

Priorities for Science and Innovation Policy 2010-2015

- UK science has a vital role to play in finding solutions to the major problems the world faces today
- Science and technology will provide economic growth and improved social equality in the UK and world wide
- The steady investment in science and innovation over the past 10 years must be maintained but with a greater focus on translating research into innovation
- It is essential to invest in STEM education and skills at all levels to create the highly skilled workforce that will be essential to a high added value economy and UK competitiveness

Science and its application will be central to achieving sustainable economies and increase social equality

Science will enable us to understand the complex world we inhabit and will be central to finding solutions to the problems facing global society today. The application of science will lead to sustainable economic growth and increase social equality as well as address issues such as global resource scarcity for a rapidly growing world population, premature death in the developing world and the impact of an ageing population in the developed world and the need to develop sustainable low carbon economies.

Maximising the contribution of UK science and scientists

The Government's policy for investment and support of science and innovation is crucial in ensuring that science and scientists maximise their contribution to the endeavours listed above. As well as continuing with an appropriate level of investment in the science base through R&D funding, the UK Government must ensure that the country has a workforce with the appropriate knowledge, skills and experience to compete in this high technology age, and that it creates a regulatory and commercial environment which will allow these activities to flourish.

The scale and immediacy of the issues the world faces, together with the pace of change in science and technology and its increasing multi-disciplinary nature and global competitiveness demand greater cooperation across science and changes to Government policies and investment strategies.

A new balancing in priorities to create wealth and social equality from research

The UK must develop a new generation of wealth creation sectors such as biotechnology, digital, fashion, creative and the low carbon industries. Basic science research - both curiosity-led and demand-led - is inspirational and will over time be the basis of wide-ranging, unforeseen advances of great importance to humanity. But timescales and outcomes are often unpredictable.

In order to achieve the maximum possible benefit from the science base there is a need to balance priorities for investment to secure a greater emphasis on translational research and the mechanisms and skills that will strengthen the UK's ability to create wealth from research.

Policies will need to link direct investment in the science base with policies for schools and higher education, skills development, international activities, regional initiatives, planning, and regulation to achieve greater coherence, collaboration and productivity.

Priorities

1. Government policy must sustain its own investment and enhance the incentives for business to invest

- 1.1. The momentum and positive impact of science and innovation investment over the last 10 years should be sustained with an investment target of at least 2.5% of GDP to ensure that the UK is able to compete in an increasingly competitive global environment.
- 1.2. Alongside this investment there should be improved techniques for assessing the impact and potential impact of research investment. Incentives on the science base to deliver both research excellence and increasing value for society should be introduced ensuring that the UK achieves economic and other impacts from society's investments.
- 1.3. A mixed economy of research investment should continue to provide for curiosity driven research, strategic demand-led priorities and targeted funding streams for both research and people. The UK's ability to take forward advances in scientific knowledge generated from both the UK and elsewhere, need to be enhanced: investment strategy will need explicitly to support pre-competitive translational and developmental of research and the associated skills if the UK is to maximise the opportunities to apply the scientific knowledge and research outputs, including non-profit outcomes. Translational research investment should be informed by local and regional opportunities.
- 1.4. In order to achieve ambitions for emerging technologies and new industries Government will need to understand and respond with incentives that will support R&D in these sectors. Government should emphasise demand-pull instruments that will incentivise business investment in R&D particularly from smaller businesses and sectors that are STEM users, for example "hidden innovation" and other new or growth sectors.
- 1.5. Current UK R&D industry investment is focussed in globally competitive fields such as oil and gas, pharmaceuticals and biotechnology. This level of investment will need to be maintained, but other industry sectors clearly need much further encouragement to become actively engaged in the science base as well as to invest in R&D.
- 1.6. Government should be more creative in procurement policies and use them to develop mechanisms that maximise the impact of science and its applications.
- 1.7. Government should commit to uplifting the Charitable Research Support Fund and use this as an opportunity to promote and foster charitable partnerships supporting research activity. The opportunities to participate should be explicitly expanded from medical and health research to embrace opportunities for philanthropic partnerships in other fields. The commitment of philanthropic organisations plays an important role in strengthening public support for, and recognition of, scientific research.

2. People and Skills. The UK must have an adequate supply of people with high level multi-disciplinary STEM skills and experience. Government policies must deliver a workforce with right depth and range of skills, knowledge and experience to support both the research base and the wider economy.

- 2.1. There is a need to develop a better understanding of the different roles and skills for scientists that are currently required, and will be required, in the various employment sectors. Most current labour market information and surveys classify by core science discipline (i.e. physics, engineering, medicine) or education level (technician, A level, first degree, postgraduate etc) or employment sectors. Moving forward there is a need for improved information that properly embraces the multi-disciplinarity of science skills

as well as STEM user industries and the 'hidden' sectors.

- 2.2. Access to STEM higher education should be available for all those with talent and commitment and government and employers need to work together to ensure that the science workforce reflects society's diversity. Some progress has been made in some areas, for example in relation to women in STEM research, but agencies need to work more effectively together, and across government, to ensure that programmes are effective in addressing the issues in the recruitment, retention and training of scientists.
- 2.3. Government should commit to maintaining a leading role for UK science as a magnet for the world's researchers and through other practical initiatives ensure that there is no of a 'brain drain'.
- 2.4. Pre-19 and post-19 education should be linked across Government with the appointment of joint senior departmental staff and joint Ministers.
- 2.5. Policies must foster and reward high quality teaching through schools, colleges and Higher Education. Excellence in Higher Education teaching departments should be fostered and protected, and consideration should be given to market incentives to attract STEM graduates to teaching. There is a case for differential pay, for example reductions in HE fees and graduate loan write-offs.
- 2.6. A strategy for lifelong learning to maintain high level skills should be introduced. The strategy would include provision for post graduate development of multi-disciplinary skills for scientists as well as CPD for scientists and engineers: there is an opportunity for HEIs to become lead providers in this area. Policies must also incentivise STEM employers to invest in training and continuous professional development of scientists.
- 2.7. Skills and qualifications need to provide the appropriate range of competencies/skills for future careers as scientists, both *in* science and *from* science. HE must be responsive to the needs of students, society and employers and ensure that the UK develops qualifications that are informed by sound evidence of demand, provide value for money for the student and are quality assured. A key priority is will be the support higher level skills development in translational and development science skill particularly at PhD level.
- 2.8. A partnership between HE and professional bodies should be established to ensure quality control of content, assessment and grading of undergraduate and postgraduate STEM degree courses.
- 2.9. To inform both provision of qualifications and training and career choice, there must be an improvement in the quality and transparency of HE output data, including employment and graduate destinations.
- 2.10. Promote science as a profession as well as an activity and support the modernisation of technical and scientific career paths at all levels.
- 2.11. The curriculum from primary through to 19 should imbed the concept that 'science and maths are part of everything we do'. There must therefore be increased investment in improved science and mathematics education to ensure that all pre-16 students are better educated in science and scientific method (including in the diploma programmes).
- 2.12. There must be a STEM curriculum and range of qualifications that will stretch the most able students enabling them to become professional scientists and to contribute a depth of science understanding and skills to other sectors of the economy. Post 16 qualifications must be reviewed with the aim of embedding stretch, choice and applied learning.
- 2.13. Government should develop and invest in increasing professionalism in science teaching in schools, FE and HE, including support for Masters level profession, CPD

and Chartered Science Teacher.

- 2.14. Increasing STEM careers awareness should remain a priority for DCSF and similar strategies should be introduced for HE.

3. Science and Society - Public Trust and Confidence.

- 3.1. Government should commit to continuing to develop the Science and Society programme with the aim supporting a public that actively supports the pursuit and application of science for society, has an understanding of what is science and is engaged in the development of science policy and the use of science.
- 3.2. In the interests of fostering open discussion of science and scientific evidence and should reform UK's libel laws.
- 3.3. In science communications campaigns there needs to be a better understanding of the different 'publics' and messages that are more specific and relevant. Communications should focus not just on the science or the technologies but also communicate the benefits to society of there being more people in the workforce with a background of science.
- 3.4. Trust in science is also about trust in the people who create the science and use it. The public has high expectations of professional standards from those who pursue scientific knowledge and apply it in society: Government will need to embrace this within the Science and Society programme. Strengthening the profession of scientist will underpin public trust and confidence in the use of science in society: The Science Council is strongly committed to this aim and believes that the code of conduct for Chartered Scientists is central to achieving and maintaining public trust in science.

4. Science in Government Policy and the Public Sector.

- 4.1. Government should lead by example and reaffirm its commitment to evidenced based policy development. Similar commitments should be sought from national, regional and local government and agencies.
- 4.2. There is a need to strengthen the commitment to transparency and accountability in use of science in policy across government and Parliament.
- 4.3. There will need to be continued commitment to strengthen and invest in the roles of Chief Scientific Advisers across government.
- 4.4. All government departments should have a science policy that identifies R&D needs (both short term policy needs as long term horizon scanning) and skills requirements.
- 4.5. Government departments, through CSAs, should encourage and invest in the ability of learned societies and professional bodies to input into government science policy.
- 4.6. Innovation in the public sector could lead to better and more cost effective government at national and local level. Government should develop the ability of national and local government to draw down on science and technology to deliver better public services.

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