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# HIGHER EDUCATION RESEARCH IN FACTS AND FIGURES

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Universities UK

## **INTRODUCTION**

Research at UK universities underpins innovation, which in turn contributes to economic growth. *Higher education research in facts and figures* provides an overview of the quality of research, impact, collaboration, students, staff and finance at UK universities.

All data relates to UK higher education institutions unless stated otherwise. All percentages have been calculated using raw figures and rounded, and therefore may not sum precisely. Further information on the sources used in this publication can be found on our website:

**[www.universitiesuk.ac.uk/research-facts-and-figures](http://www.universitiesuk.ac.uk/research-facts-and-figures)**

## HIGHLIGHTS

*'The UK continues to punch above its weight as a research nation.'*  
BEIS, 2017

76% of research at higher education institutions was considered as '**world-leading**' or '**internationally excellent**' for its overall quality in 2014.



More than half of UK research is produced through **international collaborations**.



43% of postgraduate research students and 29% of academic staff were **from overseas**.

UK higher education institutions received **£4.2 billion** from **knowledge exchange activities** in 2015–16.



UK government spending on research and development is **below the OECD average** as a proportion of GDP.



Research performed by UK universities in 2014–15 equates to an increase of **£28.9 billion** in gross value added.

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## QUALITY AND IMPACT

The Research Excellence Framework (REF) is a peer assessment of research across all disciplines at UK universities. The last assessment took place in 2014. University submissions are converted to quality profiles, which rate the research activity out of four stars. Research rated 4\* is world-leading in terms of originality, significance and rigour.

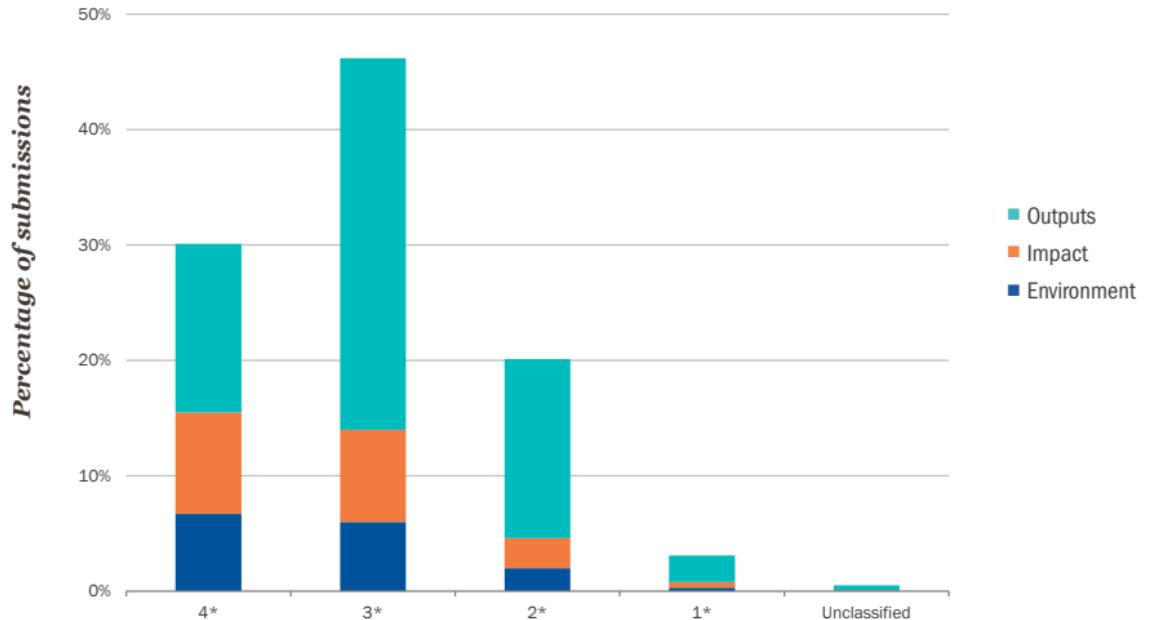
The overall quality profile awarded to each submission is based on the quality of research outputs, the impact of research beyond academia, and the research environment.

More details about the REF, its assessment process and criteria can be found on the REF website:

**[www.ref.ac.uk/2014](http://www.ref.ac.uk/2014)**

## UK RESEARCH QUALITY IS WORLD-LEADING

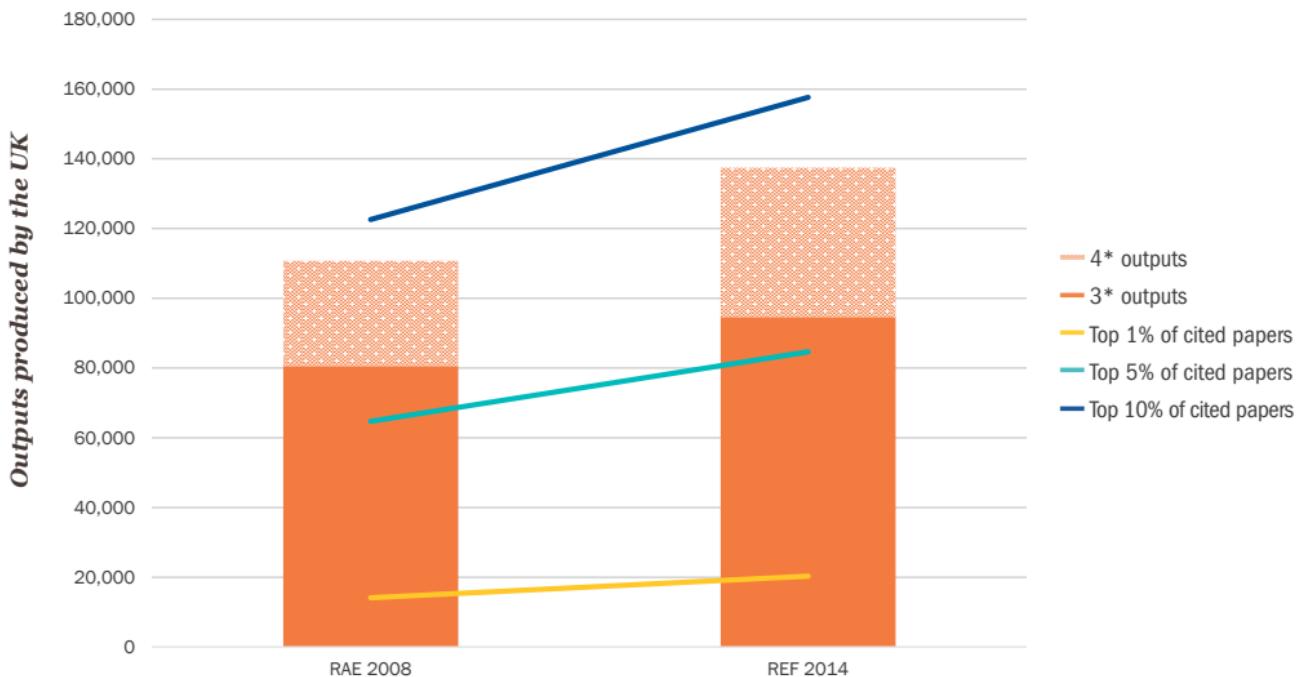
Overall, 76% of REF 2014 submissions were rated either world-leading (4\*) or internationally excellent (3\*) in quality.<sup>1</sup>



<sup>1</sup> The overall quality profile awarded to each submission is derived from a sub-profile for each of the three elements of the assessment: the quality of research outputs, impact of research beyond academia, and the research environment.

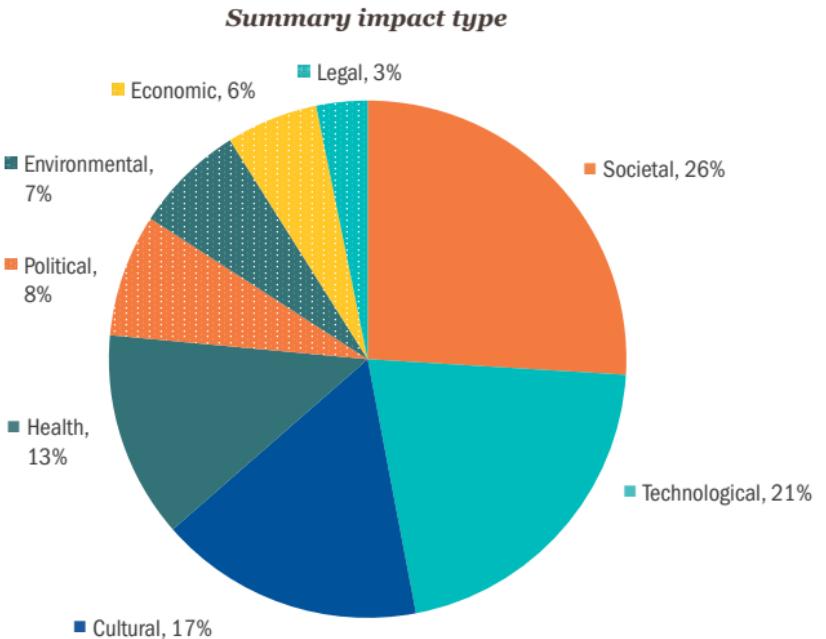
## UK RESEARCH QUALITY IS IMPROVING

Compared to the 2008 Research Assessment Exercise (RAE),  
4\* research outputs increased by 42%, and 3\* outputs increased by 24%.  
There was also an increase in the number of highly cited UK outputs.



## UK RESEARCH IMPACT IS DIVERSE

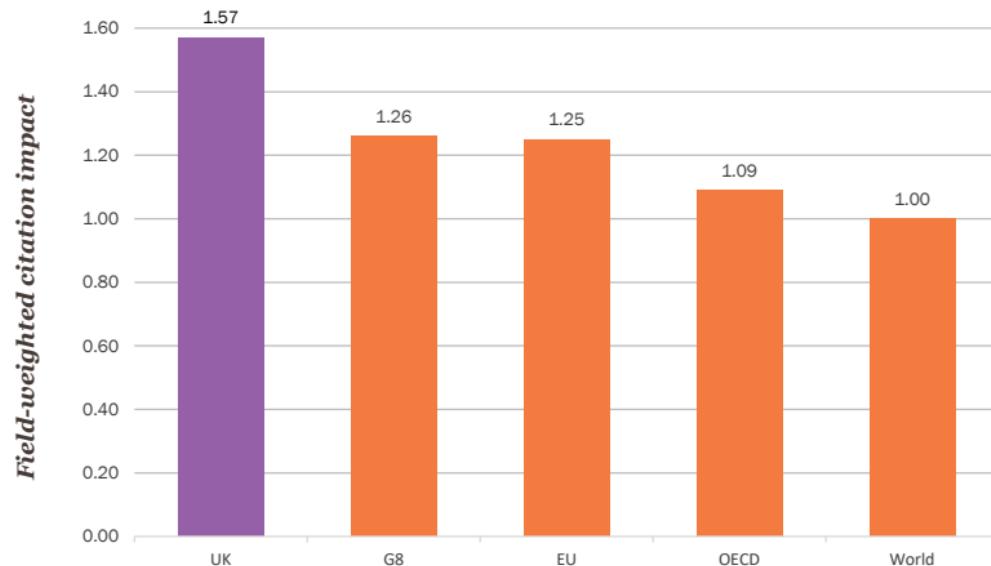
Case studies from the REF revealed that UK university research impacts a broad range of areas.<sup>2</sup>



<sup>2</sup> Case studies are assigned to a single 'summary impact type' by text analysis of the 'summary of the impact' (section 1 of the impact case study template). This is an indicative guide to aid text searching and is not a definitive assignment of the impact described.

## UK RESEARCH IS FREQUENTLY CITED

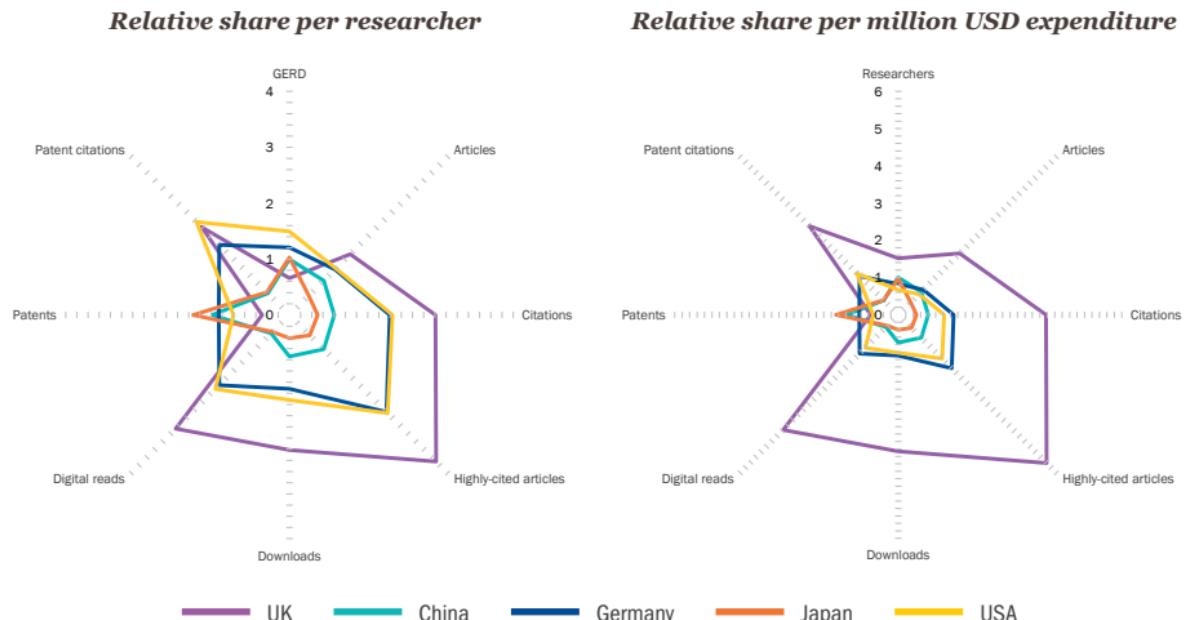
In 2014, the UK's field-weighted citation impact (FWCI)<sup>3</sup> was 1.57. This ranked first out of all G8 countries, eighth in the EU, and thirteenth in the world.



<sup>3</sup> A commonly used measure of research impact, FWCI compares the number of citations received by a researcher's publications, with the average number of citations received by similar publications indexed in the Scopus database. A FWCI of 1.00 indicates that publications have been cited at a world average, whereas a FWCI greater than 1.00 indicates that the publications have been cited more than would be expected based on the world average for similar publications.

## UK RESEARCH IS PUNCHING ABOVE ITS WEIGHT

Despite representing a small global share of research investment and only 4.1% of researchers, UK research accounted for 9.9% of global downloads, 10.7% of citations and 15.2% of the world's most highly cited articles.



<sup>a</sup> Note: a value of 1.0 implies that, per researcher or per million USD expenditure, the indicator is equal to the world average.

## UK RESEARCH HAS HIGH INTEGRITY

The *Concordat to support research integrity* was created to provide a comprehensive national framework for good research conduct and its governance.<sup>4</sup>

***Signatories and supporters of the concordat outlined their commitment to:***

maintaining the highest standards of rigour and integrity in all aspects of research

ensuring that research is conducted according to appropriate ethical, legal and professional frameworks, obligations and standards

supporting a research environment that is underpinned by a culture of integrity, and based on good governance, best practice, and support for the development of researchers

using transparent, robust and fair processes to deal with allegations of research misconduct, should they arise

working together to strengthen the integrity of research and to reviewing progress regularly and openly

In 2016, a progress report identified ways for the research community to come together to ensure that the integrity of UK research remains a priority in the years ahead.<sup>5</sup>

<sup>4</sup> Universities UK (2012), *The concordat to support research integrity*

<sup>5</sup> Universities UK (2016), *Concordat to support research integrity making progress*

## **COLLABORATION**

In 1981, about 90% of UK research output was conducted domestically. Now, over half is conducted in collaboration with institutions from overseas, meaning that almost all the growth in output has been produced through international partnerships.

UK research groups and universities lead more European Horizon 2020 collaborations than any other nation. It is concerning however that the overall number of UK participations in Horizon 2020 is declining.<sup>6</sup>

A recent Elsevier report, commissioned by the Department for Business, Energy and Industrial Strategy (BEIS) suggested that the UK's 'sustained upward trend' in research productivity is likely due to its increasing international collaboration.<sup>7</sup>

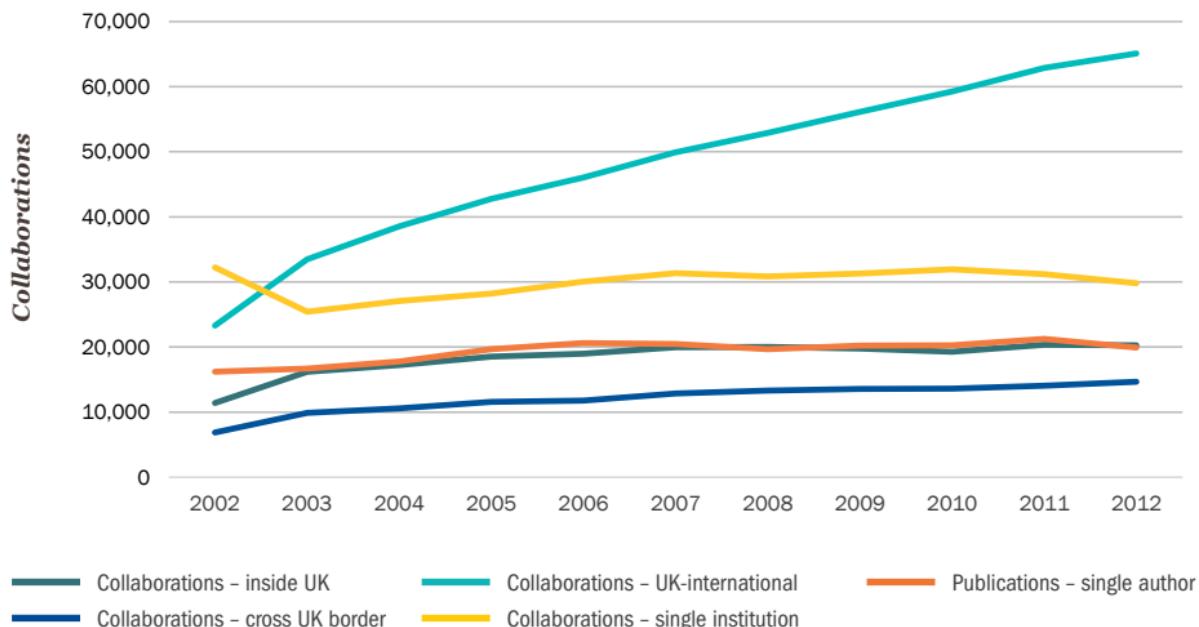
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<sup>6</sup> Universities UK (2017), *Downturn in UK participation in latest EU research programme statistics*

<sup>7</sup> BEIS (2017), *International comparative performance of the UK research base 2016*

## UK RESEARCH IS INCREASINGLY COLLABORATIVE

UK research collaborations, both domestic and international, are far more frequent than they were 15 years ago.

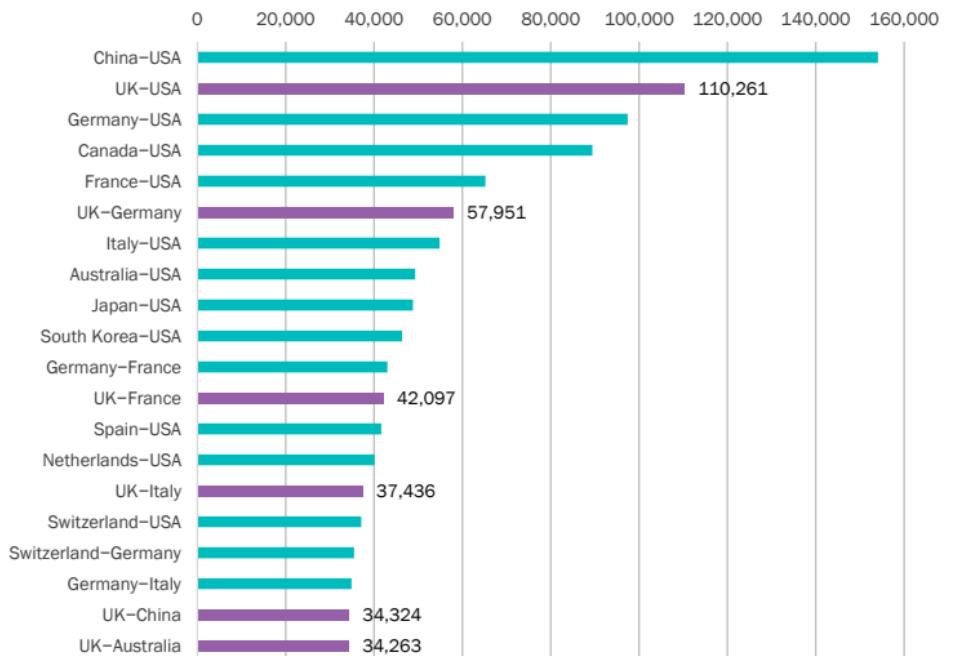


Note: these data sets are not mutually exclusive, and collaborations may occur across more than one category.

## UK RESEARCH IS INVOLVED IN MAJOR GLOBAL PARTNERSHIPS

The UK was involved in six of the 20 largest global collaborations by volume between 2011 and 2015, demonstrating the importance of the UK to the international research base.

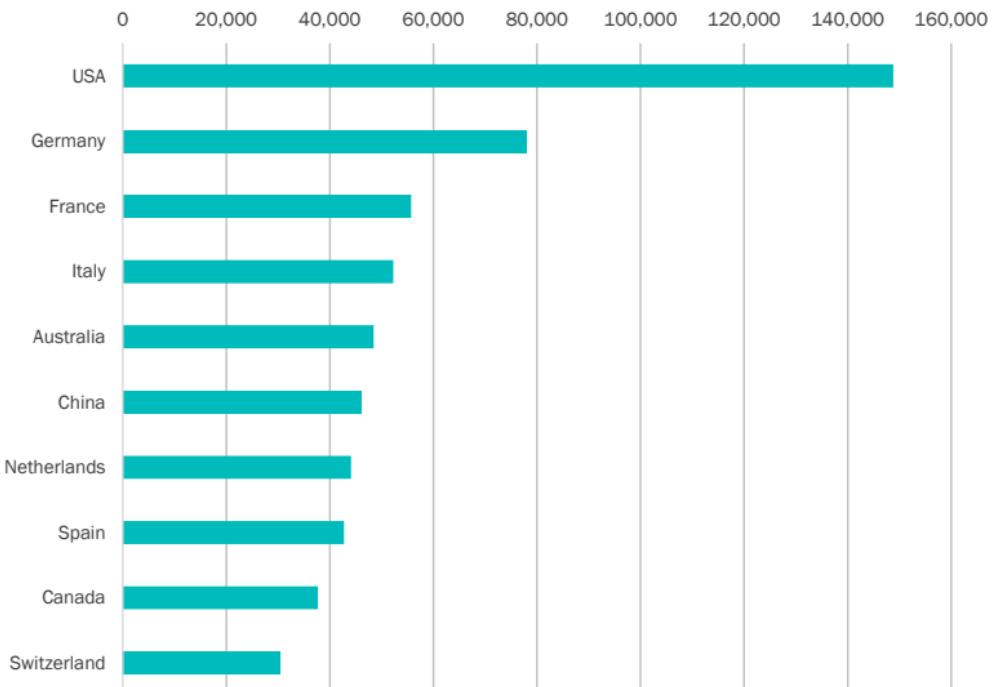
*Co-authored articles with the UK 2011 to 2015*



## UK RESEARCH IS INTERNATIONAL IN SCOPE

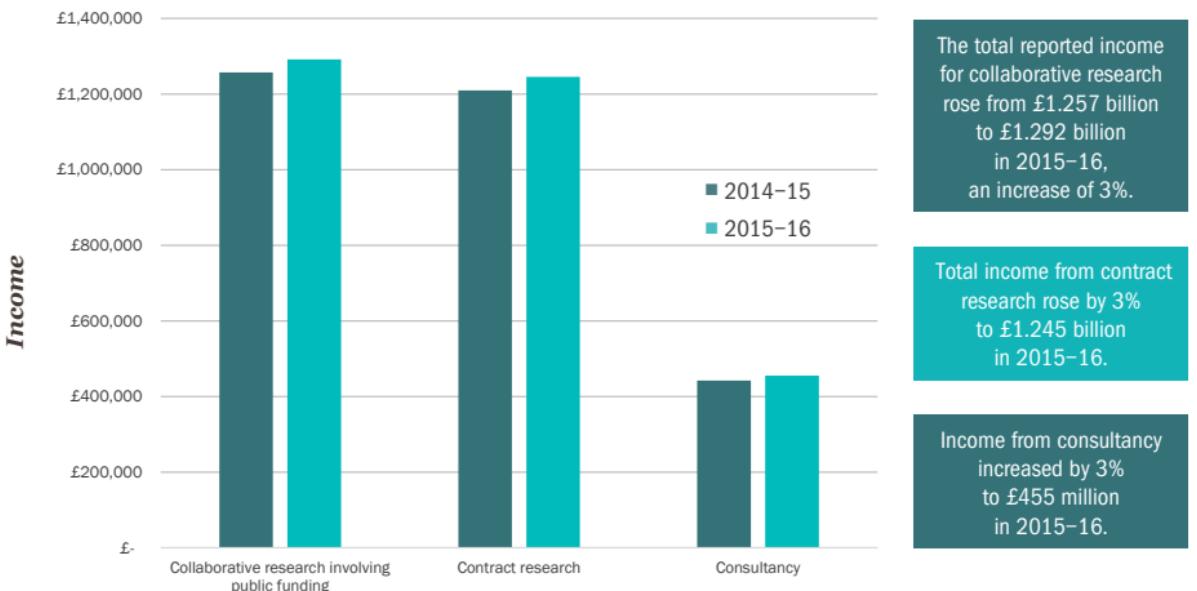
Six of the UK's top 20 international collaboration partners are from Europe.

*Co-authored articles 2011 to 2016*



## UK RESEARCH INTERACTS WITH MANY PARTS OF THE UK ECONOMY

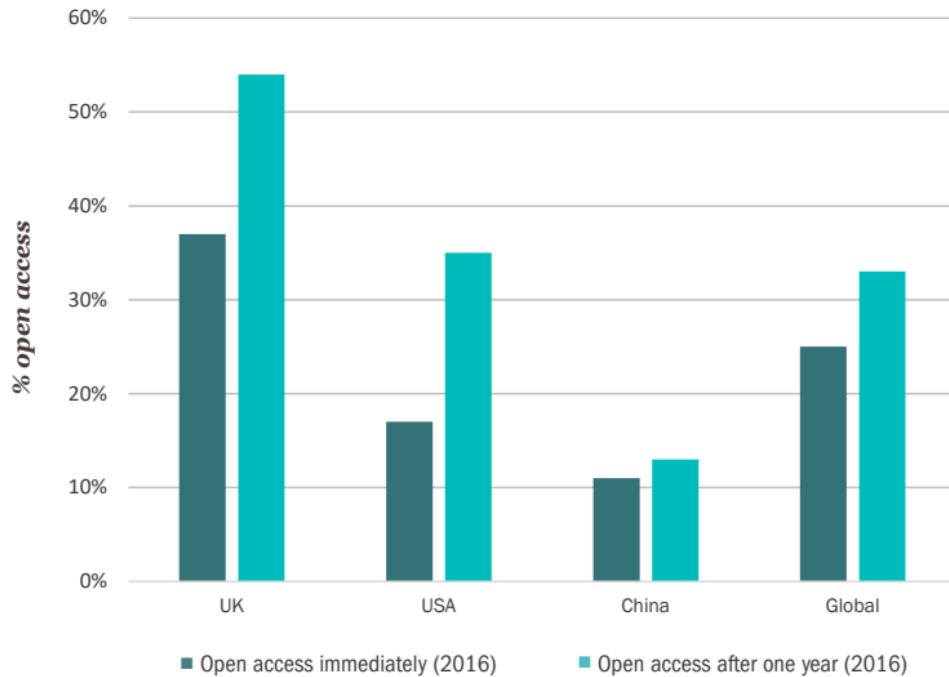
Research-based interactions cover a range of activities, from fundamental collaborative research, to interactions closer to the market with a range of partners. 2015–16 saw the creation of 150 new spin-off companies with some university ownership, up from 133 in 2014–15, and the creation of 60 staff start-ups.<sup>8</sup>



<sup>8</sup> For more information, visit the [HEFCE website](#).

## UK RESEARCH IS ACCESSIBLE

In 2016, 37% of UK research outputs were freely available to the world immediately at publication, up from 20% in 2014.<sup>9</sup>



<sup>9</sup> Universities UK (2017), *Monitoring the transition to open access*

## STUDENTS AND STAFF

In 2015, analysis by the British Council revealed that 38% of past Nobel Laureate winners who studied abroad, did so in the UK – more than any other country.<sup>10</sup> Clearly, UK universities attract top-class researchers from around the world.

There have been concerns about the future of the higher education research workforce, particularly in relation to the number of EU staff, and the lack of effective succession planning for research technicians.<sup>11</sup>

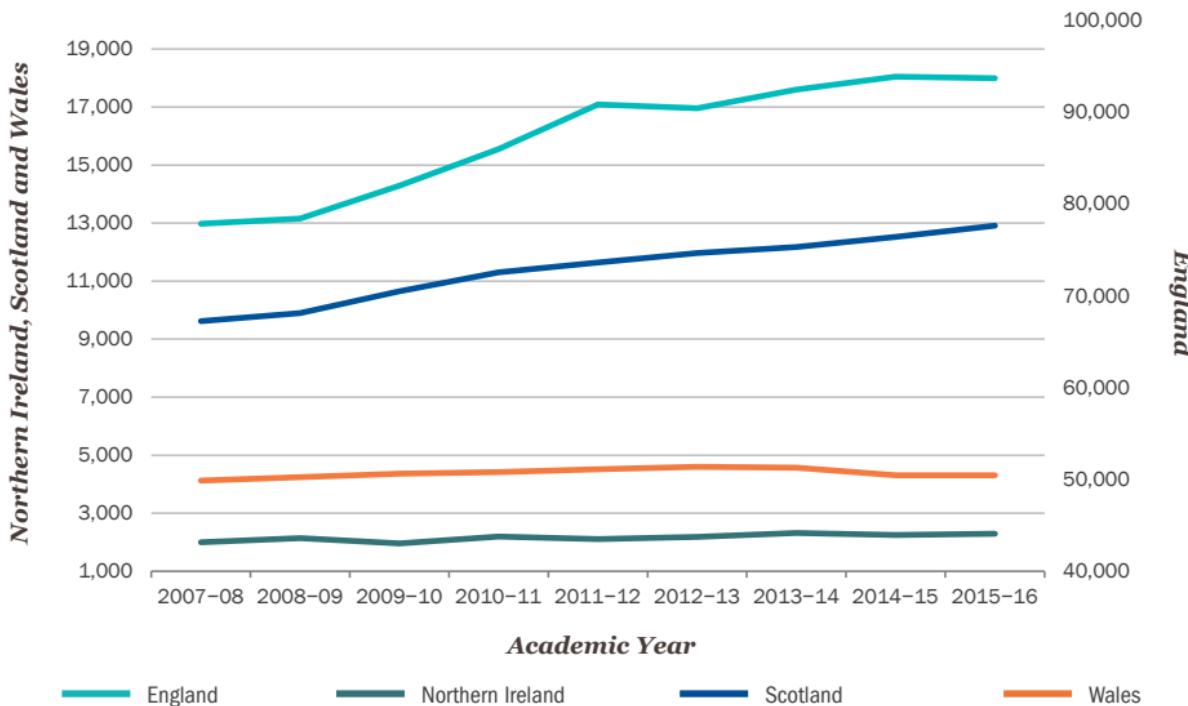
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<sup>10</sup> British Council (2015), *UK universities top destination for Nobel winners*

<sup>11</sup> Universities UK (2017), *International technicians vital for UK science and innovation*

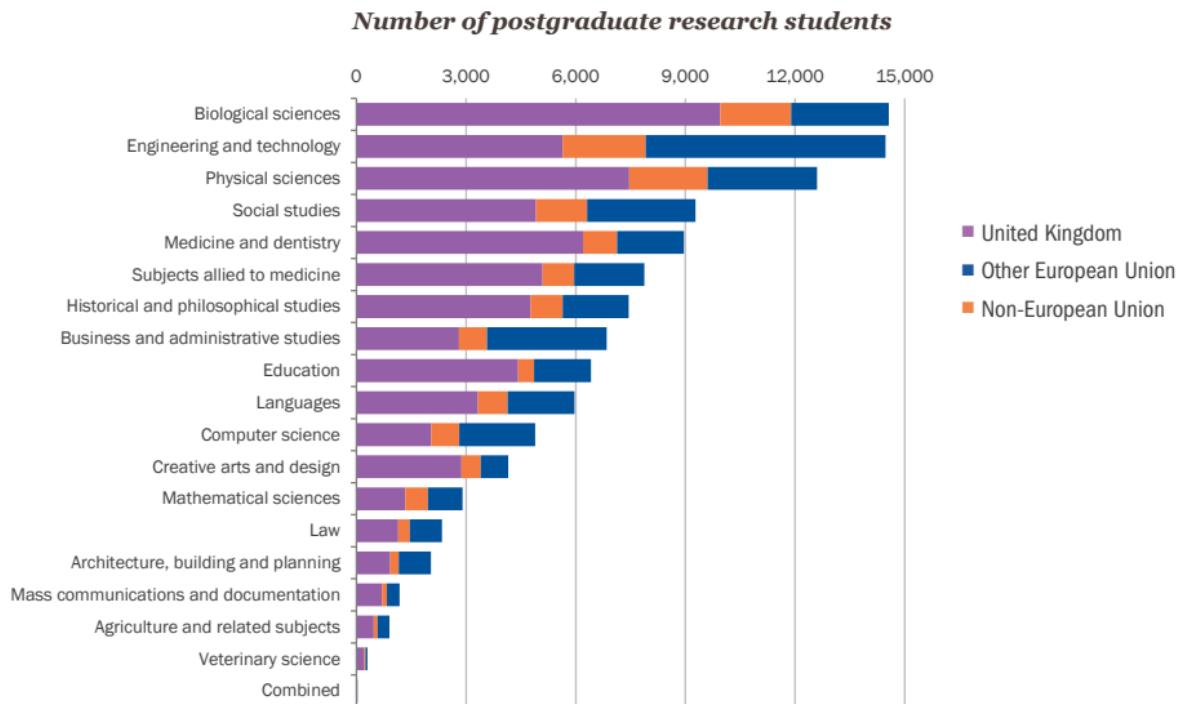
## UK UNIVERSITY RESEARCH STUDENT NUMBERS HAVE INCREASED

Since 2007–08, all home nations have seen increases in the number of postgraduate research students.



## UK UNIVERSITY RESEARCH STUDENTS ARE DIVERSE

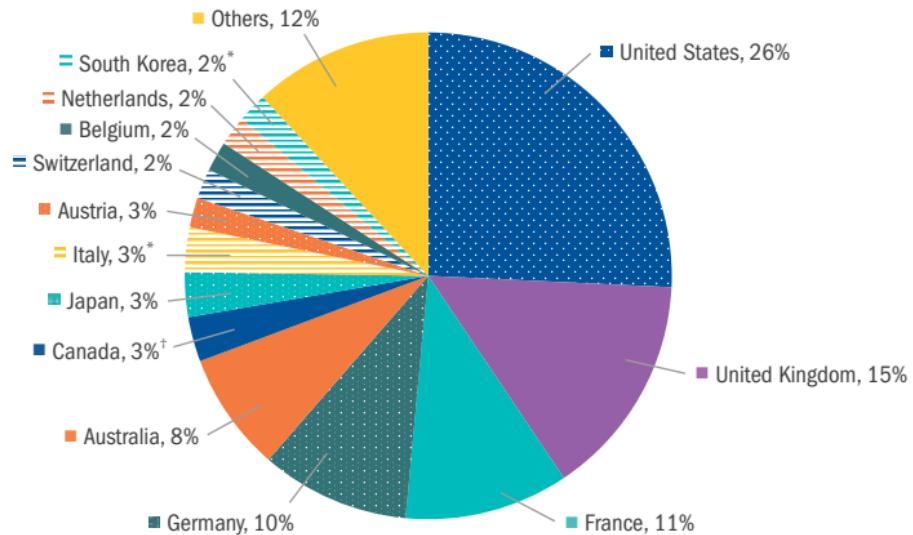
In 2015–16, the number of international students on postgraduate research courses were highest for engineering and technology, business and administrative studies, and computer science.



## UK UNIVERSITIES ARE HIGHLY POPULAR DESTINATIONS

In 2014, the UK was the second most popular OECD country for international students studying for masters or doctoral degrees (15%), behind the United States (26%).

*Distribution of masters and doctoral students in OECD countries, 2014*



\* Year of reference: 2013

† Data refers to foreign instead of international students.

## UK UNIVERSITIES ARE INCREASINGLY RELIANT ON INTERNATIONAL ACADEMIC STAFF

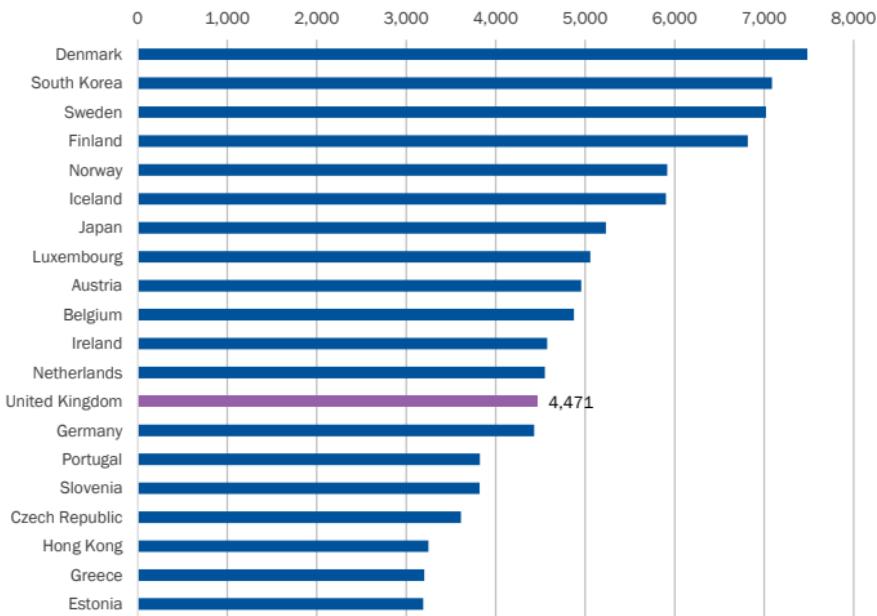
The proportion of non-UK academic staff in research-only roles at UK higher education institutions has increased considerably, from 34% in 2004–05 to 47% in 2015–16.

<i>Employment function</i>	<i>2004–05</i>			<i>2015–16</i>		
	<i>UK</i>	<i>EU</i>	<i>Non-EU</i>	<i>UK</i>	<i>EU</i>	<i>Non-EU</i>
<b><i>Research only</i></b>	22,610	5,485	6,415	25,445	12,575	9,575
<b><i>Teaching only</i></b>	27,395	2,450	2,080	40,205	6,550	4,490
<b><i>Teaching and research</i></b>	68,145	5,815	6,150	72,915	14,520	10,400
<b><i>Neither teaching nor research</i></b>	1,590	150	280	1,345	95	70
<b>Total</b>	<b>119,740</b>	<b>13,895</b>	<b>14,930</b>	<b>139,910</b>	<b>33,735</b>	<b>24,535</b>

## UK RESEARCHER NUMBERS ARE COMPARATIVELY LOW GLOBALLY

In 2015, despite the high level of research outputs, the UK was outside the top 10 countries in terms of researchers in research and development per million people.

*Researchers in research and development per million people, 2015*



## **FINANCES**

In 2015–16, UK universities received £7.8 billion in research income, of which 36% was from non-UK government sources and 16% from other overseas sources. EU sources accounted for a fifth of the total increase in research income between 2006–07 and 2015–16.

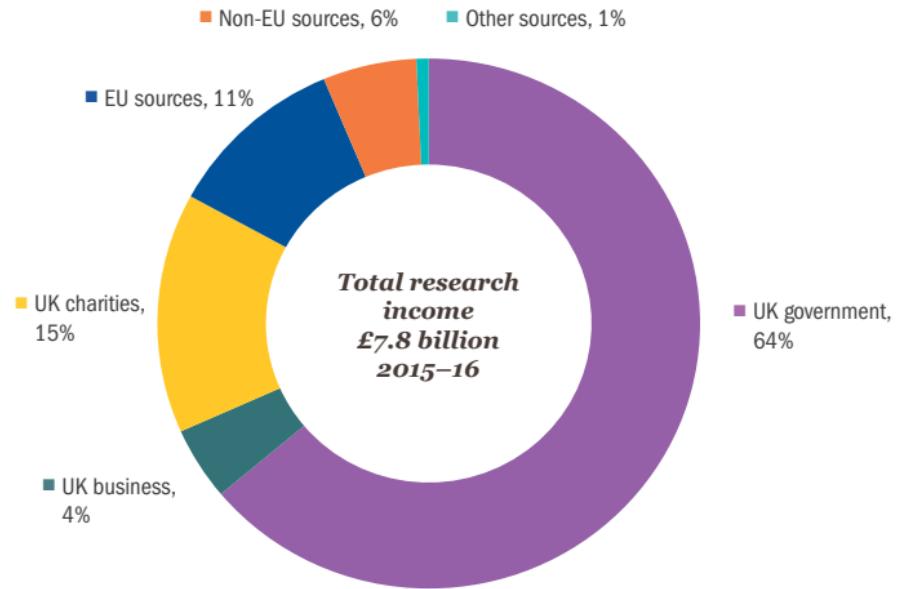
In 2015, total research and development expenditure in the UK was 1.68% of GDP, below the EU estimate of 2.03% of GDP and the 11<sup>th</sup> highest of member countries.<sup>12</sup>

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<sup>12</sup> ONS (2017), *UK gross domestic expenditure on research and development: 2015*

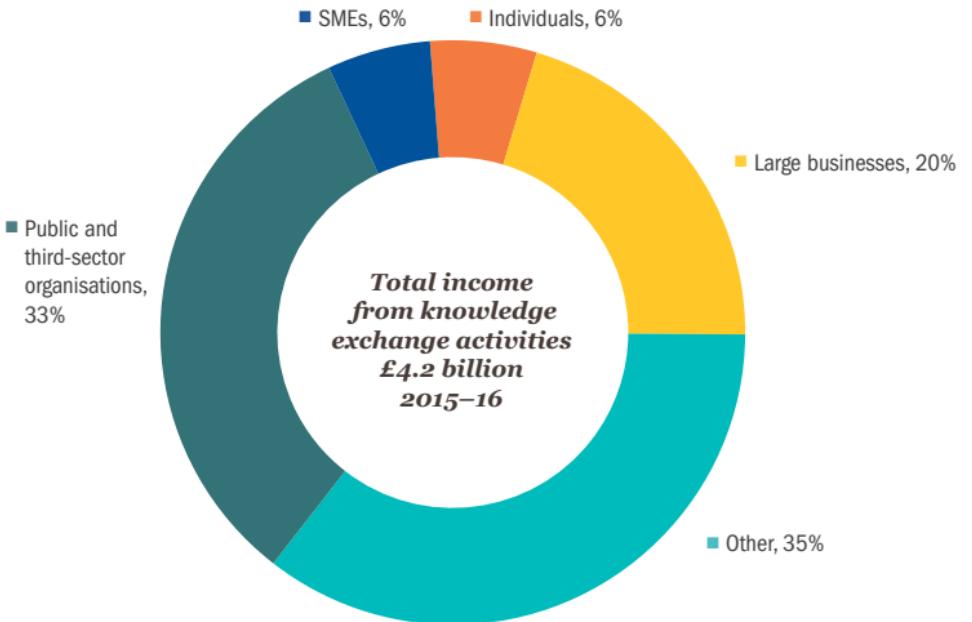
## MORE THAN £1 BILLION OF RESEARCH INCOME IS FROM OVERSEAS

In 2015–16, UK universities received £7.8 billion in research income. £840 million came from EU sources and £440 million from non-EU sources. The UK's exit from the EU presents particular challenges in relation to continued access to research funding from EU sources.



## KNOWLEDGE EXCHANGE ACTIVITIES GENERATE SIGNIFICANT INCOME

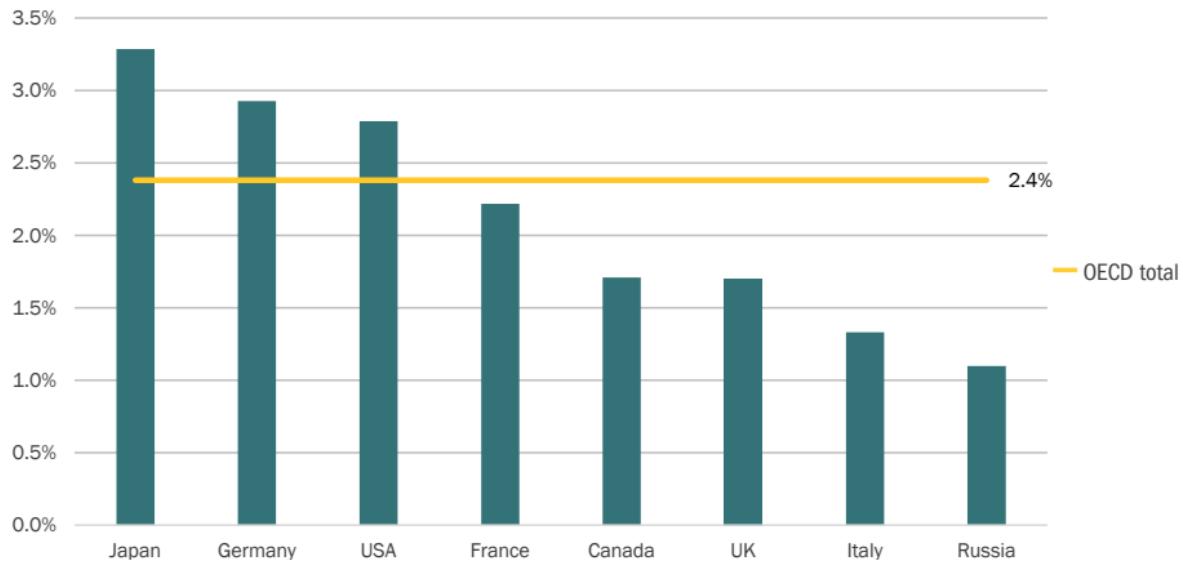
An increasingly important income stream for universities is the funding that they generate from knowledge-exchange activities through the provision of continuing professional development, consultancy services, facilities and equipment-related services, and income from intellectual property. University income from these activities amounted to £4.2 billion in 2015–16.



## GROSS DOMESTIC EXPENDITURE ON RESEARCH AND DEVELOPMENT

The UK invests significantly less in research and development than many other countries. In 2015, UK research and development expenditure was 1.7% of GDP, below the OECD figure of 2.4%. In November 2017, the UK government announced it will work with industry to increase spending to 2.4% of GDP by 2027.<sup>13</sup>

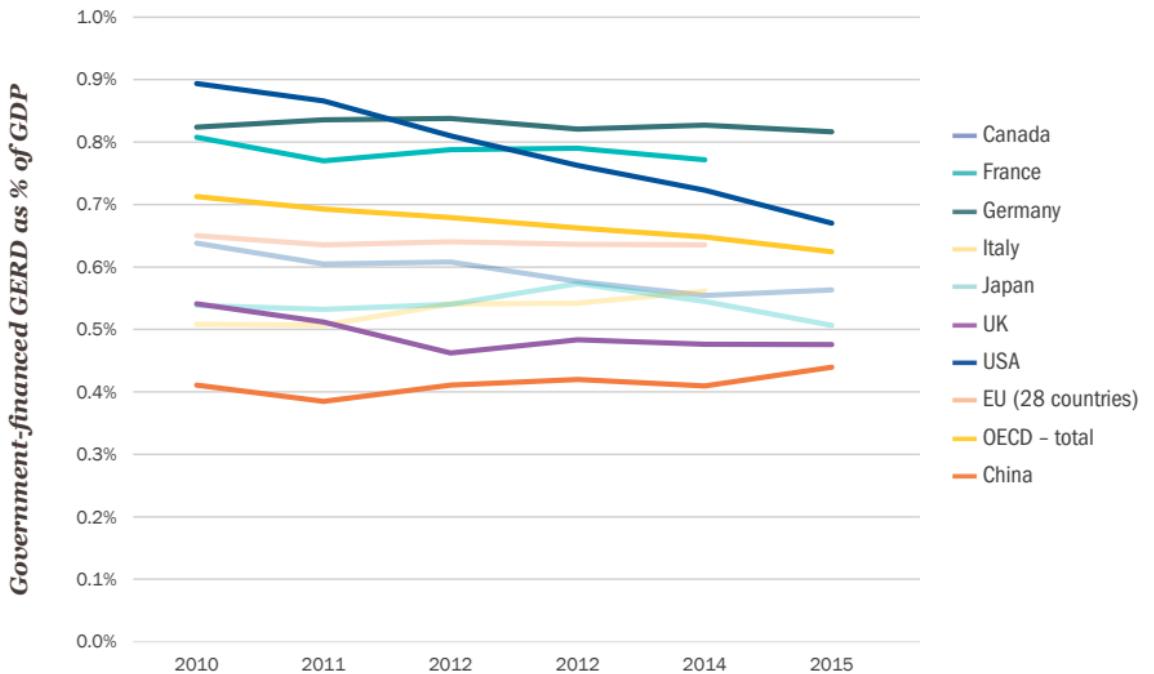
***Gross domestic spending on research and development as % of GDP***



<sup>13</sup> UK government (2017), [Record boost to R&D and new transport fund to help build economy fit for the future](#)

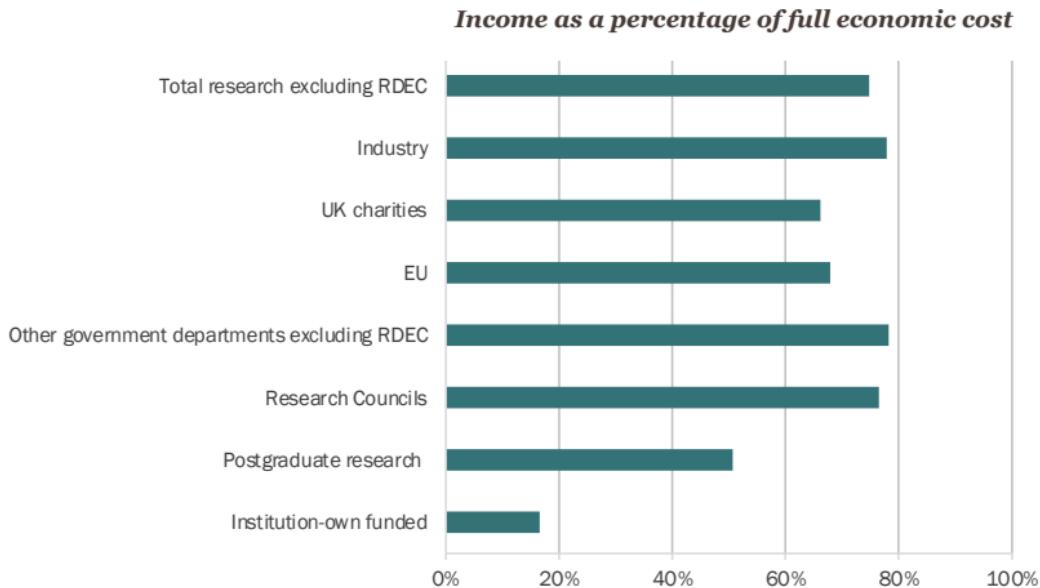
## GOVERNMENT-FINANCED GROSS DOMESTIC EXPENDITURE ON RESEARCH AND DEVELOPMENT

UK government spending on research and development is consistently below the OECD figure as a proportion of GDP.



## FULL ECONOMIC COSTING OF RESEARCH

Evidence at a national level\* suggests that the income universities receive to carry out research does not fully cover the costs of research. In 2015–16 UK universities received just 74.6% of the funding needed to cover the full economic costs of research.<sup>14</sup>



\* Based on TRAC returns.

Note: research and development expenditure credit (RDEC) gives Corporation Tax relief to companies that do research and development.

<sup>14</sup> HEFCE (2017), *TRAC data 2015–16: sector analysis*

## UK RESEARCH CONTRIBUTES TO ECONOMIC GROWTH

Recent research estimates that research and development performed by UK universities in 2014–15 will deliver a stream of benefits into the future.<sup>14</sup> If these are discounted into a net present value in 2014–15, they equate to a £28.9 billion increase in gross value added. This is equivalent to £1,071 per household in the UK.<sup>15</sup>

Research performed by  
UK universities in 2014–15  
equates to a

**£28.9 billion  
increase**

in gross value added.

<sup>15</sup> Universities UK (2017), *The economic impact of universities in 2014–15*

## GLOSSARY

### **Citation (Elsevier definition)**

Formal references to earlier work made in an article or patent.

### **Collaborative research**

Academic research with public sponsorship and at least one other external partner.

### **Consultancy**

Advice and work crucially dependent on a high degree of intellectual input from the university to the client, but without the creation of new knowledge.

### **Contract research**

May be fundamental or applied, but meets the specific research needs of external partners.

### **Doctoral/doctorate**

The highest level of study/degree offered by a university.

### **Domicile**

A student's permanent country of residence.

### **Downloads (Elsevier definition)**

Where a user views the full-text HTML or downloads the full-text PDF of an article from ScienceDirect – Elsevier's full-text journal article platform.

### **Digital readership (Elsevier definition)**

The number of Mendeley users who have added a particular article to their personal library.

### **Elsevier**

An information and analytics company, and provider of scientific and medical information.

### **Full economic costing (FEC)**

The UK government requires universities to estimate the full cost of their research projects. This includes costs related to academic staff; training of postgraduate research students; fieldwork; laboratory and studio work; maintaining and replacing infrastructure; and investing in innovation.

### ***Gross domestic product (GDP)***

The market value of all officially recognised final goods and services produced within a country in a given period of time.

### ***Gross expenditure on research and development (GERD)***

Total intramural expenditure on research and development performed on the national territory during a given period.

### ***Higher education institutions***

In 2015–16, there were 162 higher education institutions in the UK in receipt of public funding via one of the UK funding councils.

### ***Higher Education Statistics Agency (HESA)***

HESA collects, processes, and publishes data about higher education in the UK.

### ***High-skill employment (ONS definition)***

Occupations at this level are generally termed as ‘professional’ or ‘managerial’ positions, such as accountants; engineers; medical doctors; scientists; and teachers.

### ***OECD***

The Organisation for Economic Co-operation and Development.

### ***Research Assessment Exercise (RAE) 2008***

The primary purpose of the RAE 2008 was to produce quality profiles for each submission of research activity made by institutions. The UK’s four funding bodies used the submissions to determine their grant for research to the institutions.

### ***Research Excellence Framework (REF)***

The system for assessing the quality of research in UK higher education institutions. The last assessment took place in 2014, and the next assessment is scheduled for 2021.

### ***Transparent approach to costing (TRAC)***

A government initiative to enable universities to manage on a more financially sustainable basis. The TRAC methodology is used to calculate full economic costs.

## SOURCES

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British Council (2015), [UK universities top destination for Nobel winners](#)

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HESA Finance Plus [2015–16]\*

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HESA Student Record [2015–16]\*

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Universities UK (2017), [International technicians vital for UK science and innovation](#)

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## UNIVERSITIES UK

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