House of Commons

Science and Technology Committee

Balance and effectiveness of research and innovation spending: Government and UK Research and Innovation Responses to the Committee's Twenty-First Report of Session 2017–19

First Special Report of Session 2019–21

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Science and Technology Committee

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First Special Report

On 12 September 2019 the previous Committee published its Twenty-First Report of Session 2017–19, *Balance and effectiveness of research and innovation spending* [HC 1453]. The response from the Government was received on 6 March 2020. The UK Research and Innovation response was received on 10 March 2020. The responses are appended below.

Appendix 1: Government Response

Recommendation 1. Additional frontloaded funding will be key for reaching the 2.4% target, but it clearly is not sufficient. It is also important to ensure that the capacity of the UK economy and research system enables R&D expenditure to be used efficiently and effectively. Creating sufficient leverage of private sector investment will be crucial. ***The Government should consider whether a separate Government R&D spending target, either as a proportion of GDP or in real terms, would benefit the current national target.*** (Paragraph 27)

As the Committee points out, a combined public and private effort will be required to achieve the 2.4% target. The Queen's Speech stated that this Government will set out plans to significantly boost public R&D funding, helping to accelerate our ambition to reach 2.4 per cent of GDP spent on R&D by 2027. This boost in funding will allow the UK to invest strategically in cutting-edge science, while encouraging the world's most innovative businesses to invest in the UK.

Recommendation 2. It is not clear whether the Government's recent commitment to "set out plans to significantly boost public R&D funding", which it had promised this autumn, relate specifically to the roadmaps, high-level long-term funding plans, or simply greater clarification of the BEIS capital budget for next year, which was not fully set in the recent Spending Round. ***Assuming that a multi-year funding commitment is made, a "significant boost" should suitably reflect the frontloaded investment that we have established is required. We are pleased that such decisions will not be delayed until the 2020 Spending Review and urge UKRI and BEIS to make the 'strong case' we expect of them.*** (Paragraph 36)

Recommendation 3. We hope that the promise of providing "greater long-term certainty to the scientific community" indicates both a long-term funding commitment and the detailed plans we expect to be contained in the roadmaps. ***If not, we strongly recommend that both UKRI and BEIS publish their promised comprehensive roadmaps to illustrate the intended path to the 2.4% target as soon as possible, and no later than the end of 2019 following confirmation of Government funding plans. These should demonstrate an integrated approach between UKRI and BEIS that suitably reflects the strengths and prospects of the UK economy. These plans should also be developed beyond 2027 to ensure that travel towards the longer-term 3% target, indicating how momentum will be maintained and when more detailed plans for this target will be produced***. (Paragraph 37)

Recommendation 4. ***UKRI and BEIS should ensure that their roadmaps on how the UK will reach the 2.4% target detail key areas of potential conflict or policy overlap resulting from their choice of policy mix in this complex environment. Unnecessary complexities***

should be identified and removed as part of the mapping process. In order to aid public understanding they should update the Dowling Review schematic, including details of the main R&D funding streams available through the Industrial Strategy and UKRI. (Paragraph 42)

The Prime Minister has set out a vision to make the UK a science superpower and the opportunity for the scientific community to develop and export our innovation around the world. We will be setting out our plans to accelerate our ambition to 2.4% in line with the announcements made in the Spending Round September 2019 and the Queen's Speech December 2019.

The Government recognises the importance of providing long-term certainty regarding public R&D funding and agrees with the Committee the opportunity to make a strong case for it across the board. BEIS is working closely with UKRI on plans to set out a funding commitment that will help deliver our 2.4% target. We will need to take into account measures in many aspects of the R&D and innovation landscape if we are to achieve a meaningful increase in R&D intensity across the economy, both by 2027 and beyond.

Our science and research system is extensive and world-leading, and its scale means there is inevitable complexity. Recently, this Government announced its intention to launch a major review of research bureaucracy and methods in order to to improve efficiency and empower researchers. More widely, it will be important that we communicate clear priorities for our science and research system to both academia and business so we can all drive towards achieving 2.4%.

Recommendation 5. ***In line with the approach taken in this Report, UKRI should also assess and report on other dimensions of balance such as the regional concentration of funding, the balance between research and innovation, and the balance between capital and current spending, in a similar manner to its analysis of the dual support system. We believe more immediate changes to funding are appropriate to influence the current balance in these areas. There are many possible 'balances' or policy mixes, and this political choice should be transparently set out***. (Paragraph 64)

The Government intends to set out plans to significantly boost public R&D funding that will allow the UK to invest strategically in cutting-edge science, while encouraging the world's most innovative businesses to invest in the UK. In accordance with the Higher Education and Research Act 2017 (HERA 2017), when making a grant to UKRI, the Secretary of State for BEIS must have regard to the Haldane principle, the balanced funding principle and advice provided by UKRI about the allocation of funding in relation to its functions. BEIS will present UKRI's advice when making recommendations to the Secretary of State on the allocation of funding to the UKRI Councils, including funding held centrally by UKRI.

Recommendation 6. ***Research on research is an increasingly important field, and we recommend that UKRI consider a dedicated approach to supporting it, including how this research is incorporated into UKRI strategy and its assessment of the balance of R&D funding. Relatedly, UKRI should attempt to analyse the benefit gained by its creation through its enhanced ability to capture data across research councils and through cross-cutting funds***. (Paragraph 72)

Recommendation 7. ***We recommend that UKRI also develops a 'big data' focus for evaluation. It should publish a plan for creating and investing in new data sources and analysis techniques beyond traditional measures of patents and publications.*** (Paragraph 73)

Recommendation 14. ***Future consideration of the balance between disciplines must include robust evaluation of research areas within each discipline. We find the case regarding entrenched concentration of research analysed in The Biomedical Bubble compelling. UKRI analysis should widen this approach and conduct relevant cost-benefit analysis of larger research areas within different disciplines to establish whether R&D spending remains productive.*** (Paragraph 118)

Recommendation 19. ***While departments should be free to invest in areas of individual importance, UKRI should maintain a strategic overview of potential synergies with UKRI funding and the impact on skills and infrastructure that this creates. It should also analyse the potential impact of this cross-Government funding on dimensions of balance such as regional concentration of spending that we have addressed in this inquiry.*** (Paragraph 137)

We agree with the recommendations which highlight the importance of evaluation. UKRI will need significant work programs and investment in improving monitoring and evaluation. UKRI are currently building up capability in their monitoring and evaluation teams and this work should continue. BEIS analysts will continue to engage with UKRI monitoring and evaluation analysts, and work to ensure best practice and learnings are shared. UKRI will respond on the detail of their work in this area.

Recommendation 8. We recognise that the dual funding system of block grants and project-based research council funding has been crucial to the success of UK universities, and that maintaining this system with 'appropriate balance' will be a key function of UKRI. There may be no optimal balance, but trying to reach an appropriate balance in the light of current policy goals is a key political choice and should be made in a transparent and accountable fashion. ***UKRI should continually monitor the appropriateness of balances struck in the operation of the dual support system and publish the advice given to the Government, alongside its analysis and commentary, at regular intervals.*** (Paragraph 89)

This recommendation will be addressed by UKRI.

Recommendation 9. The flat profile of QR funding in recent years suggests it has not been prioritised in funding decisions. The announcement of a £45 million increase in mainstream QR funding by Research England in July 2019 indicates that there may be a change in this focus, and a recognition of the benefits of un-hypothecated budgets which allow universities to maintain agility and develop their own areas of expertise. ***We recommend that focus on QR funding is maintained in future considerations, and that QR should continue to be prioritised to address previous real-terms reductions in funding.*** (Paragraph 90)

Recommendation 10. ***UKRI should review the quality-related (QR) formula which has been responsible for increasing concentration of regional spending, paying attention to the formula used in Scotland which has been less geared towards driving concentration.*** (Paragraph 91)

Recommendation 11. Whilst QR funding provides a stability of funding over the course of the seven-year REF cycle, we also recognise that these timeframes create barriers for smaller but potentially fast-growing institutions or areas of excellence who receive lower QR allocations. ***We recommend that in UKRI's ongoing evaluation work it reviews whether additional support for these institutions should be provided, possibly through specific gearing of investment across the REF period, through additional review periods for smaller bodies, or through separate QR stream for smaller and specialist institutions.*** (Paragraph 92)

As part of our plans to boost public R&D funding, Government will consider the case for, and the appropriate balance of, funding across a range of activities, including the balance of funding between the functions of Research Councils and those of Research England.

The Government has reaffirmed its commitment to the Dual Support system by enshrining the concept of "balanced funding" within the HERA 2017. We recognise that Quality-related Research (QR) funding remains critically important to our research success. We value QR's un-hypothecated nature which contributes to a sustainable research system and allows universities to deploy this funding strategically and to respond to the broad range of research partners and funders including business, charities, public sector and government departments. We have asked UKRI to provide formal advice to BEIS (in accordance with HERA requirements) on the balance of funding across the functions of Research Councils and Research England to inform future funding bids and allocations.

Responsibility for detailed decisions on the allocation of Quality-related Research (QR) were a matter for the Higher Education Funding Council for England (HEFCE) until 2017–18 and are now for Research England, since the creation of UKRI in April 2018. Guidance from BEIS and Ministers has consistently requested that they "continue competitive allocations through the selective funding of world-leading and internationally excellent research with impact wherever it is found; to provide selective support for the next generation of researchers; and to support research funding leveraged from external sources such as the charitable and business sectors."

Research England has established the "Expanding Excellence in England Fund" to support the strategic expansion of research units that demonstrate research excellence but have limited scale of activity.

UKRI will be responding to specific recommendations.

Recommendation 12. ***We recommend that UKRI and BEIS substantially increase the size of the Strength in Places Fund given it appears to be the primary lever through which it is attempting to influence the regional concentration of funding and create new centres of excellence beyond the golden triangle. It should further clarify the rationale and expectations of this expanded programme. This should include the intended evaluation approach and key metrics for assessing the level of regional concentration of funding and the outcomes of this funding.*** (Paragraph 102)

The Strength in Places Fund (SIPF) is a new programme and therefore the monitoring and evaluation procedures, which are key parts of the programme, are currently being established. The evaluation process will assess the impact of the fund against its objectives, which are published on the UKRI website. An informed view of the impact of the fund

can only develop over time but we see the evaluation of the scheme as vital in assessing and refining future policy. Indeed, SIPF has an explicit objective to help ensure that the evidence base around the impact of locally targeted R&D spending in the UK is improved.

SIPF has an explicit place focus and is one approach to supporting the growth of high-quality research and innovation capacity across the UK but it is not the only one. For example, Research England is currently running a pilot for Expanding Excellence in England (E3) which aims to support the strategic expansion of research units in HEIs across England.

The Government is committed to making further progress in levelling up opportunities in every region. You will be aware that the Prime Minister recently announced (27th Jan) that we are working on an ambitious Place Strategy for UK R&D which is to be published in the summer.

SIPF funding aligns with wider local strategies such as the Local Industrial Strategies and forms part of a wider coherent government approach to reduce regional disparities. Other key funds that support research and innovation in the UK can also have a regional impact. For example, the Industrial Strategy Challenge Fund has made significant investment in the automotive and space sectors and these, due to existing strengths in particular parts of the country, can have a significant regional impact which ultimately is to the UK's overall benefit.

To date, Wave 1 of SIPF has provided bid development funding for 23 projects to develop full bids. Full funding for up to 8 Wave 1 projects – each valued between £10 million and £50 million – will be awarded in 2020, together with bid development funding for the best expressions of interest bids submitted into Wave 2 which is running concurrently.

Recommendation 13. The balance across research disciplines should be easier to monitor and adjust under UKRI. Historic patterns clearly should not be maintained for their own sake. However, we are concerned that the Strategic Priorities Fund (SPF) may have not been established in a way that effectively addresses this issue. *We recommend that UKRI review the SPF and ensure that individual research councils are not exerting excessive influence on what is intended to be a cross-council, multi-disciplinary focus.* (Paragraph 117)

The Strategic Priorities Fund (SPF) builds on the vision of a "common fund" set out in Paul Nurse's review. It supports high quality research and development priorities which would otherwise be missed, including multidisciplinary and interdisciplinary programmes at the cutting edge of research and innovation. It also supports collaboration with government departments and the priorities of BEIS Public Sector Research Establishments.

For SPF Wave 2, Chief Scientific Advisors across government worked together to suggest proposals of their own to shape UKRI Councils' developing proposals to address cross-government issues of social relevance. The expert panel which considered the bids into the fund included more independent panel members in response to feedback on the process run for the previous SPF Wave. Whilst of course UKRI would seek to continually refine processes, we do not agree that individual Councils exerted too much influence on the Fund. GO-Science is currently working closely with UKRI to facilitate cross-government collaboration in informing proposals for continuing the next wave of the fund in the next Spending Review period.

Recommendation 15. We welcome the opportunity to redress reductions in capital investment for research. The UKRI roadmap represents an opportunity to consider where investment can be focused and most effective in contributing to ongoing research excellence and to the wider goals of the 2.4% target. ***In order for UKRI to take ownership of the 'batteries not included' issue, we recommend that decisions for investment include consideration of the coordination of capital and revenue funding and the long-term requirements of new and existing investments. Major capital investment project plans should explicitly state assumptions regarding future QR or research council funding that may be required to staff or run them***. (Paragraph 123)

UKRI's infrastructure report, "UK's research and innovation infrastructure: opportunities to grow our capability" was published in November 2019, is intended as a strategic guide to inform future investment decisions and identification of priorities for the next-generation of R&D infrastructure to 2030. It identifies long term future research and innovation infrastructure capability themes and opportunities to guide funding decisions.

Considerations around skills, data and sustainability were the top barriers to effective operation of infrastructures identified in UKRI's Landscape Analysis questionnaires, which informed development of the infrastructure report. The report says Infrastructures need to be sustainable not just in terms of funding but also organisationally, technically and in terms of their human resources. They also need to be responsive to changes in user needs and disruption from new technologies, evolving and developing their approach over the course of their lifecycle. Stable support and a long-term investment plan are vital to enable the full benefits to be realised for users, potential co-funders and the wider economy.

Recommendation 16. There are concerns that ring-fencing of funds for specific goals such as overseas development assistance will further diminish the ability of universities to undertake responsive mode funding. This is related to wider concerns regarding quality-related funding and the implications for basic research from a perceived focus on application-led research. ***Whilst we do not currently see this as a pressing concern, UKRI should continue to monitor this balance and detail the proportion of ring-fenced funding on ODA in its publications.*** (Paragraph 127)

As previously mentioned, Government has committed to significantly boosting public Research and Development funding and providing a framework that gives long-term certainty to the scientific community. Ring-fences are useful in ensuring that money is spent in line with Government priorities and for assessing the impact of the funding. We continue to monitor the balance of funding between discovery research and challenge – led research. We agree with the recommendation that UKRI should continue to monitor this balance and detail the proportion of ring-fenced funding on ODA in its publications.

Recommendation 17. ***The Government should conduct a review of all the funding streams and opportunities for R&D support advertised across Government. It should create a central linking point or web portal for access, and consider how this is advertised, particularly to SMEs***. (Paragraph 133)

Recommendation 21. ***The Government should consider using the SBRI to procure the web portal for innovation support detailed in the recommendation at paragraph 133, allowing external experts and potential users to create an intuitive directory and system for coordinating future innovation support schemes***. (Paragraph 145)

We welcome the perspective of the Committee on the matter of a means of drawing together available opportunities for public R&D support.

Reflective of the different sorts of activity, performed in different academic or business contexts, and types of support currently available, there are a number of sources that simplify the landscape across government and its agencies and arms-length bodies. For example, the greatbusiness.gov.uk website presents a consolidated view of business-focussed support and funding opportunities centred on providing "support, advice and inspiration for growing your business".

UKRI will be launching a new funding website next year. It will be more user friendly and showcase the variety of research and innovation that is supported including opportunities for engagement from all audiences.

Recommendation 18. ***The Government strategy for reaching 2.4% R&D investment, which we hope will be illustrated in the promised roadmap, should highlight the cross-Government R&D investment that is undertaken, particularly by large departments such as the NHS and Defence. The roadmap should include detail on UKRI's role in coordinating this investment. The creation of UKRI represents an opportunity for it to operate as the ultimate steward of this system***. (Paragraph 136)

Government, including UKRI, and business both have considerable roles to play if we are to achieve our goal of raising R&D intensity to 2.4%. We are considering a broad range of levers including investment and non-fiscal measures to understand the package of actions that will help us to achieve this goal.

UKRI will be a key partner in delivering Government R&D plans and are closely involved in developing our plans for R&D, alongside BEIS and other government departments across the R&D and innovation policy ecosystem.

Recommendation 20. The GovTech Catalyst only supports public bodies in sourcing digital technology solutions and the three-year, £20m GovTech Fund is significantly smaller than the £250m that the Connell Review recommended to be spent per annum through SBRI, or the £200m target the Government had for SBRI spending in 2014–15, and should not be viewed as a replacement. ***We recommend that the Government fully adopts the recommendations of the Connell Review, and establishes a central SBRI fund with a National Board to oversee its delivery as part of the 2020 Spending Review.*** (Paragraph 136)

The GovTech Catalyst and GovTech Fund use SBRI competitions to encourage the development of digital solutions for the public sector and support the UK's growing GovTech sector. Although relatively small-scale, it does provide a valuable way for small digital and tech companies and start-ups to work with government and access new procurement opportunities. It also provides a structured way for the public sector to experiment with digital technologies at an early stage, so they can scale up the most successful solutions. Challenges are seeking innovative solutions to fix important social problems, such as

plastic pollution, firefighter safety, local traffic management, and national security. The Government Technology and Innovation Strategy committed to explore how to build on the success of the Catalyst and promote this approach more widely in government, along with the SBRI programme, so that more departments use pre-commercial procurement processes.

We are grateful to David Connell for his thorough review of SBRI as part of the Industrial Strategy. The main Review recommendation for a large-scale central SBRI fund and National Board is a very interesting proposal. However, there are some issues still to resolve around ensuring maximum impact from scaling up SBRI to a fund of the proposed scale, including increasing capability for public sector bodies in delivering effective SBRI competitions and increasing wider adoption of solutions developed through SBRI. We are continuing to explore the role and potential of SBRI as a lever for R&D and innovation in the context of the 2.4% R&D Roadmap. We are consulting David Connell in the development of this work.

Recommendation 22. ***Alongside increasing the size and reach of SBRI, the Government should produce a procurement strategy and communications plan for addressing businesses that specifically identifies innovation opportunities and promotes innovation-friendly practices across all types of procurement. It should address barriers currently perceived by the business community, such as treatment of risk and intellectual property. The benefits of a central portal that collates procurement opportunities from across Government should be pursued***. (Paragraph 152)

Many measures have already been put in place to adopt and encourage greater transparency in its commercial activity to support innovation opportunities in procurement, and promote innovation-friendly practices.

Contracts Finder is the single publishing portal which enables suppliers to search for information about contracts worth over £10,000 with government and its agencies. Contracts Finder can be used to search for contract opportunities in different sectors, find out what is coming up in the future and look up details of previous tenders and contracts. Contracts finder is free to use, users can search without registration and can create an account to get email updates and save their searches. SMEs make up the majority of Contracts Finder registered users.

Published in February 2019 by the Government Commercial Function, The Outsourcing Playbook contains guidelines, rules, principles and best practice to support government's contracting of outsourced services. These may also be applied more generally to any procurement. The Playbook identifies that inappropriate risk allocation has been a perennial concern of suppliers looking to do business with government and a more considered approach will make us a more attractive client to do business with. A guidance document exploring how risk allocation should be considered in the commercial strategy has been published alongside the Playbook.

The Playbook also promotes consideration of innovative solutions through early market engagement (including with Small and Medium Enterprises and Voluntary, Community and Social Enterprises), the make or buy decision, first generation pilots, and routes to market including Competitive Dialogue and Innovation Partnerships.

In June this year, Government published the Government Technology Innovation Strategy setting out the foundations needed for government to innovate through emerging technologies, including help with funding experimentation and innovative procurement. As part of this, the Strategy announced the launch of Spark, a new marketplace for technology innovation, which provides government with an open and agile approach to deal with emerging technologies and their suppliers.

Recommendation 23. ***The Treasury and HMRC should undertake updated analysis of the tax credit system which addresses the issue of deadweight spending and reassesses current estimates of additionality of R&D spending by business. This analysis should also evaluate the benefit of other potential changes to the scheme to encourage additionality of spending, and methods of targeting credit for regional or sectoral priorities, to encourage alignment with the goals of the Industrial Strategy.*** (Paragraph 160)

The UK has one of the most competitive tax regimes for business, and R&D tax reliefs play a key part in attracting high-value investment. In 2016–17, R&D tax reliefs of £4.4 billion supported £32.8 billion of R&D expenditure. So far £4.3 billion of R&D tax relief support has been claimed for 2017–18, corresponding to £31.3 billion of R&D expenditure. (The 2017–18 figures are based on partial data and expected to increase as more tax returns are received)

HMRC published an evaluation report for the R&D tax reliefs in 2015 which showed additionality of between £1.53 and £2.35. As with all tax reliefs, HM Treasury keeps R&D tax credits under review to ensure they continue to provide good value for money for the taxpayer. In addition, as part of State Aid requirements, the government is required to periodically evaluate the SME scheme and report on this to the European Commission.

The proposal to use the Credits for targeting regional or sectoral priorities is very interesting, but a key strength and benefit of the UK's R&D tax reliefs is that they are available to businesses in all sectors and regions of the UK and this is valued by industry. R&D tax reliefs are available to any eligible company undertaking R&D and are not limited to any one sector. Most governments apply a mix of tax incentives and other instruments to foster private R&D investment, and there are already appropriate instruments for delivering targeted support on R&D, including the Industrial Strategy Challenge Fund.

Recommendation 24. ***We recommend that the Government act quickly on the recommendations of the FCA review of regulations relating to patient capital and permitted links and publish a further update at Budget 2020 that details the additional pension fund investment that has been stimulated by these rule changes. Further review should be considered if there has not been a step change, maintaining a commitment to exploiting the considerable funding potentially available through both defined-contribution and defined benefit pension schemes.*** (Paragraph 169)

The FCA launched a consultation on permitted links in December 2018. They are currently in the process of considering the proposed rules in light of the responses received, and intend to publish their Policy Statement including the final rules in due course. The rules will aim to remove some potential barriers to retail investors investing in a broader range of long-term assets in unit-linked funds. This was part of a wider package of measures that

the Government announced at Autumn Budget 2018 to help ensure the UK's regulatory environment enables defined contribution pension schemes to invest as appropriate in patient capital, which included:

- The Pensions Regulator (TPR) publishing updating guidance for trustees on patient capital investing;
- The Asset Management Taskforce, which is exploring the feasibility of a long-term asset fund, and an FCA discussion paper exploring how effectively the UK fund regime enables investment in patient capital;
- A Department of Work and Pensions consultation on enabling the use of performance fees within the charge cap.

The British Business Bank have also been working alongside some of the UK's leading pensions providers to explore the case for defined contribution pension scheme investment in venture capital and growth equity, and potential solutions to overcome key risks and challenges to access. The British Business Bank published their findings in September 2019.

The Government is committed to ensuring that both defined contribution, and defined benefit schemes, are able to invest long-term in innovative UK companies, as part of a balanced portfolio. We welcome the work carried out by the regulators and the British Business Bank, and will consider their recommendations very closely.

Appendix 2: UK Research and Innovation Response

UK Research and Innovation (UKRI) welcomes the Science and Technology Committee's report on the balance and effectiveness of research and innovation spending. UKRI plays a pivotal role in ensuring the UK's research and development (R&D) capability continues to grow, flourish and deliver significant benefits at home and across the globe.

We support the government's commitment to increase R&D intensity to at least 2.4% of GDP by 2027 and 3% in the longer term. Increasing investment in R&D to 2.4% of GDP in less than seven years is ambitious, but we know that other countries have been able to increase R&D intensity to similar scales and timeframes.

In this response we address the recommendations from the committee that relate directly to UKRI. Where appropriate, we have grouped recommendations together.

Recommendation 1: The Government should consider whether a separate Government R&D spending target, either as a proportion of GDP or in real terms, would benefit the current national target. (Paragraph 27)

Recommendation 2: Assuming that a multi-year funding commitment is made, a "significant boost" should suitably reflect the frontloaded investment that we have established is required. We are pleased that such decisions will not be delayed until the 2020 Spending Review and urge UKRI and BEIS to make the 'strong case' we expect of them. (Paragraph 36)

Recommendation 3: We strongly recommend that both UKRI and BEIS publish their promised comprehensive roadmaps to illustrate the intended path to the 2.4% target as soon as possible, and no later than the end of 2019 following confirmation of Government funding plans.

Recommendation 4: UKRI and BEIS should ensure that their roadmaps on how the UK will reach the 2.4% target detail key areas of potential conflict or policy overlap resulting from their choice of policy mix in this complex environment.

We welcome this government's ambition to make the UK a global science superpower, including their commitment to significantly boost public R&D funding. UKRI welcomes this commitment and the long-term certainty such an increase will bring to both research and innovation communities, and businesses looking to invest in R&D.

We are working closely with government on these plans and are making a strong case for public R&D investment on the scale required to achieve the 2.4% ambition. This work is informed by the extensive analysis and engagement we have carried out on pathways to 2.4% target. We have identified opportunities across people, places, technologies and infrastructures that would transform the landscape for science in the UK, help the UK attract and retain the world's top talent, and increased inward investment.

We also intend to engage widely during 2020 to shape a long-term strategy setting out how UKRI will advance research and innovation in the UK.

Recommendation 5: In line with the approach taken in this Report, UKRI should also assess and report on other dimensions of balance such as the regional concentration of funding, the balance between research and innovation, and the balance between capital and current spending, in a similar manner to its analysis of the dual support system.

Recommendation 14: Future consideration of the balance between disciplines must include robust evaluation of research areas within each discipline. We find the case regarding entrenched concentration of research analysed in The Biomedical Bubble compelling. UKRI analysis should widen this approach and conduct relevant cost-benefit analysis of larger research areas within different disciplines to establish whether R&D spending remains productive.

Recommendation 15: In order for UKRI to take ownership of the 'batteries not included' issue, we recommend that decisions for investment include consideration of the coordination of capital and revenue funding and the long-term requirements of new and existing investments. Major capital investment project plans should explicitly state assumptions regarding future QR or research council funding that may be required to staff or run them.

Our vision is to create the best possible environment in the UK for research and innovation to flourish. We have begun to set out how we will achieve this, beginning with our 2018 Strategic Prospectus and continuing with our 2019/20 Delivery Plans. The Research Councils, Research England and Innovate UK have undertaken an extensive programme of engagement with stakeholders across academia, industry, charity, and government to inform these plans.

We agree that an effective research and innovation system has an appropriate balance of funding not only between the two arms of the dual support system, but also between research and innovation, capital and current spending, and across disciplines. As we describe in more detail in a subsequent answer, we recognise the potential of research and innovation to transform the economic potential of places right across the UK and this is an important area of focus for us.

Determining the appropriate balance of investment between these dimensions will be central to our advice to Ministers on the allocation of research and innovation funding. We continue to undertake a comprehensive programme of evidence-gathering and analysis to explore balance and tension between different areas and dimensions of our portfolio, and the balances of investment necessary to ensure we meet our objectives in an effective, efficient and sustainable manner. We will describe our approach to these questions in more detail during 2020 as we form our long-term strategy.

We agree that decisions about major infrastructure programmes should take into account the long-term requirements of new and existing investments to avoid the 'batteries not included' issue. This is a key finding of the major report on the UK's future research and innovation infrastructure needs, that we published in November 2019.[1]

Recommendation 6: Research on research is an increasingly important field, and we recommend that UKRI consider a dedicated approach to supporting it, including how

1 https://www.ukri.org/files/infrastructure/the-uks-research-and-innovation-infrastructure-opportunities-to-grow-our-capacity-final-low-res/

this research is incorporated into UKRI strategy and its assessment of the balance of R&D funding. Relatedly, UKRI should attempt to analyse the benefit gained by its creation through its enhanced ability to capture data across research councils and through cross-cutting funds.

We agree that 'research on research' is key to helping us understand how best to support excellent research and innovation. It will help us ensure we make the best use of public funds, enabling the UK and the wider research and innovation system to maximise the quality and impact of research and innovation.

Taking advantage of our opportunity to carry out analysis across UKRI, we are now progressing an ambitious project to build our evidence base on 'what works' in research and innovation policy and practice. We are doing this by commissioning 'research on research' that will tackle our most pressing, strategic policy questions, and thereby enable us to achieve greater impact from public investment in Research and Innovation (R&I). This project will draw on our enhanced data capabilities from better linking of our data internally and with external datasets to enable generalisable findings that can be used to shape our policies and funding schemes.

This work fits well with the emphasis we are placing on the role of research culture and the research environment in delivering our vision. We have appointed a research culture team and a Head of Research Culture to work with Professor Jennifer Rubin, our Executive Chair Champion for Equality, Diversity and Inclusion. This will enable us to obtain a better understanding of research culture, its impacts, and how it can be improved. It will allow us to embed the changes needed to improve research culture into our systems and policies – including end-to-end aspects of our funding mechanisms.

We are also working with the Wellcome Trust, who have recently launched the Research on Research Institute (RORI), and a number of other funders interested or already involved in RORI, to ensure that as a community we take advantage of the data we collectively have and work together to answer key questions as efficiently and effectively as possible. We will also work with partners to ensure the findings from research on research inform our policies and practices.

Alongside this work we are developing a framework to measure the performance and impact of UKRI overall, as well as our evaluations of our large investments, including the cross-cutting funds.

Recommendation 7: We recommend that UKRI also develops a 'big data' focus for evaluation. It should publish a plan for creating and investing in new data sources and analysis techniques beyond traditional measures of patents and publications.

We agree that we need to look beyond traditional measures of R&I impact towards a more varied set of measures which, collectively, better capture UKRI's impact on knowledge, the economy and wider society. To do this, we will need to make better use of a wider range of data sources and adopt new analysis techniques to fully exploit insights from this data. We are using the creation of UKRI as an opportunity to improve how our organisation uses data to evaluate impact and have made good progress to date.

For instance, we recently purchased the Dimensions tool, which brings together data on our grants, including reported R&I outputs and outcomes, enabling us to undertake

powerful, bespoke analysis of our portfolio. Separately, we recently co-developed, with the Wellcome Trust, a new analytical tool that uses text-mining to identify where UKRI-enabled R&I has influenced the policies or decisions of external organisations, as captured in these organisations' online literature. As another example, by linking UKRI grants data with external data on company performance, we were recently able to analyse the commercial performance of UKRI-enabled spinouts over time.

There is more to do, and we will continue to look to build our in-house data analysis capability going forward. Alongside this, we will continue to commission external evaluations of selected programmes that use a wide range of data sources to assess our wider, additional impact.

Recommendation 8: UKRI should continually monitor the appropriateness of balances struck in the operation of the dual support system and publish the advice given to the Government, alongside its analysis and commentary, at regular intervals.

Recommendation 9: We recommend that focus on QR funding is maintained in future considerations, and that QR should continue to be prioritised to address previous real-terms reductions in funding.

Recommendation 10: UKRI should review the quality-related (QR) formula which has been responsible for increasing concentration of regional spending, paying attention to the formula used in Scotland which has been less geared towards driving concentration.

Recommendation 11: Whilst QR funding provides a stability of funding over the course of the seven-year REF cycle, we also recognise that these timeframes create barriers for smaller but potentially fast-growing institutions or areas of excellence who receive lower QR allocations. We recommend that in UKRI's ongoing evaluation work it reviews whether additional support for these institutions should be provided, possibly through specific gearing of investment across the REF period, through additional review periods for smaller bodies, or through separate QR stream for smaller and specialist institutions.

The decision by the government to enshrine the Dual Support system and ensure "reasonable balance" within it through the Higher Education and Research Act (HERA) 2017 places Quality-Related (QR) funding central within our decision-making. We are strongly supportive of this decision given the critical role QR funding plays in sustaining our excellent research sector, enabling universities to work with partners in business, charities, policy and government, and supporting the fundamental research that underpins all that we do.

We are working closely with colleagues across the research sector, including the Funding Councils within the Devolved Administrations, to collate and analyse a large body of evidence to inform our advice to government on balance within the dual support system. We have explored the value of QR funding to different organisations, the wide range of functions and capabilities supported by QR, and the impact of the different balances of dual support funding across all English universities.

This analysis will underpin our advice on balances of investment, in which we will ensure that the dual support system continues to support the effective and efficient delivery of

high quality and sustainable research. We note and are supportive of the Committee's recommendation to publish this advice and analysis at regular intervals and are currently exploring how we can share this information most effectively.

This body of evidence is also directly informing our planning around 2.4% to ensure the longer-term success and sustainability of UK research. We have already increased our investment in Mainstream QR funding by £45m in 2019/20[2] in recognition of the central role of QR funding in the successful delivery of 2.4%.

Mainstream QR funding provides a relatively stable source of funding for institutions across the REF funding period, which allows them to invest strategically over that period. Our work on the balance of dual support funding found that the stability of QR funding compared to other university funding streams was identified as one of its most valued features.

We acknowledge that improvement must be recognised and supported, and momentum sustained when building research excellence. Research England will examine options for supporting fast-growing institutions following the results of REF 2021 in a way that ensures value for money for taxpayers and that does not create excessive burdens for institutions.

We do have mechanisms in place to support emergent pockets of excellence. The Expanding Excellence in England (E3) funding call supports the strategic expansion of research units that demonstrate research excellence but have limited scale of activity. £76 million was awarded in 2019 across 13 units, concentrating the investment directly in excellent and expanding units. We intend to build on this, pending a successful settlement following the completion of this year's budget process to maintain our momentum in this area. In a letter sent to David Sweeney, the Executive Chair of Research England, on 2 October 2019,[3] Minister Skidmore indicated that he would be supportive of further rounds aimed in particular at helping to increase research capacity to tackle place-based research problems.

In addition, charity and business QR streams are calculated based on institutions' income from those sources. This offers institutions the chance to increase elements of their QR allocation within REF periods, based on the level of charity and business funding they have obtained.

Recommendation 12: We recommend that UKRI and BEIS substantially increase the size of the Strength in Places Fund given it appears to be the primary lever through which it is attempting to influence the regional concentration of funding and create new centres of excellence beyond the golden triangle. It should further clarify the rationale and expectations of this expanded programme. This should include the intended evaluation approach and key metrics for assessing the level of regional concentration of funding and the outcomes of this funding.

On 27 January 2020, the government announced that they will be publishing an ambitious place strategy for UK R&D to ensure funding builds on strengths in the regions. UKRI will be working in close partnership with the government to develop this strategy, which will be a vital part of the levelling up agenda. This will focus on driving R&D investment

2 https://re.ukri.org/news-events-publications/news/uplift-for-re-qr-funding-to-support-governments-commitment-to-rnd/

3 https://re.ukri.org/news-events-publications/news/letter-from-universities-minister-to-research-england/

across the whole country and ensuring every region and nation is contributing to and benefitting from the 2.4% R&D target. UKRI will consider the role of the Strength in Places Fund (SIPF), and other place-focused mechanisms, within this strategy.

We are fully committed to supporting every part of the UK to identify and build on its R&D strengths to support the government's 2.4% R&D investment target. We also recognise the powerful role that research and innovation can have in transforming the economic potential of places right across the UK. An important part of our strategy is supporting large-scale, cutting edge, innovation-focused R&D clusters through SIPF. We therefore strongly welcome the Committee's support and enthusiasm for the SIPF. The SIPF is specifically designed to identify local research and innovation strengths and leverage these to drive significant business-led local economic impact in the funded areas, thereby growing high impact clusters of local and national significance. This should bolster the capability and capacity of these clusters, which could make individual institutions, both research organisations and businesses, more competitive in attracting further investment and support in the future, including from core UKRI competitions.

We are designing a full monitoring and evaluation framework for the SIPF, which will measure the impacts of individual projects and the programme as a whole against its objectives. These objectives can be found in the programme information on the UKRI website.[4]

Recommendation 13: We recommend that UKRI review the SPF and ensure that individual research councils are not exerting excessive influence on what is intended to be a cross-council, multi-disciplinary focus.

The Strategic Priorities Fund (SPF) has three main objectives:

- To drive an increase in high quality multi and interdisciplinary research and innovation;
- to ensure that UKRI's investment links up effectively with government research priorities and opportunities;
- and ensure the system responds to strategic priorities and opportunities.

83% of programme spending across Waves 1 and 2 of the SPF is being co-delivered by at least two delivery partners,[5] and 91% has a letter of support from at least one government department's Chief Scientific Advisor (CSA). This demonstrates that partners are taking a collaborative approach to this Fund.

We are continuing to work with delivery partners and government departments to foster further collaboration as we look forward to potential future waves. With their assistance we have reviewed the objectives, structures and processes in place for the SPF and will make adjustments as necessary to deliver the vision of this fund.

Recommendation 16: There are concerns that ring-fencing of funds for specific goals such as overseas development assistance will further diminish the ability of universities to undertake responsive mode funding. This is related to wider concerns regarding quality related funding and the implications for basic research from a perceived focus

4 https://www.ukri.org/funding/funding-opportunities/strength-in-places-fund/

5 Delivery partners include UKRI Councils and BEIS Public Sector Research Establishments.

on application-led research. Whilst we do not currently see this as a pressing concern, UKRI should continue to monitor this balance and detail the proportion of ringfenced funding on ODA in its publications.

We will report the proportion of UKRI funding that is ODA in our Annual Report and Accounts and other strategy publications.

Recommendation 18: The Government strategy for reaching 2.4% R&D investment, which we hope will be illustrated in the promised roadmap, should highlight the cross-Government R&D investment that is undertaken, particularly by large departments such as the NHS and Defence. The roadmap should include detail on UKRI's role in coordinating this investment. The creation of UKRI represents an opportunity for it to operate as the ultimate steward of this system.

Recommendation 19: While departments should be free to invest in areas of individual importance, UKRI should maintain a strategic overview of potential synergies with UKRI funding and the impact on skills and infrastructure that this creates. It should also analyse the potential impact of this cross-Government funding on dimensions of balance such as regional concentration of spending that we have addressed in this inquiry.

We have a responsibility to ensure that the UK has a world-class research and innovation system, and so it is vital that we work with other funders of R&D, including other government departments. UKRI has a particular role in funding underpinning research and innovation programmes and institutions, infrastructure and people. We engage regularly with other government departments, including through representation on UKRI councils. We will continue to strengthen these relationships to maximise the impact of UK research and innovation across the full range of societal, policy and economic opportunities.