innovation to drive and inform healthier and sustainable living from cradle to grave.

Three interconnected themes cut across the neighbourhood's infrastructure and purpose and will feed into research and innovation, education, and engagement as well as deliver real-world impact. These three pipelines will examine health and its determinants ('Health'), digital advancement and enablement in everyday lives ('Innovation'), and the role of the environment in helping people live healthier and more sustainable lives ('Neighbourhood').

The site will host research activity across discovery, translation, application, and into implementation of new ideas. It will explore interdisciplinary solutions for longer and healthier lives, from medical sciences to humanities.

5

Talent and Skills

Universities offer businesses and the public sector more than simply an opportunity to procure or spin out intellectual property and innovative products, they also provide a talented pool of researchers that organisations can tap into, providing access to 'on demand' expertise from university staff through a variety of different flexible engagement models, such as funding a university-based PhD student or seconding specialist researchers. The porosity that co-funded staffing between private and university led-R&D projects provides can also de-risk the hiring and staffing prospects for both companies and employees, particularly with SMEs.

A crucial enabler in embedding porosity between university-based R&D and industry are universities' centres for doctoral training (CDTs), which offer an alternative and adaptable model for research training to the standard PhD system. It was noted that for certain disciplines, particularly fast-moving ones such as AI, conventional PhD training moves too slowly for the pace of innovations and that CDTs, such as the CDT for AI at the University of Surrey, are able to adopt a challenge-led approach with sponsorship from multiple companies providing varied training over flexible time frames (Case Study G). Moreover, CDT graduates can go on to become part of the academia-industry talent pipeline, with previous CDT cohort members who go on to work in businesses returning to the university in their company role to recruit and sponsor new PhD's into the CDT program, supporting the next cycle of skills training.

A further, subtler benefit of university-led R&D is in the production of skilled graduates entering the workforce from a research-rich education environment. Beyond their specialist skillset and knowledge-base, these employees will also have an awareness of, and aptitude for, engaging with research. Such staff members will not only be more likely integrate new research outcomes into their work, such as considering new clinical trial results in healthcare or adopting technological innovation in business, they will also bring a willingness to challenge conventional thinking and benefit companies and public sector bodies in other ways, beyond subject specific knowledge.



The benefits of university R&D

Case Study G) Centre for Doctoral Training in AI – University of Surrey

The [Centre for Doctoral Training in AI for Digital Media Inclusion](#) combines the expertise of the Surrey Institute for People-Centred AI at the University of Surrey, a pioneer in AI technologies for the creative industries and Story Futures at Royal Holloway University of London, leader in creative production and audience experience.

The CDT has designed an innovative participation model that addresses the issues of short-term budget constraints and the rapid pace of development in AI that affect the creative industries and the AI sector. Our partners will be offered 4 participation modes: a subscription model; a challenge sponsorship opportunity; a classic full PhD co-funding mechanism; and a knowledge exchange placement.

The centre's novel approach will train over 80 industry-ready PhDs and foster a responsible creative AI ecosystem co-designed and co-delivered with 50+ organisations, ranging from big-tech corporations to creative SMEs and user organisations, to address real-world inclusive media challenges and realise the impact on society and the UK economy.

Case Study H) NESST: North East Space Skills and Technology Centre - Northumbria University

This [state of the art £50M facility](#) is being developed by Northumbria University with investment from the UK Space Agency and the space and satellite division of industry giant Lockheed Martin. The facility will serve as an R&D hub to unite industry with academia and grow the pipeline from graduates with in-demand skills. Diversifying routes into the sector is a core element of the initiative, with new teaching courses being established, various outreach activities run through the centre, PhD studentships available, as well as placements opportunities for T level students.

6

De-risking Research and Innovation

Universities have a crucial role in de-risking the research and innovation pipeline. These institutions often take early, high-risk ideas to the point of validated proof-of-concept technology, at which point companies are more willing to carry the innovation forward to market. In addition to accelerating technology readiness through both in-house R&D and seeding spin-out companies, universities and their research can also support R&D-led business through partnerships that integrate new companies and their products into existing industry supply chains with large-scale companies and manufacturers (Case Study I). Globally mobile businesses of all sizes will increasingly go elsewhere if we lose this pipeline of research development.

A further means by which universities can de-risk R&D is through the recognition and branding that they can provide to start ups and SMEs. Universities, as known entities, can bring credibility to new businesses; SMEs in close collaborations or partnerships with universities can more readily attract investment and interest from venture capital than stand-alone companies.



The benefits of university R&D

Case Study I) Supporting the development of New Business Models and company strategy using a smart roadmapping toolkit – Durham University

Durham University Business School (DUBS) research into the analysis and re-engineering of a complex, commercial supply chain network has realised new business opportunities worth more than £800 million. [A road-mapping toolkit developed by DUBS](#), and adopted by NG Bailey, one of the UK's leading engineering companies, has had a transformational impact on process and decision making within the business and across its supply chains.

The impact of the toolkit, developed as part of the 'Customer of Choice' strategic supply chain initiative, has been far reaching. More than 300 companies in NG Bailey's supply chain have used it to benchmark, re-engineer and improve operations, reducing product development time by more than 40% and accessing a wealth of new revenue.

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The views and recommendations expressed within this report are those of the Campaign for Science and Engineering and inclusion on this list does not imply endorsement for the contents of the report.

Existing work and economic modelling

- [The economic impact of the Russell Group universities' R&D activities, 2024 - London Economics](#)
- [Research and innovation facts and figures: 2022 - Universities UK](#)
- [A Bright Future - Places and People - The Russell Group](#)
- [Universities are essential in our aim to reduce regional disparities and level up regional prosperity throughout the UK - HEPI](#)
- [The economic impact of university research funding in Scotland - The Fraser of Allander Institute](#)
- [The economic impact of the Russell Group universities' R&D activities - The Russell Group](#)
- [The role of universities in driving overseas investment into UK Research and Development - HEPI](#)
- [Why does university research matter? - Universities UK](#)
- [Beyond red herrings: why claims universities don't drive economic growth fall short - NCUB](#)
- [University R&D and Innovation Are Essential to Government Ambitions for Levelling Up - University of Birmingham](#)
- [How can public investment in research improve UK economic performance? - Economics Observatory](#)
- [The impact of the higher education sector on the UK economy - Universities UK](#)