

Science Budget and Industrial Strategy

A response from the Royal Society of Chemistry to the House of Commons Science & Technology Select Committee.

Summary

Science & Research Funding and the Balance of Funding

- It is critical that the additional £4.7 billion of funding for research and development, announced by the Chancellor in his 2016 Autumn Statement, is truly additional and is not absorbed into future Research Council allocations.
- New investments in application-oriented missions and major capital projects, with associated operational expenditure, must be in addition to previously announced indicative Research Council allocations. This is to ensure that the UK maintains its world-class capabilities in core areas of science as well as at the frontiers and interfaces of core science disciplines.
- Support for core science and engineering disciplines as well as for interdisciplinary and challenge-driven research is vital. This is essential because core disciplines underpin and enable interdisciplinary and challenge-driven research.
- Support for fundamental, curiosity-driven research must be sustained, alongside challenge-based and applied research. This is vital because, whilst the impacts of curiosity-driven research are often long-term, the history of science demonstrates that curiosity-driven research delivers the ground-breaking discoveries that open completely new avenues for research and for innovation. Support for fundamental research currently includes funding from the European Research Council and from other Horizon 2020 instruments.
- There is an opportunity for UKRI to leverage the existing capability, networks and knowledge of cutting-edge research across the Research Councils to achieve UKRI's objectives of pushing the frontiers of human knowledge, delivering economic impact and creating jobs and supporting a strong and healthy society.

Industrial Strategy Challenge Fund (ISCF)

- As government plans future ISCF funding calls, inclusive and transparent consultation across the research and innovation community will be vital to ensure stakeholder confidence.
- With wider and deeper consultation, there is an opportunity to broaden the focus of future funding calls to support cross-cutting areas that will underpin disruptive technologies with short and longer term applications spanning multiple industrial sectors. Examples are advanced materials, biotechnology & synthetic biology, advanced measurement techniques and computational visualisation and data analysis tools.

Place-based Growth

- In developing a strategy for place based growth, the government must build on existing best practice and existing institutes, networks and hubs to avoid duplication and to maximise impact.

Science & Research Funding and the Balance of Funding

In March 2016, the Science Minister announced allocations for science and research funding from 2016/17 to 2019/20.¹ This announcement confirmed that the science resource budget would continue to be protected in real-terms,² but included the Global Challenges Research Fund (GCRF).³ The GCRF aims to support *'challenge-led disciplinary and interdisciplinary research'* and forms part of the UK's Official Development Assistance (ODA) commitment. The associated ODA commitment places a focus in this funding stream on improving research capacity in both UK and overseas partner countries. Constraining a considerable part of the science budget through this driver has resulted in a restriction on the overall research funded by the Research Councils.

In November 2016, the Chancellor announced an additional £4.7 billion for research and development by 2020 *'to enhance the UK's position as a world leader in science and innovation'*⁴ as part of the £23 billion National Productivity Investment Fund (NPIF). This additional funding was welcomed by our community.⁵

It is critical that the additional £4.7 billion of funding for research and development, announced by the Chancellor in his 2016 Autumn Statement, is truly additional and is not absorbed into future Research Council allocations.

New investments in application-oriented missions and major capital projects, with associated operational expenditure, must be in addition to previously announced indicative Research Council allocations. This is to ensure that the UK maintains its world-class capabilities in core areas of science as well as at the frontiers and interfaces of core science disciplines.⁶

Both the funding schemes revealed in the 2016 Autumn Statement and subsequent funding announcements suggest an emphasis to date on aiming the additional investment proved by the NPIF on challenge-based research. Research and innovation funding must achieve a balance to ensure support for the core disciplines, and for research at the frontiers between disciplines that enable interdisciplinary and challenge-led research.

Support for core science and engineering disciplines as well as for interdisciplinary and challenge-driven research is vital. This is essential because core disciplines underpin and enable interdisciplinary and challenge-driven research.

Furthermore, support for fundamental and curiosity-driven research must be sustained. Currently, the EU is an important source of funding for long-term fundamental research carried out in the UK. For example, the European Research Council (ERC) provides large, long-term research grants (up to €2.5 million per awardee over 5 years), assessed on the basis of excellence alone. The UK received 21.5% of all ERC funding during the initial period of the current Horizon 2020 programme (until 30 September 2016).⁶

Support for fundamental, curiosity-driven research must be sustained, alongside challenge-based and applied research. This is vital because, whilst the impacts of curiosity-driven research are often long-term, the history of science demonstrates that curiosity-driven research delivers the ground-breaking discoveries that open completely new avenues for research and for innovation. Support for fundamental research currently includes funding from the European Research Council and from other Horizon 2020 instruments.

In his July 2017 speech outlining the vision and objectives for UK Research & Innovation (UKRI), Sir Mark Walport discussed building upon the *'enormous strengths in research and innovation across the whole of the United Kingdom'* which included the Haldane principle and the dual support system.⁷

He also outlined the three pillars to achieve the vision of UKRI *'to be the best research and innovation agency in the world'*. These are *'pushing the frontiers of human knowledge in all of its aspects'*, *'delivering economic impact and creating better jobs'* and *'creating social impact by supporting society to become stronger and healthier'*.

The Research Councils have the capability to harness UK strengths in core disciplines and their interfaces by working closely with researchers, on the ground, across communities in a range of disciplines. The transition to the new UKRI structure and development of future research funding rounds provides a unique opportunity to enhance the role of the research councils in delivering UKRI's vision across the three pillars.

There is an opportunity for UKRI to leverage the existing capability, networks and knowledge of cutting-edge research across the Research Councils to achieve UKRI's objectives of pushing the frontiers of human knowledge, delivering economic impact and creating jobs and supporting a strong and healthy society.

Industrial Strategy Challenge Fund (ISCF)

The Chancellor's Autumn Statement also confirmed that part of the additional £4.7 billion for research and development would be used to fund the ISCF. We are aware of some stakeholder engagement across the community to inform the selection of challenge areas. However, some in our community feel that more visible opportunities to be part of this process would help to ensure that wider and more diverse perspectives are included as part of this process.

As government plans future ISCF funding calls, inclusive and transparent consultation across the research and innovation community will be vital to ensure stakeholder confidence.

An initial wave of ISCF calls was announced earlier this year. These were challenge-based funding calls that related to specific kinds of technologies; batteries for clean and flexible energy storage, cutting-edge healthcare & medicine, and robotics & artificial intelligence for use in extreme environments. There are opportunities to broaden this focus so that the UK is supporting the full spectrum of current and future-facing science and innovation opportunities. By considering cross-cutting, transformative research that will underpin advances in current and emerging fields, technologies that are applicable across several industrial sectors can be developed.

With wider and deeper consultation, there is an opportunity to broaden the focus of future funding calls to support cross-cutting areas that will underpin disruptive technologies with short and longer term applications spanning multiple industrial sectors. Examples are advanced materials, biotechnology & synthetic biology, advanced measurement techniques and computational visualisation and data analysis tools.

Place-based Growth

In our own response to the Industrial Strategy Green Paper, we emphasised the need to *'build on, and link, existing successful initiatives ensuring sustained funding for research and innovation and building on universities and colleges as regional centres.'*⁸

Universities and colleges are regional centres that are part of existing regional networks. There are opportunities to share and build on good practice in areas where universities and colleges are already innovating. Our own work in this area with chemistry departments uncovered more than 1,000 research collaborations between chemistry departments and companies.⁹ Of these collaborations, 34% were with small and medium sized enterprises (SMEs). The resulting case studies, which aim to share good practice amongst our community include examples of a university chemistry department sharing cutting-edge scientific equipment with local SMEs through to universities working with businesses to improve entrepreneurship skills in both staff and students.¹⁰

In developing a strategy for place based growth, the government must build on existing best practice and existing institutes, networks and hubs to avoid duplication and maximise impact.

Contact

The Royal Society of Chemistry would be happy to discuss any of the issues raised in our response in more detail. Any questions should be directed to Dr Mindy Dulai, dulaim@rsc.org, 01223 432674.

About us

With over 50,000 members and a knowledge business that spans the globe, the Royal Society of Chemistry is the UK's professional body for chemical scientists, supporting and representing our members and bringing together chemical scientists from all over the world.

Our members include those working in large multinational companies and small to medium enterprises, researchers and students in universities, teachers and regulators.

¹ - [The allocation of science and research funding 2016/17 to 2019/20](#), Department for Business, Innovation & Skills, March 2016

² - [Government to invest record £26.3 billion in UK's world-class science until 2021](#), Department for Business, Innovation & Skills, March 2016

³ - <http://www.rcuk.ac.uk/funding/qcrf/>

⁴ - [Autumn Statement 2016](#), HM Treasury, November 2016.

⁵ - [Royal Society of Chemistry response to the Autumn Statement](#), November 2016

⁶ - [UK's participation in horizon 2020: September 2016](#), Department for Business, Energy & Industrial Strategy, December 2016

⁷ - [Sir Mark Walport outlines the vision for UK Research and Innovation](#), Research Councils UK, July 2017

⁸ - [Royal Society of Chemistry response to Department for Business, Energy & Industrial Strategy green paper on Building Our Industrial Strategy](#), Royal Society of Chemistry, April 2017

⁹ - [Open For Business](#), Royal Society of Chemistry, November 2016

¹⁰ - <http://www.rsc.org/campaigning-outreach/campaigning/university-business-engagement/#case-studies>

All links active on 30 October 2017