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### **Re: Science and Innovation strategy 2014**

We welcome the Government's commitment to producing a Science and Innovation Strategy. Science is a proven and critical element of the UK economy, driving success and encouraging investment. Government must be determined to create the best environment for science and technology to flourish.

The Society of Biology is a single unified voice, representing a diverse membership of individuals, learned societies and other organisations. We are committed to ensuring that we provide Government and other policy makers, including funders of biological education and research with a distinct point of access to authoritative, independent, and evidence-based opinion, representative of the widest range of bioscience disciplines.

The research output of the UK is world leading, and well placed to reward sustained investment and planning with creation of jobs and economic growth<sup>1</sup>. However, as BIS is aware, there has been 'a sustained, long-term pattern of under-investment in public and private R&D', with the UK's total investment 'structural and static at around 1.8% of GDP<sup>2</sup>'. This is considerably less than the 3% European Union 2020 target. The UK's underachievement in relation to this aim is concerning and contradictory to Government statements on the importance of the UK science sector. The formulation of the Science and Innovation strategy is an ideal opportunity to outline how the UK can work towards this target, and address the policy, regulatory and investment environment that support scientific innovation.

#### *The Science & Innovation Strategy: a framework*

The Strategy should provide a long-term framework for progress and decision making in the UK science and innovation system that sufficiently supports the broad UK science base and addresses a range of grand challenges. It should consider governance structure and ministerial oversight, and how issues spanning government departments and external research bodies will be tackled.

The framework should be just that; not prescriptive but supporting, taking into account the following characteristics:

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<sup>1</sup> Research and innovation underpin a healthy economy, create jobs and are vital to prepare the nation for future challenges. Haskell (2010) showed that a decline of £1bn in Research Council funding could cost £10bn in GDP losses. Across Europe the bio-based sector already represents a market worth over €1.5Tn, and more than 22 million people are employed in the bio-economy. In the UK 5.8million people employed in science based occupations, equating to 20% of the UK workforce. This is an endeavour in which the UK must continue to excel.

<sup>2</sup> [Insights From International Benchmarking of the UK Science and Innovation System](#) – Economic report by Tera Allas published by BIS on 31 January 2014.

### *Flexibility*

- A framework that provides a stable environment from which there is reasonable flexibility to respond to novel or timely public issues, and adapt to future technologies and knowledge is essential.

### *Long-term*

- Research is a long-term endeavour, and the political, economic and regulatory environment needed to facilitate innovation within this context must be reflected in the strategy. A long term strategy will enable structured planning and investment. It is essential for maintaining and improving key infrastructure as well as the development of new projects. It will foster confidence, and in turn investment, from the private sector, aiding collaboration at home and abroad.
- A vision for the UK science and innovation system by 2020 is welcome; however Government must be aware that the benefits of current and recent investment will take longer than six years to materialise, and make early preparations for science and innovation in the UK beyond 2020. Since the outcome of the 2014 Research Excellence Framework will inform the allocation of research funding to HEIs with effect from 2015-16, this provides an even shorter timeframe in which to implement and observe progress.

### *Cross-cutting*

- The strategy must address the whole innovation cycle, including education and skills, research and technology, intellectual property and standardised data, business development, regulation and commerce. It must therefore be integrated across government departments outwith BIS, fully incorporating departmental research initiatives and public sector research establishments (PSREs), influencing education policy at curriculum and HE level, immigration policy, the Treasury and procurement policy, and aligning with health and environment policy.
- The strategy must also take into account the vast amount of research carried out wholly and in partnership with private funds in the UK, including by charities and business. Haskell et al (2014) explains the complementary relationship between private and public sector R & D, where public investment attracts and increases private investment<sup>3</sup>; the strategy should be cognisant of this relationship and aim to maximise potential benefit for the UK.
- The framework should also integrate international and EU policy and regulation where possible.

### *The Haldane approach enshrining researcher leadership*

- The Chancellor stated in his 2013 Spending Review announcement that '*[O]ur philosophy is simple: trust people to make their own decisions and they will usually make better ones*', yet we have seen a string of directed capital investment announcements from Government that contradicts this assertion<sup>4</sup>. Researchers are best placed to identify research priorities and direct the allocation of public funding based on research excellence and likely impact, peer review, and scientific and societal need, as well as job creation and economic pull. The framework must allow for these decisions to be made by the research community, through the allocation of the majority of funds to the Research Councils and Hefce.

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<sup>3</sup> Haskel, Hughes and Bascavusoglu-Moreau (2014) [The Economic Significance of the UK science base](#).

<sup>4</sup> This Government has increased capital funding through specific infrastructure announcements such as the £50m for a National Graphene Institute, investment in scientific facilities, including The Francis Crick Institute and Pharmavision, and £150 million of capital investment in 2015-16 to fund health research infrastructure in the areas of dementia, genomics and imaging. Funding is also promised for the 'Great Eight' technologies for which analysis has suggested Government should be promoting with further capital investment and technology support.

### *Support for a broad research base*

- Both basic and applied research must have a place in the strategy. Innovation is reliant upon different interpretations of fundamental research; this creates a continuum of discovery and commercialisation of applied science. Without this underpinning science, the innovation cycle would cease - it must therefore be appropriately valued. The skills to evolve, innovate and adapt basic research are also critical and must be supported.

### *Inclusive*

- Diversity is essential in science; without it we lose out on potential talent, and change the environment for scientific questioning, and resolution, so that they become the preserve of a particular group that is not representative of society at large. A diverse workforce provides equal opportunities for the best minds regardless of gender, race, disability, sexuality, beliefs or means. Diversity is not limited to gender, and barriers still remain in all aspects of underrepresented groups. With the BIS STEM Diversity Programme funding towards the Royal Society and Royal Academy of Engineering's diversity programmes ending soon, there remains a need for this support; measures to address diversity issues should be included in the strategy.
- Science is by its very nature a global enterprise and to be successful, science relies on free movement of experts and information. There is still work to be done to make the UK truly 'open for business' for both STEM students and researchers. The strategy must address immigration policies and government messaging if the UK is to attract the brightest minds and maintain a global reputation for the excellence of its science<sup>5</sup>.

### *Supporting UK research & Innovation through procurement*

- Government departments and local government are major procurers of technology and science; they therefore play an important role in fostering innovation and supporting skills development.
- The strategy provides an opportunity to derive a better return on investment by linking research funding and procurement of resulting products at a national and local level.
- Procurement of research is also important as departments move away from sourcing evidence from their own networks, and look towards the wider research environment. For instance, in 2014/15, it is expected that 40% of Defra's £200m evidence budget will be spent with external suppliers of evidence<sup>6</sup>.

### *Skills- focussed*

- Skilled people are the UK's most valuable asset. The strategy can provide a framework for skills support; ensuring undergraduates are 'research ready' by appropriate valuation of teaching at HEIs, addressing the near-total lack of funding available to students for Masters courses, and providing support for mid-career researchers seeking to develop new areas of expertise.
- There are good incentives for new researchers, but after the first grant, there is little or no support. This means that early career researchers are competing against very well established names for less money. Research Councils are now unable to approve all 6 star grants and are forced to make drastic choices, which may ultimately favour established groups at the expense of potentially emerging talent, which could have development consequences. Given this and changes to other funders' grant schemes, there is now a real danger that we will lose a generation of current scientists, unable to obtain funding for their work and dissuade future generations from pursuing a career in research in the UK.

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<sup>5</sup> [Society of Biology response to the Lords Science and Technology Select Committee inquiry into International STEM students](#)

<sup>6</sup> <https://www.gov.uk/government/publications/evidence-strategy-for-defra-and-its-network>

- Supporting skills development in management, communication, and entrepreneurship is also highly relevant for the ability of UK bioscience community to realise the potential of discoveries as tools, technologies, policy, and advice. We are aware that there are many initiatives in this area. However, there are still gaps in scientists' knowledge regarding the commercialisation of their ideas, and training to provide scientists with specific information and the inspiration they need to think about commercialising an idea would be welcomed. Independent accreditation of Degrees can play a key role in delivering this, ensuring that graduates are research-trained, with communication, analytical and translational skills.

### *Business Environment*

- The business environment in the UK is good, but it could be better. The UK must move from being a land of start-ups and sell-offs, to a productive business environment that nurtures industries to develop and grow. Only then will the UK reap the maximum benefit from its science investment.
- We welcome the Technology Strategy Board and its successes<sup>7</sup>, and ask that this be further supported. We welcome the patent box, which has already improved the UK's innovation system. Initiatives such as the R&D tax credit are welcome and have been successful, but a mechanism is needed to support SME's who 'do disproportionately badly from the current scheme<sup>8</sup>', and the 5% limit on commercially sponsored research carried out in a particular building, is a discouragement that could be reviewed.
- Private equity investment could be encouraged through larger tax breaks and more opportunity to partner with government initiatives. Government should also encourage longer term return expectations for life science research, and help to bridge the gap in early stage funding at the pre-commercialisation stage when costs and risks are high. For early stage projects a step-wise investment based on early milestones may be helpful as it limits initial investment but then increases for investors who are progressing with the product.
- Clear ethical frameworks and agreements must be in place for private investment in spin-out companies, and tax break rules should apply to research founders so they are treated as if they were employees (whilst remaining employed by the University), otherwise at each stage of investment, founder shares become diluted.
- Providing the right environment for business investment and development must be incorporated into the Strategy, and Government must lead by example by addressing the shortfall in public investment and fostering innovation through the procurement of UK research and technology.

### *Capital*

The Society has submitted a full response to the separate inquiry on proposals for long term Capital Investment in Science and Research<sup>9</sup>. In summary, we ask that capital investment should remain research led, with the Research Councils and higher education funding bodies maintaining the majority of the available funding for the proposed spending period. We recommend that spending should support resource sharing and collaboration to ensure good value for money and to support a mixed portfolio of investment with appropriate funding for resources, training and research activity.

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<sup>7</sup> [The Technology Strategy Board at a glance.](#)

<sup>8</sup> House of Commons Science and Technology Committee Bridging the valley of death: improving the commercialisation of research Eighth Report of Session 2012–13

<sup>9</sup> [Society of Biology response to the Department for Business, Innovation and Skills consultation on the Proposals for long term Capital Investment in Science and Research](#)

The Society would be pleased to continue discussions with BIS on all aspects of science and innovation policy and the development of skilled scientists who we believe can make a crucial contribution to our economy and society as a whole.

Yours sincerely,



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Chief Executive