HOUSE OF COMMONS LIBRARY

DEBATE PACK

Number 2021/0035, 15 March 2021

The future of research and development spending

By Louise Smith, Matthew Ward

Summary

There will be a Westminster Hall debate on the future of research and development spending on Wednesday 17th March at 2:30 pm.

The debate has been initiated by Daniel Zeichner MP.

Contents

1. Background

1.1 What is R&D funding and spending?

Broadly, research and development funding covers expenditure on research, predominantly in science and technology, that results in new products, processes and understanding. It includes research undertaken in, and funded by, the public and private sectors (for example universities and businesses).

R&D is measured by the amount spent **performing** R&D by an organisation, or the **funding** provided to perform R&D. These are not always the same – for example, the higher education sector in the UK *performs* R&D worth around £8.7 billion, but the sector only provides direct *funding* for R&D worth £211 million.

These two ways of measuring R&D spending are different ways of analysing the same overall total expenditure for R&D, known as Gross Expenditure on R&D (GERD). GERD is the preferred way of measuring R&D spending in the UK, and for comparing R&D spending in different countries.

1.2 Statistics on R&D

Total R&D funding

In the UK in 2018, total R&D (gross expenditure on research and development) was £37.1 billion, the equivalent of 1.7% of GDP. This was £558 per head.[1]

[1] Unless otherwise stated, the data in this briefing paper is from ONS, *Gross expenditure on Research and Development*, 2019

Total Research & Development spending in the UK

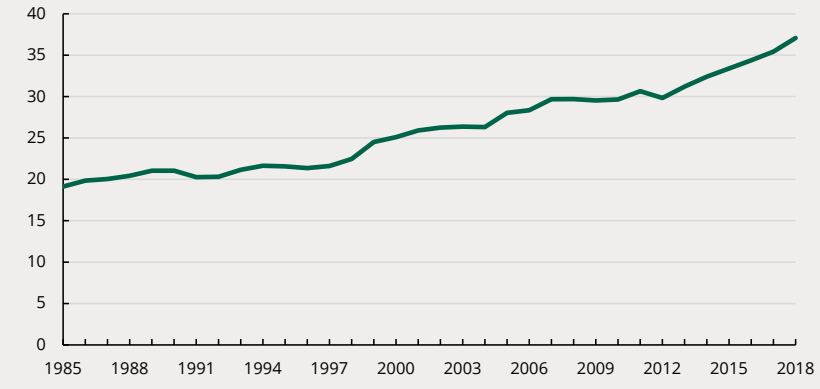
	£ billion (current)	£ billion (2018 prices)	% of GDP	£ per head
2000	17.6	25.1	1.6%	298.6
2001	18.4	25.9	1.6%	310.8
2002	19.0	26.3	1.6%	320.9
2003	19.5	26.4	1.5%	327.4
2004	20.0	26.3	1.5%	334.1
2005	21.9	28.0	1.5%	361.9
2006	22.7	28.4	1.5%	373.7
2007	24.4	29.7	1.6%	398.5
2008	25.1	29.7	1.6%	405.5
2009	25.3	29.5	1.6%	407.0
2010	25.9	29.7	1.6%	412.4
2011	27.2	30.7	1.6%	429.2
2012	27.0	29.8	1.6%	423.5
2013	28.8	31.2	1.6%	448.8
2014	30.3	32.4	1.6%	468.8
2015	31.5	33.4	1.6%	483.4
2016	33.2	34.4	1.6%	505.4
2017	34.8	35.4	1.7%	526.6
2018	37.1	37.1	1.7%	558.0

Source: ONS, GERD statistics, 2019; Series GLBA, GLBD, GLBD; Gross expenditure on research and development per head data uses ONS population estimates and current price data

R&D investment in the UK has risen steadily over the past thirty years, from £19.1 billion in 1985 to the current total of £37.1 billion (in 2018 prices). This is a real terms increase of 94% over the period.

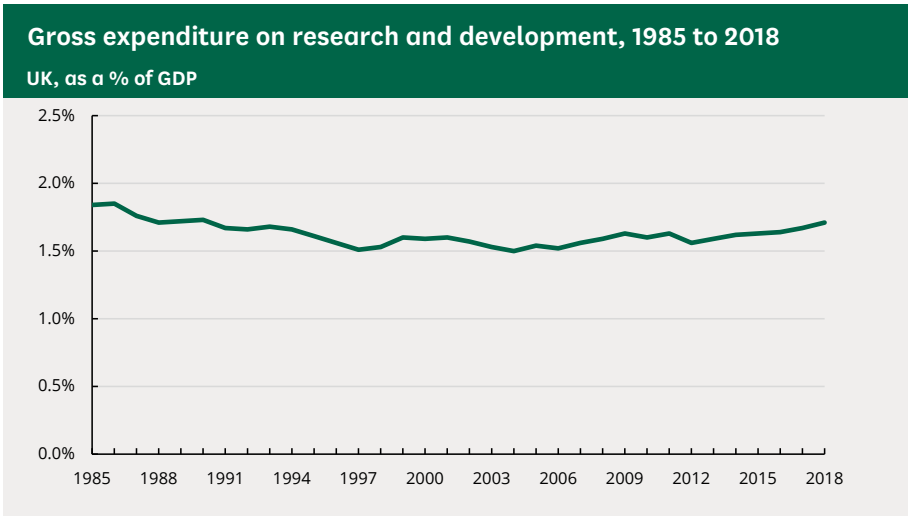
Gross expenditure on research and development, 1985 to 2018

UK, £ billion, 2018 constant prices



Source: ONS, Series GLBD

However, over the same period, R&D expenditure has fallen slightly as a proportion of GDP. R&D expenditure was the equivalent of 1.9% of GDP in 1986, compared to the 2018 figure of 1.8% of GDP. R&D expenditure as a % of GDP has risen slightly in each year since 2012.



Source: ONS, Series GLBH

In its Industrial Strategy (published in November 2017), the Government set a target to "…raise total R&D investment to 2.4% of GDP by 2027".[2] For further information about this target see section 1.3 below.

Increasing expenditure on R&D to the equivalent of 2.4% of GDP would lead to a record level of R&D investment in the UK. At 2.4% of GDP, R&D expenditure in the UK would match the current OECD average (2.4% of GDP).

R&D performance and funding

The following table shows the sectors funding and performing R&D in 2018.

Total public funding of R&D, including research councils and devolved higher education funding councils, was £9.6 billion.

The business/enterprise sector performed £25.0 billion of R&D in 2018. £19.8 billion of this was funded by the business/enterprise sector, whilst £6.0 billion was funded by overseas sources, and £1.2 billion was funded by the government.

[2] Department for Business, Energy & Industrial Strategy, Industrial Strategy, 2017, p11

Total expenditure on R&D, by performing and funding sectors

£ million, 2018, UK

	Sector performing R&D						
	Government	UK Research & Innovation	Higher Education	Business Enterprise	Private Non-Profit	**Total**	Overseas
Sector funding R&D							
Government	1,296	150	380	1,190	113	**3,129**	649
Research Councils	51	626	2,600	530	189	**3,996**	84
HE Funding Councils	-	-	2,492	-	-	**2,492**	0
Higher Education	4	18	-	179	10	**211**	0
Business Enterprise	16	54	389	19,832	25	**20,315**	5,955
Private Non-Profit	34	38	1,318	67	402	**1,860**	0
Overseas	97	75	1,562	3,250	84	**5,069**	0
Total	**1,498**	**962**	**8,740**	**25,048**	**823**	**37,072**	-
of which:							
Civil	1,331	962	8,693	23,363	810	**35,159**	-
Defence	168	-	47	1,685	14	**1,913**	-

Source: ONS, Gross expenditure on R&D, Data table 1

R&D by sector

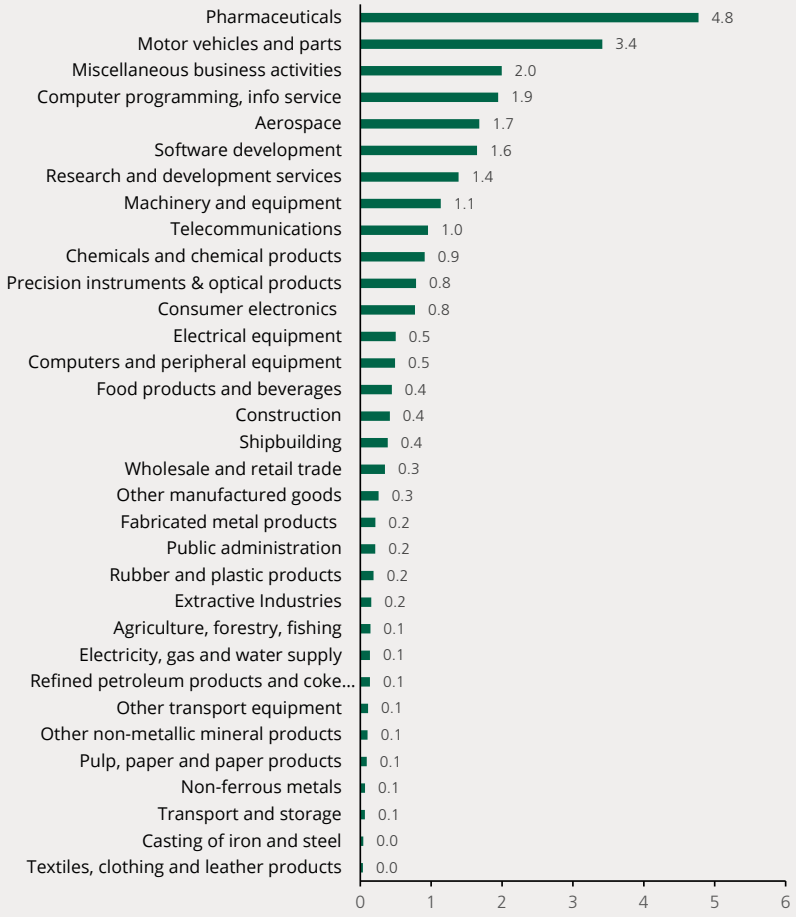
Expenditure on R&D performed by businesses is available broken down by sector.[3]

In 2018, the pharmaceutical industry performed the most R&D in the UK – worth £4.8 billion. The automotive manufacturing industry performed the second most R&D, worth £3.4 billion.

3 ONS, Business enterprise R&D, 2020

Expenditure on R&D performed by businesses, by sector, UK

£ billion, 2019



Source: ONS, Business enterprise R&D, 2019, Data table 2

R&D: international comparisons

The following chart shows total R&D investment as a proportion of GDP in each of the Organisation for Economic Co-operation and Development (OECD) member countries and several other major economies such as China.[4]

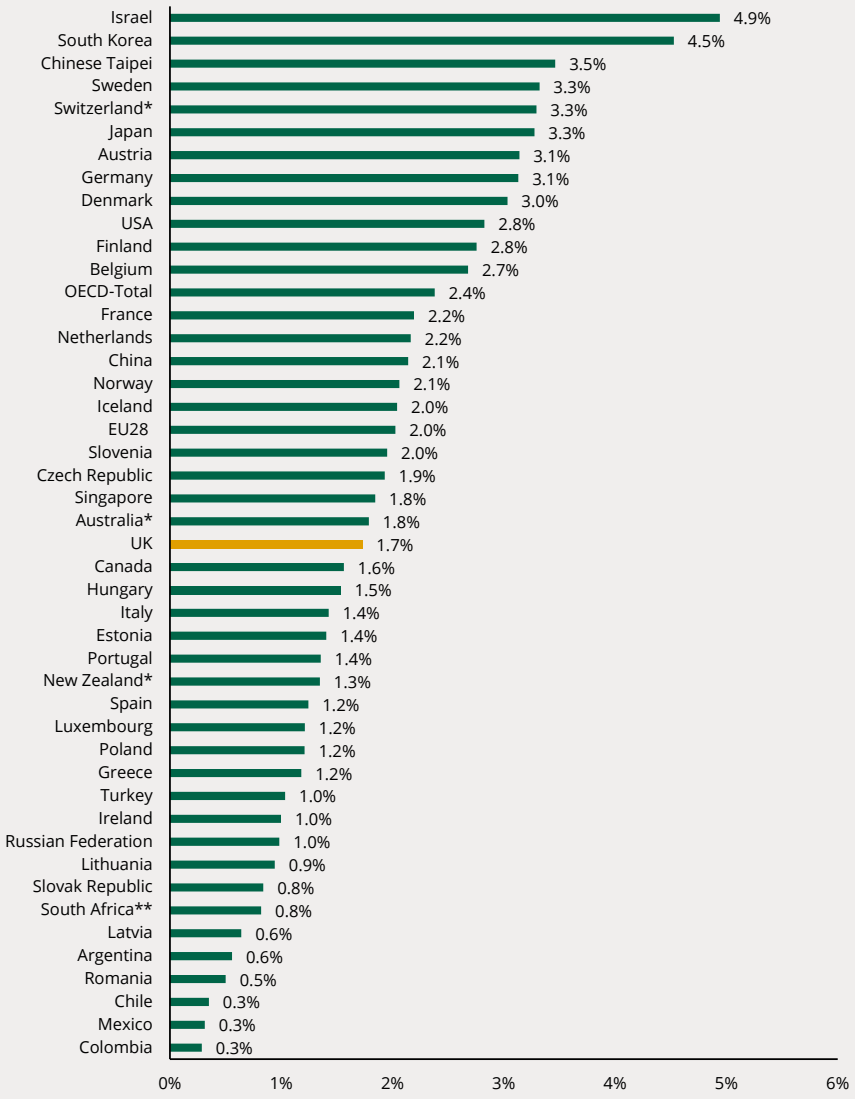
UK R&D investment equivalent to 1.7% of GDP in 2018 is below the EU28 average of 2.0%, and below the OECD average of 2.4%.

UK has a lower level of R&D investment than competitor countries such as the France (with R&D investment equivalent to 2.2% of GDP), the US (2.8%) and Germany (3.1%).

[4] OECD, Main science and technology indicators, Issue 2019, Volume 2

Gross expenditure on R&D as % of GDP

OECD and selected countries, 2018



*=2017; **=2016

Source: OECD, Main Science and Technology Indicators, Volume 2019, Issue 2

1.3 Government investment in R&D

Public funding for R&D (including government, research councils and the devolved higher education funding councils) was £9.6 billion in 2018, 26% of total R&D funding.[5]

How does the UK Government invest in R&D?

The majority of public expenditure on R&D comes from the Department for Business, Energy and Industrial Strategy (BEIS). Other Government Departments (for example the Ministry of Defence) have their own separate R&D funding streams.

In turn, the majority of BEIS funding for R&D is allocated to UK Research and Innovation (UKRI). UKRI was launched in April 2018 as a non-departmental public body sponsored by BEIS. UKRI brings together the seven disciplinary research councils,[6] Research England, (which is responsible for supporting research and knowledge exchange at higher education institutions in England), and the UK's innovation agency, Innovate UK.[7]

The Secretary of State for BEIS allocates funding to UKRI and constituent Councils through grants. UKRI cannot change these allocations. The vast majority of the funding allocated to UKRI's individual councils comes from the BEIS Research and Innovation budget. Funding is distributed to researchers through competitively allocated grant funding from the seven Research Councils as well as block grants to higher education institutions by Research England. Innovate UK uses its allocation to support business innovation.

The Royal Society UKRI explainer (PDF, October 2019) provides an overview of UKRI's responsibility, oversight and budget.[8]

Through UKRI the Research Councils and Innovate UK carry out activities reserved for the UK government and so operate across the UK. Funding of Higher Education Institutions is a devolved matter and so a similar function to Research England is performed by Higher Education Funding Council Wales (HEFCW), the Scottish Funding Council (SFC), and the Department for the Economy (Northern Ireland).[9]

The Industrial Strategy 2.4% target

The Government's 2017 Industrial Strategy committed the UK to spending 2.4% of GDP on R&D by 2027 and 3% in the 'longer-term' (including both public and private sector spending).[10]

Increasing expenditure on R&D to the equivalent of 2.4% of GDP would lead to a record level of R&D investment in the UK. At 2.4% of GDP,

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5 ONS, Gross domestic expenditure on research and development, UK: 2018, 2 April 2020
6 For further information about the research councils see UKRI, Our research councils [downloaded 10 March 2021]
7 UKRI website, Who we are [downloaded on 10 March 2021]
8 Royal Society, UK Research and Innovation, 3 October 2019
9 Royal Society, How does the UK government invest in R&D?, November 2017
10 Department for Business, Energy & Industrial Strategy, Industrial Strategy, 2017

R&D expenditure in the UK would match the current OECD average (2.4% of GDP).

In giving evidence (in November 2018) to the Science and Technology Committee inquiry for its 'Balance and effectiveness of research and innovation spending', public innovation charity Nesta[11] described the 2.4% target as "monumentally ambitious" requiring a "sustained year-on-year increase that we have not seen in a generation".[12] Former Minister of State for Universities and Science, Lord Willetts, has suggested it was "ambitious by our historical standards but doable".[13] The ambitiousness of the target is also contentious. Former President of the Royal Society, Sir Paul Nurse, argued it was a "step in the right direction, but you cannot say that it is that ambitious" as other countries already fund at a rate above 2.4%.[14]

In their September 2019 report following the inquiry, the Committee welcomed the target but concluded it would be difficult to achieve:

> We welcome the Government's target for R&D spending which, if achieved, would represent a significant increase in the research intensity of the UK economy. However, the difficulty in achieving the target should not be underestimated, and will require successful coordination of public spending and further increases in private investment. [15]

In 2019, the then Science Minister highlighted that issues relating to the workforce and private investment are some of the key challenges the Government are likely to face in meeting this target.[16,17] An increase in the size of the workforce may be required to absorb the increased funding. The Minister estimated that 260,000 additional researchers working in R&D across universities, business and industry may be required.[18]

In July 2019, the Government estimated that an additional £12 billion per year of private investment will also be required to meet the 2.4% target.[19] Government programmes offering tax relief to encourage R&D investment, encouraging knowledge exchange between universities and industry and supporting the scale-up of innovative start-up businesses

11 Nesta (formerly NESTA, National Endowment for Science, Technology and the Arts) is an innovation foundation based in the UK
12 Science and Technology Committee, Balance and effectiveness of research and innovation spending, 20 November 2018, HC1453, Q2
13 Kings College London, The road to 2.4 per cent, 2019, pg 11
14 Ibid, Q3
15 Science and Technology Committee, Balance and effectiveness of research and innovation spending, 9 September 2019, HC1453, para 33
16 Reaching 2.4%: Securing the research talent of tomorrow, Chris Skidmore MP, 7 May 2019.
17 Becoming an Innovation Nation: Driving up private investment into research and development, Chris Skidmore MP, 10 July 2019
18 Ibid.
19 Ibid.

are expected to play a role in encouraging private investment in R&D.[20,21,22]

With regards to where R&D investment is made, concerns have been raised that there are significant disparities in how much R&D is spent per head across the UK, with most R&D spending occurring in the South East of England.[23] The Government have committed to using R&D expenditure to 'level up' the country and its regions, committing to publish an "ambitious Place Strategy for UK R&D" to build on regional strengths.[24] This is expected in Spring 2021.[25]

In 2019 the Government published an International Research and Innovation Strategy, which set out how the UK will develop international research and innovation partnerships to address global challenges and help achieve targets set out in the Industrial Strategy.[26]

The 2020 budget

The March 2020 budget set out plans to increase public investment in R&D to £22 billion per year by 2024-25.[27] Public expenditure on R&D was approximately £10 billion in 2018, including funding directly from government and that from research councils.[28] The increase has generally been welcomed by stakeholders in science research.[29] Examples of funding for specific sectors in the budget include:

- An investment of £900 million in "high-potential technology and sectors", including nuclear fusion, space, electric vehicles and life sciences.
- An extra £400 million in the year 2020-21 to support world-research, infrastructure and equipment.
- An investment of £300 million from 2020-21 to 2024-25 in mathematics research.
- An investment of £380 million in some of the UK's leading research institutions.
- An extra investment of £100 million in defence R&D in areas such as new aviation technology and space propulsion.
- An investment of £1.4billion over 10 years to enhance the UK's animal health infrastructure.

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20 Claim Research and Development (R&D) expenditure credit, HM Revenue and Customs [online] 7 June 2019 (accessed 16 June 2020).
21 Knowledge exchange framework (KEF), UKRI [online] (accessed 16 June 2020).
22 £2.5BN British Patient Capital Programme Launched To Enable Long-Term Investment In Innovative Companies Across the UK, British Business Bank [online] 13 June 2018 (accessed 1 June 2020).
23 Gross domestic expenditure on research and development, UK: 2017, ONS [online] 14 March 2019 (accessed 16 June 2020), section 7.
24 Boost for UK science with unlimited visa offer to world's brightest and best, Home Office et al. [online] 27 January 2020 (accessed 16 June 2020).
25 GOV.UK, R&D Place Advisory Group [downloaded 10 March 2021]
26 HM Government, International Research and Innovation Strategy, 2019
27 HM Treasury, Budget 2020, 2020, section 2.22.
28 Gross domestic expenditure on research and development, UK, ONS Dataset [online] 2 April 2020 (accessed 17 June 2020).
29 Budget 2020: Supercharged Science, Campaign for Science and Engineering [online] 11 March 2020 (accessed 16 June 2020).

On 29 May 2020, BEIS published allocations of R&D funding to BEIS programmes and partner organisations for the year 2020/21 totalling £10.36 billion.[30]

Spending Review 2020

In the November 2020 Spending Review (SR20), the Treasury announced what it called "significant increases in research and development (R&D)", with "almost £15 billion in 2021-22 including funding for clinical research to support delivery of new drugs, treatments and vaccines."[31]

SR20 also announced some specific R&D investments in fields of defence, international collaboration, healthcare and immigration. There was also specific support for Covid-19 vaccines and support for innovation:

> 1. SR20 confirms that the government has now made available more than £6 billion in total to develop and procure Covid-19 vaccines. Of that, SR20 confirms £733 million in 2021-22 for the UK Vaccines Taskforce to purchase successful vaccines and £128 million for research and development (R&D) and vaccines manufacturing. Further funding will be allocated from the Covid-19 reserve as needed.
>
> (…)
>
> 2. up to £17 million in 2021-22 to establish a new unit and fund that will focus on the last mile of innovation to help ensure that public sector knowledge assets (R&D, intellectual property and other intangible assets) translate into new high-tech jobs, businesses and economic growth
>
> 3. £450 million in 2021-22 to support government priorities, drive the development of innovative ways to build new science capability and support the whole research and innovation ecosystem. SR20 allocates £350 million of this investment to UK Research and Innovation. This includes the first £50 million towards an £800 million investment by 2024-25 in high-risk, high-payoff research.
>
> Supporting innovators is vital to ensure that the UK translates its world class research into technological breakthroughs, enhancing the productivity and competitiveness of UK business. That is why the government is committed to raising economy-wide investment in R&D to 2.4 per cent by 2027. Innovative businesses require access to growth capital and funding for high-risk, high-reward innovation activities. Innovate UK's grant programmes and the Catapult Network provide critical support for innovative small and medium-sized enterprises and SR20 provides at least £490 million for Innovate UK's core budgets next year. This will support high-tech firms across the UK in developing the technologies of the future. The government is investing in R&D across a wide range of areas, from 5G through to climate change programmes, driving innovation across the economy.[32]

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30 BEIS research and development budget allocations 2020 to 2021, BEIS [online] 29 May 2020 (accessed 16 June 2020).
31 HM Treasury, Policy paper Spending Review 2020, Updated 15 December 2020
32 HM Treasury, Policy paper Spending Review 2020, Updated 15 December 2020

The increased investment in R&D was generally welcomed by stakeholders.[33]

Budget 2021

The March Budget 2021 announced that the Government will carry out a review of R&D tax reliefs, with a consultation published alongside the Budget. This review has the objective of ensuring the UK remains a competitive location for cutting edge research, that the reliefs continue to be fit for purpose and that taxpayer money is effectively targeted.[34]

The Government also announced:

> 4. Future Fund: Breakthrough – Building on the government's Future Fund, the government will commit £375 million to introduce Future Fund: Breakthrough, a new direct co-investment product to support the scale up of the most innovative, R&D-intensive businesses. The British Business Bank will take equity in funding rounds of over £20 million led by private investors to ensure these companies can access the capital they need to grow and bring prosperity to communities across the UK.
>
> (…)
>
> 5. Energy innovation – In line with the commitment to double spending on energy innovation, the government is announcing support for the development of new solutions to cut carbon emissions and accelerate near-to-market low-carbon energy innovations:
>
> a) the launch of a £20 million programme to support the development of floating offshore wind technology across the UK
>
> b) the launch of a new £68 million UK-wide competition to implement several first-of-a-kind energy storage prototypes or technology demonstrators
>
> c) a £4 million UK-wide competition for the first phase of a biomass feedstocks programme, to support the rural economy in making improvements to the production of green energy crops and forestry products.[35]

Commentators welcomed the funding that was announced, but concerns were raised that it had not offered any further clarity on the source of funding for association to the EU funding programme called Horizon Europe (for more on Horizon Europe see section 1.5 below):

> "Today's budget does not provide any clarity on the source of funding for association to Horizon Europe, expected to be around £2 billion a year, which may mean significant funds will need to be found from core R&D budgets," said Tim Bradshaw, chief executive of the Russell Group of the UK's top research universities.
>
> Royal Society president Adrian Smith said, "We are disappointed that the government has not used this opportunity to announce

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33 See for example, Campaign for Science and Engineering, CaSE responds to 2020 Spending Review, 25 November 2020
34 HM Treasury, Budget 2021 (HTML), 3 March 2021
35 HM Treasury, Budget 2021 (HTML), 3 March 2021

> additional funding for the UK's association to Horizon Europe but look forward to further announcements. A real term decrease at this time would send the wrong signal to a sector that will be key to a successful recovery."[36]

1.4 A new funding body

The 2020 Budget proposed spending, "at least £800 million" on the establishment of a new "blue skies" research agency, a pledge also outlined by the Conservative party in the 2019 General Election.[37] The establishment of this agency was first announced in the October 2019 Queen's Speech which proposed:[38]

> …a new approach to funding emerging fields of research and technology. It will provide long term funding to support visionary high-risk, high-pay off scientific, engineering, and technology ideas...

The October 2019 Queen's Speech briefing note explained that this would be "broadly modelled on the US Advanced Research Projects Agency" (ARPA). The US Government's "Defense Advanced Research Projects Agency" (DARPA), which evolved from ARPA, funds high-risk, high reward research. Its budget in financial year 2019–20 was approximately £2.65bn.[39]

The House of Commons Science and Technology Committee published a report into A new UK research funding agency, in February 2021.[40] The Committee's report concluded that, on balance, there would be a role for a new body to drive research:

> We consider on balance that there can be a role for a body that sits outside and operates in a different way to the established UK research funding mechanisms, with a different culture and which is able to operate free of some of the structures that are necessary for the dominant research funding institution. We conclude that UK ARPA can play an important role in the research and innovation system by pursuing goal-oriented research, driven by societal need, with the potential to produce lasting, transformational changes. We recommend that UK ARPA should focus on 'mission-based' or 'challenge-led' research, aligned with the long-term goals of the nation, which has the potential to make transformative changes with implications for the economy and wider society.[41]

The Committee also concluded that the new body should fund "transformational" research that would be considered too risky by the existing research and innovation system and that these should be long

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36 Science Business, "UK budget offers a few crumbs for research, but no Horizon Europe money" 4 March 2021

37 Investing in research and development, Conservative Party [online] (accessed 16 June 2020).

38 The Queen's Speech and associated background briefing, Prime Minister's Office [online] 14 October 2019 (accessed 17 June 2020).

39 DARPA, Budget [online] (accessed 16 June 2020).

40 House of Commons Science and Technology Committee, A new UK research funding agency, Third Report of Session 2019–21, HC778 12 February 2021

41 House of Commons Science and Technology Committee, A new UK research funding agency, Third Report of Session 2019–21, HC778 12 February 2021, p3

term projects of 10-15, with guaranteed long term funding to go with them.[42]

On 2 March 2021 the UK Government published a Bill[43] to create what is now called the Advanced Research and Invention Agency (ARIA), an independent UK scientific research agency that will fund "cutting-edge science and technology".[44] Announcing the Bill, the Government set out that it would have an "innovative approach to funding":

> The agency will empower some of the world's most exceptional scientists and researchers to identify and fund transformational areas of research to turn incredible ideas into new technologies, discoveries, products and services – helping to maintain the UK's position as a global science superpower.
>
> The design of the agency allows this work to take place at greater speed, with flexibility and minimised bureaucracy.
>
> The Bill equips ARIA with unique powers and freedoms that it needs to succeed, explicitly allowing the agency a much higher tolerance for failure than other UK funding agencies. This flexibility is necessary to enable the agency to develop technologies at speed that could create profound positive change for the UK and the rest of the world, recognising that failure is an essential part of scientific discovery.
>
> As part of this, the Bill provides the agency with the powers to have an innovative and flexible approach to programme funding, including seed grants and prize incentives, as well as being able to start and stop projects according to their success. This innovative approach to funding will give its leadership the tools and autonomy to push boundaries in search of new discoveries.[45]

The Science Media Centre reported that ARIA's announcement had been broadly welcomed from representatives from research councils, academia and professional bodies.[46]

1.5 Horizon Europe

Horizon Europe is the EU's next funding programme (Framework Programme 9) for research and innovation. It will run from 2021 to 2027 with a proposed budget of approximately €100 billion. The Joint Declaration on Participation in Union Programmes and Access to Programme Services states that the UK will participate as an "associated country" in all parts of the Horizon Europe programme. Associated countries can typically participate under the same conditions as Member States in Framework Programmes, meaning they can both lead, and participate, in collaborative research projects.

Associated countries have no formal decision-making power over the Programme; namely they are not involved in discussions about how the

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42 House of Commons Science and Technology Committee, A new UK research funding agency, Third Report of Session 2019–21, HC778 12 February 2021, p3-4

43 The Advanced Research and Invention Agency Bill 2019-21

44 HM Government, Bill introduced to create high risk, high reward research agency ARIA, 2 March 2021

45 HM Government, Bill introduced to create high risk, high reward research agency ARIA, 2 March 2021

46 Science Media Centre, expert reaction to announcement of UK government plans for the Advanced Research and Invention Agency (ARIA), 19 February 2021

programme is to be structured, priority funding areas etc. However, paragraph 5 of the Joint Declaration states that "where United Kingdom entities participate in direct actions of the Joint Research Centre, representatives of the United Kingdom shall have the right to participate as observers in the Board of Governors of the Joint Research Centre, without voting rights".

Financial contribution

A figure for the UK's financial contribution has not yet been published, although parts of the formula to be used are available. The contributions will be linked to the UK's GDP level with a correction mechanism where grants to the UK are above or below set levels. Estimated UK costs are expected to be set out alongside other 2021/22 research funding.

Article UNPRO.2.1 of the Trade and Cooperation Agreement (Financial conditions) sets out the rules for financing the UK's participation in Union programmes and activities (including Horizon Europe). It explains that the financial contribution shall

> take the form of the sum of:
>
> (a) a participation fee; and
>
> (b) an operational contribution
>
> […]
>
> the participation fee shall be 4% of the annual operational contribution [...] the operational contribution shall be based on a contribution key defined as the ratio of the Gross Domestic Product (GDP) of the United Kingdom at market prices to the GDP of the Union at market prices.[47]

Article UNPRO.8 (Participation fee in the years 2021 to 2026) sets out that the administration fee will not start at 4% but rather will slowly increase as follows:

> The participation fee referred to in Article UNPRO.2.1(4) [Financial conditions] shall have the following value in the years 2021 to 2026:
>
> - in 2021: 0.5%;
>
> - in 2022: 1%;
>
> - in 2023: 1.5%;
>
> - in 2024: 2%;
>
> - in 2025: 2.5%;
>
> - in 2026: 3%.[48]

There is also an automatic correction mechanism (set out in Article UNPRO.2.2) so that, if in any two consecutive years, the funding the UK receives from the programme (namely the value of grants apportioned

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47 Trade and Cooperation Agreement Between the European Union and the European Atomic Energy Community, of the one part, and the United Kingdom of Great Britain and Northern Ireland, of the other part (dated 24 December 2020), p368-9

48 Trade and Cooperation Agreement Between the European Union and the European Atomic Energy Community, of the one part, and the United Kingdom of Great Britain and Northern Ireland, of the other part (dated 24 December 2020), p382

to the UK) is 8% or more of what it contributes, then an additional contribution will be required.[49] Conversely, if the value of grants apportioned to the UK is 12% less than its contribution to the Programme, it can request the "Specialised Committee on Participation in Union Programmes to start the performance review procedure [...] analyse the relevant performance-related data and adopt a report proposing appropriate measures to address performance related issues".[50]

In a March 2021 PQ response the Government set out that its plans for funding Horizon Europe will be published in its R&D allocations "in due course":

> The UK will participate in Horizon Europe as part of the Trade and Co-operation Agreement (TCA) with the EU. We will pay a fair and appropriate share into the budget of this programme to enable the UK science and research sector to further their partnerships with our European neighbours.
>
> Participating in Horizon Europe will strengthen R&D to build on the UK's world class reputation for research and innovation. It provides exciting opportunities for UK businesses and SMEs to support growth and innovation, working with our international partners. Business organisations and researchers have strongly welcomed us securing this outcome.
>
> We will set out our plans for R&D spend in 2021/22 – including funding for Horizon Europe – when we publish our R&D allocations. This will be done in due course.[51]

1.6 UKRI Official Development Assistance cuts

At SR20 the Chancellor announced a reduction in the overseas aid budget as a result of financial pressures caused by the Covid-19 pandemic. In 2021 the Government will allocate 0.5 per cent of Gross National Income (GNI) for Official Development Assistance (ODA). ODA is defined by the OECD Development Assistance Committee as government aid that promotes and specifically targets the economic development and welfare of developing countries.[52]

This means, for the first time since 2013, the UK will not meet the UN recommended target of spending 0.7 per cent of GNI on ODA. The government intends to return to the 0.7 per cent target "when the fiscal situation allows."[53] For more information see Library insight,

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49 Trade and Cooperation Agreement Between the European Union and the European Atomic Energy Community, of the one part, and the United Kingdom of Great Britain and Northern Ireland, of the other part (dated 24 December 2020), p371-2

50 Trade and Cooperation Agreement Between the European Union and the European Atomic Energy Community, of the one part, and the United Kingdom of Great Britain and Northern Ireland, of the other part (dated 24 December 2020), p376

51 Horizon Europe Question for Department for Business, Energy and Industrial Strategy, UIN 162588, tabled on 3 March 2021

52 OECD website, Official Development Assistance (ODA) [downloaded on 15 March 2021]

53 HM Treasury, Policy paper Spending Review 2020, Updated 15 December 2020

Spending Review: Reducing the 0.7% aid commitment, 26 November 2020.

This announcement has, in turn, had implications for UKRI's planned ODA expenditure. On 11 March 2021, UKRI stated that the BEIS ODA allocation to UKRI "has reduced significantly in planned ODA expenditure for FY21/22, leading to a £125m budget and a £120m gap between allocations and commitments."[54]

Examples of UK ODA projects have included work on developing low-cost tools for assessing dementia in low-to-middle income countries and establishing a global network for addressing neglected tropical diseases.[55] UKRI reports ODA spending via the International Aid Transparency Initiative registry. For further information see the UKRI Official development assistance data webpage and the Global Challenges Research Fund webpage.

In a letter to stakeholders, UKRI set out that these reduced ODA allocations will affect every UKRI Council, including Innovate UK, and will, "have whole-system impacts in the UK and overseas."[56] The letter set out further what this meant for ODA projects funded by UKRI:

> Our aim now is to work closely with you try to maximise the benefits from the limited funding we have available, and ensure that we are making the best use of the £125m funding we have available next year. This may involve reprofiling and reducing grants, with a view to supporting current longer-term awards to remain active during this challenging year and to continue to operate into future years. It is also unavoidable that some grants will need to be terminated. The reduction in ODA spend also means that we are unable to initiate any new awards where proposals have been submitted but have not reached the grant award stage.
>
> We are still working through what this means for the ODA projects funded by UKRI and we will shortly provide a briefing detailing the impact on the various grant types.
>
> We are informing you by this letter that whilst we will seek to agree mitigation measures including reprofiling with you, if an alternative approach cannot be agreed we will have to issue a formal notice of termination, and that it is our current assessment that we would be unable to provide funding for the majority of awards beyond the amount currently agreed up to 31 July 2021.
>
> UKRI will continue to support all ODA grants and contracts, including those issued by Innovate UK, according to their usual arrangements for Quarter 1 2021/22, but will not be liable for the cost of new activities entered into after receipt of this letter. The terms and conditions of individual grants and contracts provide more detail of the arrangements that apply should a termination notice be issued.[57]

In a Guardian online article on 14 March 2021 a number of researchers and academics expressed concern about this cut to funding and that it would erode Britain's ability to make key contributions to issues such as

54 UKRI, UKRI Official Development Assistance letter 11 March 2021
55 UKRI, Global Challenges Research Fund webpage [downloaded on 15 March 2021]
56 UKRI, UKRI Official Development Assistance letter 11 March 2021
57 UKRI, UKRI Official Development Assistance letter 11 March 2021

improving world health (including research into antimicrobial resistance research) and on climate change.[58]

[58] "UK scientists attack 'reckless' Tory cuts to international research" The Guardian online, 14 March 2021

2. Press Articles

UK scientists attack 'reckless' Tory cuts to international research

Robin McKie

The Guardian online, 14 March 2021

Chancellor pledges big increase to research spend

Pallab Ghosh

BBC, 11 March 2021

Tech tax breaks given UK Budget boost: Treasury to hold consultations on reforming and expanding R&D relief and stock options scheme

Tim Bradshaw

Financial Times, 3 March 2021

Industry calls for reform to 'outdated' R&D tax credit regime: Enhancing the regime to include capital spending could add £4bn a year to the economy within a decade, according to a new report

Julia Bradshaw

Daily Telegraph, 14 February 2021

A new science agency is part of plans to transform research in Britain: The aim of the scheme is to boost high-risk projects

The Economist, 6 February 2021

I'm from the government, I'm here to help: The case for more state spending on R&D: It is a strong one

The Economist, 16 January 2021

Government plans new office to attract scientists to UK

BBC, 1 July 2020

Academic cited by Cummings wants to redraw map of research spending: Public expenditure on R&D is wrongly skewed towards south-east of England, says report

Andy Bounds

Financial Times, 27 May 2020

Research and development investment to rise to record £22bn: Spending set to increase above annual target set by prime minister in general election

Clive Cookson

Financial Times, 11 March 2020

The £18bn question: Britain's great research bonanza: The government has promised to double funding. How should it spend the dosh?

The Economist, 27 February 2020

Science world hails Boris Johnson's post-Brexit bid to boost R&D: Pledge to lift spending and set up innovation hub welcomed by academics and industry

Clive Cookson

Financial Times, 7 January 2020

CBI calls for urgent UK action to boost research and development: Britain will miss target for investment by 26 years on current trends

Andy Bounds

Financial Times, 14 May 2019

3. Parliamentary material

3.1 Written questions

Research: Finance: Question for Department for Business, Energy and Industrial Strategy: UIN 153240

Asked by Chi Onwurah

Asked on 11 February 2021

To ask the Secretary of State for Business, Energy and Industrial Strategy, pursuant to the Answer of 11 January 2020 to Question 130729 on Research: Finance, what estimate his Department has made of the average proportion of private sector R&D investment from charities and not for profit organisations; and if he will provide a breakdown of inward R&D investment from overseas in the latest period for which figures are available.

Answered by Amanda Solloway

Answered on 26 February 2021

The Office for National Statistics (ONS) publishes data on UK Gross domestic Expenditure on Research and Development (GERD), and the latest release for 2018 stated the private non-profit sector funded £1,860 million, amounting to 5% of total UK GERD of £37,072 million. The equivalent percentages over the previous decade were also about 5%.

The same ONS release gave a figure for GERD funding from overseas of £5,028m in 2018, with £3,250m of this being performed by UK businesses, £1,562m by Higher Education, £172m by Government and UKRI, and £84m by the private non-profit sector.

A more detailed breakdown of the overseas funding of UK business R&D by product group is available in table 12 of the separate ONS release on UK Business Enterprise Research and Development (BERD), while table 23 shows expenditure on R&D performed in overseas-owned UK businesses by product group.

Research: Finance: Question for Treasury: UIN 134414

Asked by Grahame Morris

Asked on 8 January 2021

To ask the Chancellor of the Exchequer, with reference to the 2020 Spending Review, whether the £14.6 billion announced for Research and Development in 2021-22 is part of the £22 billion announced in March 2020.

Answer by Kemi Badenoch

Answered on 13 January 2021

Spending Review 2020 provides funding to ensure that the UK remains at the forefront of international scientific leadership and a global leader in tackling climate change. To cement the UK's future as a scientific superpower and drive economic growth, the government is providing almost £15 billion for R&D next year.

Science will underpin our response to the greatest challenges ahead, including tackling climate change and delivering transformative economic growth. Recognising this, the Spending Review commits £14.6bn to R&D next year, as well as confirming multi-year funding for certain key R&D priorities.

Research: Finance: Question for Department for Business, Energy and Industrial Strategy: UIN 128967

Asked by Chi Onwurah

Asked on 14 December 2020

To ask the Secretary of State for Business, Energy and Industrial Strategy, pursuant to the Answer of 8 December 2020 to Question 124750 on Research: Public Expenditure, whether the Government has targets for increasing R&D investment year on year to meet its target of spending 2.4 per cent of GDP on R&D by 2027.

Answered by Amanda Solloway

Answered on 22 December 2020

In the Spending Review last month, my Rt hon Friend Mr Chancellor of the Exchequer said that to cement the UK's future as a scientific superpower and drive economic growth, the government is investing £14.6 billion in R&D in 2021/22. It will be important to stimulate private sector investment and support public services to get the most out of our excellent research base and to achieve the 2.4% target.

Research: Finance: Question for Department for Business, Energy and Industrial Strategy: UIN 127548

Asked by Chi Onwurah

Asked on 9 December 2020

To ask the Secretary of State for Business, Energy and Industrial Strategy, with reference to the November 202 Spending Review, how much of the £15bn committed to R&D has been ring fenced to replace lost funding from EU R&D programmes in 2021-22.

Answered by Amanda Solloway

Answered on 14 December 2020

No decision has been made on whether the UK will associate to upcoming EU R&D Programmes as negotiations remain ongoing. Whatever the outcome of negotiations, this government is committed

to maintaining and enhancing the UK's position at the forefront of global science collaboration.

We have made clear in the R&D Roadmap that we aim to maintain a close and friendly relationship with our European partners, seeking to agree a fair and balanced deal for participation in EU R&D schemes. We will make a final decision once it is clear whether such terms can be reached. If we do not associate to Horizon Europe, the Government will implement ambitious alternatives as quickly as possible from January 2021 and address the funding gap.

Science: Research: Question for Department for Business, Energy and Industrial Strategy: UIN 124749

Asked by Chi Onwurah

Asked on 3 December 2020

To ask the Secretary of State for Business, Energy and Industrial Strategy, what progress he has made in achieving the target of 2.4 per cent of GDP spending on science research; and what proportion of spending since the introduction of that target has been in the (a) public, (b) charity and (c) private sector.

Answered by Amanda Solloway

Answered on 8 December 2020

The latest data published by the Office for National Statistics is for 2018, showing UK Gross Expenditure on R&D at 1.71% of GDP, an increase on the previous year's figure. ONS plans to release data for 2019 in spring 2021.

The Government has set out plans at Spending Review to cement the UK's status as a global leader in science and innovation by investing £14.6 billion in R&D in 2021/22.

Private investment is a major part of UK R&D spend and leveraging this investment will be key to achieving the 2.4% target. In our R&D Roadmap, published in July 2020, we set out our priorities for boosting R&D across the economy.

Question for Department for Business, Energy and Industrial Strategy: UIN HL7418

Asked by Lord Allen of Kensington

Asked on 28 July 2020

To ask Her Majesty's Government when they expect the UK to meet the OECD average for gross domestic expenditure on research and development.

Answered on Lord Callan

Answered on 6 August 2020

On 1 July, the Government published its ambitious research and development (R&D) roadmap. This builds on the ambitious commitment set out at Budget to increase public spending in R&D to £22 billion per year by 2024 to 2025, putting the UK on track to reach 2.4% of GDP, the current OECD average, being spent on R&D across the UK economy by 2027. We will set out details of this historic investment in due course, giving researchers and innovators confidence through our long-term investment.

Research: Finance: Question for Department for Business, Energy and Industrial Strategy: UIN 71047

Asked by Chi Onwurah

Asked on 8 July 2020

To ask the Secretary of State for Business, Energy and Industrial Strategy, whether the £100 million funding for Direct Air Capture R&D announced in the Plan for Jobs is part of the £22 billion R&D funding announced in Budget 2020; and who will be responsible for distributing that funding.

Answered by Kwasi Kwarteng

Answered on 13 July 2020

My Rt. Hon. Friend the Prime Minister announced up to £100 million for new research and development of Direct Air Capture on June 30th. Part of this will be funded through the more than £1bn announced in Budget 2020 by my Rt. Hon. Friend Mr Chancellor of the Exchequer for Net Zero Innovation to stimulate commercial activity in this essential technology. As with the current £505 million Energy Innovation Portfolio, this will be distributed by BEIS. The other part will be distributed by UKRI under its Strategic Priorities Fund, to accelerate innovation by universities.

The new funding is part of the Government's ambitious plans to increase public research and development (R&D) investment to £22 billion per year by 2024 to 2025 announced in Budget 2020. Later this year, the Spending Review will provide the opportunity for the government to set out further detail on the long-term priorities for R&D investment as part of those plans.

Research: Coronavirus: Question for Treasury: UIN 31528

Asked by Daniel Zeichner

Asked on 18 March 2020

To ask the Chancellor of the Exchequer, what assessment he has made of the potential merits of (a) a financial assistance package for early-stage R&D companies in the (i) life sciences and (ii) other sectors that includes rapidly available grants for loss-making companies and (b)…

Answered by Steve Barclay

Answered on 27 March 2020

The government is committed to supporting innovative businesses to grow, as part of the strategy to increase economy-wide investment in R&D to 2.4% of GDP by 2027.

At the 2020 Budget, government announced it would increase public investment in R&D to £22bn by 2024-25. Detailed allocations of this funding will be set out in due course. Budget 2020 also announced the R&D Expenditure Credit rate would be increased to 13%, providing an additional £1bn over the next 5 years.

The government offers two R&D tax relief schemes which are internationally competitive. The government keeps all tax reliefs under review to ensure they remain well-targeted, and will continue to monitor whether further support for businesses is required through the tax system.

In response to the Covid-19 outbreak, the government has announced a significant package of financial support for businesses and employees. Further details of this package are available at: www.businesssupport.gov.uk

Research and Development Expenditure Credit: Question for Department for Business, Energy and Industrial Strategy: UIN 222034

Asked by Chi Onwurah

Asked on 15 February 2019

To ask the Secretary of State for Business, Energy and Industrial Strategy, what assessment he has made of the effectiveness of R&D tax credits in encouraging private sector spend on R&D (a) overall and (b) by economic sector.

Answered by Chris Skidmore

Answered on 20 February 2019

A study by HMRC in 2015 showed that for every £1 of tax forgone up to £2.35 of R&D is stimulated, this suggests that the current R&D tax reliefs schemes are effective at encouraging additional investment in R&D. R&D tax reliefs are available to any company in any sector undertaking R&D projects seeking an advance in science or technology.

3.2 Oral questions

UK Research and Development: HC Deb 9 Feb 2021, c 135-36

Jack Lopresti (Filton and Bradley Stoke) (Con): What steps his Department is taking to support UK research and development. (912039)

Mr Speaker: I call the Secretary of State—and congratulations.

The Secretary of State for Business, Energy and Industrial Strategy (Kwasi Kwarteng): Thank you very much, Mr Speaker.

We announced at the spending review an investment of £14.6 billion in R&D for 2021-22. This will no doubt cement our status as a science superpower here in the UK. We are taking forward the ambitious commitments in the R&D road map, which was published only last year, and we are of course continuing co-operation with the EU through association with the Horizon Europe programme.

Jack Lopresti: Apprentices have played a key role throughout this pandemic, including working on the Oxford-AstraZeneca vaccine, which is helping the country overcome this virus. Can my right hon. Friend confirm that, in National Apprenticeship Week, he will be working with and encouraging more R&D-based businesses to provide apprenticeship opportunities so that more young people can gain the skills they need to progress in this field?

Kwasi Kwarteng: Absolutely. I thank my hon. Friend for the great work he is doing as co-chair of the all-party parliamentary group on apprenticeships. He will know that apprenticeships are a key part of this Government's plan for jobs as we build back better from the pandemic, and that is why we are offering employers cash payments of up to £2,000 when they hire a new apprentice, until 31 March this year.

Chi Onwurah (Newcastle upon Tyne Central): We are all grateful to Britain's world-leading scientists for blazing a trail of hope in this terrible pandemic, but how are Government protecting science's future? Medical charity research is predicted to fall by over £4 billion after Government refused support. University research has only been offered loans to cover losses from international students, while 90% of UK researchers are excluded from support, even though the virus prevents them from finishing their research. Postgraduate research students from the nine doctoral training programmes have written to demand action, given the escalating scale of the crisis, and there is a massive reduction in funding for early career researchers. Why are Government not protecting the future of the science that is protecting us?

Kwasi Kwarteng: The hon. Lady seems to be living in a parallel universe. If we look at the vaccine roll-out—we have seen 12.3 million, or nearly 12.3 million, people vaccinated as of this morning—we can see that the strength of the UK science base is really impressive. It is looked on throughout the world as something to aspire to. We are a world-leading science power—a science superpower. I have already mentioned the £14.6 billion that we have committed to R&D, and this is an area where we are confident and world-beating.

4. Further reading

Modelling the impact of public R&D spending plans

National Centre for Universities and Businesses, Oxford Economics, September 2020

The Missing £4 Billion: Making R&D work for the whole UK

Nesta, May 2020

Research and development: relationship between public and private funding

Department for Business, Energy and Industrial Strategy, Oxford Economics, March 2020

DEBATE PACK
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