



## **Government's review of the balance of competencies between the United Kingdom and the European Union – Research and Development**

### **Department for Business, Innovation and Skills Science Council Evidence**

#### **The Science Council**

1. The Science Council was established in 2004. It is an umbrella organisation of learned societies and professional bodies and currently has over 40 member organisations drawn from across science and its applications: a list of member bodies is attached. In addition to providing a mechanism for the sector to work collectively, the Science Council develops and leads collaborative projects working with member bodies and the wider scientific community: examples include the Future Morph website<sup>1</sup> designed to provide young people with information about careers opportunities, and LMI analysis of the UK Science Workforce,<sup>2</sup> and studies undertaken by special interest groups.
2. The Science Council is the leading UK organisation working to advance the professional practice of science. Since 2004 it has awarded the professional qualification of Chartered Scientist (CSci) with 15,000 individuals registered. With the aim of raising the profile, aspirations and retention of scientists at graduate and non-graduate levels, professional registration was extended in 2012 to include Registered Scientist and Registered Science Technician.
3. Collectively the Science Council member bodies represent more than 400,000 individual members, including scientists, teachers, senior executives and other individuals at all levels in industry, academia and the public sector.
4. In preparing this submission we have consulted member bodies to identify areas of common interest and the issues they raised form the content of this submission. In addition to this submission, a number of member bodies will be responding individually to the inquiry.

#### **Science as an international activity**

5. The scale and immediacy of the issues the world faces, together with the pace of change in science and technology demands increasing interaction and cooperation between countries and scientists working in international multi-disciplinary teams. It is critical therefore to the future success of the UK economy as well as being essential to finding solutions to the current grand scientific challenges, such as the environment, climate change and global food security that the government continues to view science as an international activity.
6. To date the Government has indicated an understanding of the value of science and its capacity to deliver over time wide ranging, and often unforeseen advances of great importance. The Prime Minister has stated on a number of occasions his aspiration to make the UK one of the best places in the world to do business. The Chancellor has also stated his commitment to maintaining a leading role for UK science as a magnet for the world's leading science and innovation companies, and to ensure that global market

<sup>1</sup> <http://www.futuremorph.org/>

<sup>2</sup> *The current and future UK science workforce* TBR, Sept. 2011 <http://www.sciencecouncil.org/content/science-workforce>

opportunities can be exploited by UK businesses.<sup>3</sup> The recent statement from the G8 Science Ministers summit also recognised the need for continued international collaboration.<sup>4</sup> However announcements in other areas of government policy have conflicted with the view that the UK is best served by being a member of the EU, and have contributed to distrust in its relationship with the UK.

7. In 2010 UK researchers published 123,600 articles, accounting for 6.4% share of world publications, and its share of the top 1% of most-highly-cited papers was second only to the US, at 13.8%.<sup>5</sup> Additionally, the Finch Report found that UK researchers are more likely than those in almost any other competitor nation to collaborate with colleagues overseas, finding that 46% of the articles published by UK authors in 2010 included a non-UK author.<sup>6</sup> This highlights the fact that scientific collaboration is a global endeavour of which UK scientists are a vital component.

### **The UK's relationship with Europe**

8. The UK benefits from collaborative partnerships at the European and global level. Maintaining strong relationships with countries in the European Union and across the world is critical to the UK's long-term success in many areas of scientific endeavour such as co-operation on large-scale infrastructure facilities and research projects which can generate large-scale economic benefits and jobs creation. Astronomy and space science for example, have benefitted enormously from both EU funding streams and international EU-fostered collaboration through networks such as Astronet and the European Astro-particle Physics Network (ASPERA). There is general agreement in these communities that the UK has greatly benefited in these areas from having access to EU research programmes.
9. The European commissioner for research, innovation and science Máire Geoghegan-Quinn has said that it would be highly damaging for UK engagement in European-wide science, research and innovation programmes if it withdrew from the EU.<sup>7</sup> Recent statements from UK trading partners<sup>8,9</sup> have also cautioned the UK against withdrawing from the EU. To maximise the EU's impact in science it is critical that the UK remains a member of the EU so that it has the opportunity to be involved at the earliest stages of an international project's formulation, design and implementation. This will ensure that UK scientists can continue to help shape the future of European and international programmes for the benefit of European and global communities. If the UK lost its influence in the European Parliament or Council, the science community is concerned that this will also diminish the UK's ability to shape a programme's design and strategic direction.
10. Recent reports from the Institute of Physics<sup>10</sup> and the Royal Society of Chemistry<sup>11</sup> serve to highlight the significant financial contribution that investment in science research makes to the UK economy. For the UK economy to grow it must be an attractive place for investment from domestic and overseas businesses. This requires the UK government to maintain and build on the existing strength of the UK's research base, world-class facilities, and research and science skills. A recent CBI study found that the quality of the UK's scientific research base was one of the most significant factors for

<sup>3</sup> <https://www.gov.uk/government/speeches/speech-by-the-chancellor-of-the-exchequer-rt-hon-george-osborne-mp-to-the-royal-society>

<sup>4</sup> <https://www.gov.uk/government/publications/g8-science-ministers-statement-london-12-june-2013>

<sup>5</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/142814/bis-13-689-open-access-economic-analysis-of-alternative-options-for-the-uk-science-and-research-system.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/142814/bis-13-689-open-access-economic-analysis-of-alternative-options-for-the-uk-science-and-research-system.pdf)

<sup>6</sup> <http://www.researchinfonet.org/wp-content/uploads/2012/06/Finch-Group-report-FINAL-VERSION.pdf>

<sup>7</sup> <http://www.timeshighereducation.co.uk/commissioners-advice-on-eu-exit-strategy-dont/2001252.article>

<sup>8</sup> <http://www.whitehouse.gov/the-press-office/2013/05/13/remarks-president-obama-and-prime-minister-cameron-united-kingdom-joint->

<sup>9</sup> [http://www.uk-emb-japan.go.jp/en/japanUK/governmental/130711\\_UKEU.html](http://www.uk-emb-japan.go.jp/en/japanUK/governmental/130711_UKEU.html)

<sup>10</sup> [http://www.iop.org/news/13/jun/page\\_60322.html](http://www.iop.org/news/13/jun/page_60322.html)

<sup>11</sup> [http://www.rsc.org/images/campaign\\_case\\_studies\\_tcm18-232087.pdf](http://www.rsc.org/images/campaign_case_studies_tcm18-232087.pdf)

international companies to bring high value investment to the UK.<sup>12</sup> This is borne out by the fact that the largest areas of industry R&D investment in the UK and investment globally are currently focused in areas of intense global competition: pharmaceuticals, biotechnology, aerospace and defence, and software and computer services.<sup>13</sup> Any signal that the UK will withdraw from the EU jeopardises its ability to fully engage in European science programmes and undermines the motivations for international businesses investing in the UK economy.

11. The Science Council recognises that the government budget will remain tight over the coming years, and notes that the science budget has been ring-fenced until the year 2015/16. In this context it must be appreciated that the UK received over £3 billion of research funding in the Seventh Framework Programme (FP7), representing nearly 15% of the total programme funds<sup>14</sup>. UK-based research teams have been the biggest recipient of grants from the European Research Council in recent years, particularly in the physical sciences.<sup>15</sup> Although the final budget for Horizon 2020 has yet to be confirmed the proposed research and innovation programme budget is thought to be in the region of £6 billion.<sup>16</sup> If the UK were to receive 15% of the Horizon 2020 budget that would equate to £900 million.
12. The Geological Society reports that among the UK science and research community some world class research groups are dependent on EU funding to continue their work. UK science cannot afford to put at risk the potential investment available from Horizon 2020, especially when competitor nations have increased their spending on science since the economic downturn. To remain internationally competitive the UK government would be required to take on any shortfall in funding should the UK not receive funding from Europe for science and research.
13. An example of where the UK has benefited from EU funding is the pan-European Laboratory Astrochemistry Surface Science in Europe (LASSIE) programme which was formed as part of FP7 in 2010. LASSIE is an inter-disciplinary training network for researchers in the fields of astronomy and astrochemistry across a consortium of 13 European universities, 5 of which are based in the UK. The programme supports the training of a cohort of students who are equipped to work in this field across Europe. Such a programme is needed to ensure that there is an adequate supply of skilled researchers who can undertake future laboratory-based astrochemistry research that will complement observational data collected through large facilities. The programme is co-ordinated by the UK (Heriot-Watt University) which reflects and strengthens the standing of the UK within the European and international astrochemistry community.
14. The Science Council welcomes the expansion of Horizon 2020 to embrace an increasing number of European countries that have not been wholly engaged in previous programmes. Increasing interaction and cooperation between countries and scientists are required to tackle many of the current grand scientific challenges the world faces. Collaboration on scientific issues can also be an effective means of advancing diplomatic relations between nations.

<sup>12</sup> Making the UK the best place to invest. CBI, April 2011

<http://www.cbi.org.uk/media/934670/making-the-uk-the-best-place-to-invest-report.pdf>

<sup>13</sup> The 2010 R&D Scorecard. Department for Business, Innovation and Skills, November 2010

[http://webarchive.nationalarchives.gov.uk/20101208170217/http://www.innovation.gov.uk/rd\\_scoreboard/downloads/2010\\_RD\\_Scoreboard\\_analysis.pdf](http://webarchive.nationalarchives.gov.uk/20101208170217/http://www.innovation.gov.uk/rd_scoreboard/downloads/2010_RD_Scoreboard_analysis.pdf)

<sup>14</sup> [http://ec.europa.eu/unitedkingdom/press/press\\_releases/2012/pr1233\\_en.htm](http://ec.europa.eu/unitedkingdom/press/press_releases/2012/pr1233_en.htm)

<sup>15</sup> [http://erc.europa.eu/sites/default/files/document/file/erc\\_2012\\_stg\\_results\\_pe.pdf](http://erc.europa.eu/sites/default/files/document/file/erc_2012_stg_results_pe.pdf)

<sup>16</sup> [http://europa.eu/rapid/press-release\\_IP-13-668\\_en.htm](http://europa.eu/rapid/press-release_IP-13-668_en.htm)

## **A skilled and mobile science workforce**

15. There is a developing evidence base indicating that highly-skilled migrants make an important contribution to UK enterprise, innovation and economic growth,<sup>17</sup> and much of the UK's economic success has relied on its ability to attract highly skilled and talented individuals from across the world: this is particularly true for science based industries. Generating long-term, sustainable economic growth in the UK will also require the employment of highly skilled individuals from across the world to be able to fully collaborate with international partners and lead international research projects.
16. Improving the mobility of professionals is one of the priorities outlined in the EU's Single Market Act. The EU-wide recognition of professional qualifications has made vast improvements to the mobility of professionals, and has provided a better climate for businesses to operate.<sup>18</sup> The Professional Qualifications Directive enables UK scientists to work abroad more easily as well as enabling highly-skilled scientist from across the EU to be able to work in the UK. Facilitating easier movement between institutions within Europe has also meant that more students, post-doctorate students and scientists are keen to remain employed in Europe rather than seeking employment in other countries like the USA or China.
17. Our members are concerned that the UK's ability to attract high calibre scientists and researchers from across the EU and beyond will be affected should it withdraw from the EU. A recent survey found that the UK ranked second only to the USA as the most popular work destination for science and technology professionals.<sup>19</sup> The same survey also found that the greatest barrier to relocation was insufficient job opportunities. Withdrawing from the EU would jeopardise many of the estimated 3.5 million jobs in the UK that are directly or indirectly linked to EU membership<sup>20</sup>, thus increasing unemployment as well as putting off high-quality science and technology professionals and innovative companies that would otherwise come to the UK. A further barrier is the difficulty in transferring employee pension rights between EU member states, something fundamental for professionals considering movement between countries rather than remaining in one nation for the duration of their career.
18. A priority for government should be to maximise the position of the UK as a world class science base to significantly increase investment in its skills pipeline and scientific infrastructure. These will in turn increase the attractiveness to overseas businesses of investing its R&D activities in the UK. Enhancing the UK's science infrastructure capacity provides the world-class facilities that encourage inward investment, as well as contributing to the skills and knowledge development of the UK technician and science workforce. If the global perception of the UK's research base can be advanced further it may incentivise overseas investment in a wide range of emerging technologies. But any policies or other actions that give the perception to international and European companies that investing in the UK will restrict their practice will be detrimental to the long-term development of the UK economy.
19. An example of successful skills collaboration is the European Medicines Research Training Network (EMTRAIN). EMTRAIN is part of the Innovative Medicines Initiative, Europe's largest public-private partnership that aims to develop new medicines, providing support to scientists working across the entire medicines pipeline from drug discovery to pharmacovigilance, throughout their career. It works towards the establishment of an integrated and unified training and CPD framework in medicines discovery across the EU. UK students are now becoming trained with a set of medicines discovery skills and industry awareness to the same standard as researchers in Europe.

<sup>17</sup> Skilled immigration and strategically important skills in the UK economy, February 2012

<sup>18</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/32276/11-794-uk-government-response-mutual-recognition-professional-qualifications.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/32276/11-794-uk-government-response-mutual-recognition-professional-qualifications.pdf)

<sup>19</sup> <http://www.hydrogengroup.com/servlet/servlet.FileDownload?file=00PD00000Hj92wMAB>

<sup>20</sup> [www.parliament.uk/briefing-papers/SN06091.pdf](http://www.parliament.uk/briefing-papers/SN06091.pdf)

The programme enables the mobility of UK research teams across the continent, as they are not required to undertake repeat training exercises where they may differ across national borders. It also continues to make the UK an attractive place for European and global drug discovery companies to locate to because there is a highly skilled home-grown workforce.

20. There is a fear that in the medium to long-term European and international businesses that are currently headquartered in the UK will relocate to other countries in the EU to stay within the Common Market. As a consequence of this the UK would be in danger of losing highly-skilled home-grown scientists and researchers as they look for opportunities in other countries with businesses that support the field of science in which they work.
21. International collaboration has become increasingly important in science, and EU programmes developed over the last few decades have bred a deep culture of collaboration which has strengthened European scientific endeavour. In countries such as Germany students are required to gain international experience for many jobs. This necessitates the ability to speak a foreign language. In continental education systems, learning foreign languages remains compulsory at a level beyond that in the UK, but here the uptake of teaching and learning of foreign languages has steadily fallen in recent years. Although English remains the predominant spoken and learned language across Europe, UK science students' lack of foreign language skills is detrimental to their ability to study and work abroad, and work in international teams.
22. An example of where the UK can benefit from but has under-utilised its membership of the EU is in ERASMUS, the EU's pan-European education exchange programme. The programme provides students and staff across Europe the opportunity to live and study abroad, thus enabling them to develop their language skills as well as engage in cultural exchange. This is important for international companies that are increasingly looking to identify employees that have an understanding of different languages and business cultures. Uptake of the ERASMUS programme among UK students has increased recently. According to the British Council the number of UK students participating in the ERASMUS programme rose by 6.5% between 2010/11 and 2011/12. However, countries with comparable student numbers to the UK have markedly higher participation rates. Spain, France and Germany for example have two to three times the number of Erasmus students studying abroad than the UK.<sup>21</sup> The UK government needs to promote much more widely the social and professional benefits of studying abroad to home-grown students.
23. The UK also needs to be an attractive destination for high-quality students from EU and non-EU countries to come and study. The Bologna Process has received mixed views from members of the Science Council, but there is evidence that harmonisation of degree programmes in UK higher education institutions (HEI) with those across Europe has made some degree courses more attractive to students in Europe and beyond. Student from outside the UK are most likely to be attracted to the UK to study if courses in British HEIs are recognised as meeting certain standards in their home country. This attraction will be diminished if studying UK programmes diminishes their employability when returning to their home country. UK immigration policy must also value and encourage the contribution made by highly skilled workers from overseas to the generation of economic growth in the UK.

### **The impact on UK trade**

24. According to the 2013 United Nations Conference on Trade and Development (UNCTAD), foreign direct investment (FDI) into the UK rose by 22% in 2012 to more than £41bn and ranked second only to the USA. In contrast global and Euro-zone FDI fell by 18% and

<sup>21</sup> <http://www.britishcouncil.org/press/record-number-uk-students-study-work-abroad-erasmus>

41% respectively.<sup>22</sup> This indicates that the UK remains an attractive place to invest for international businesses. To sustain and attract similar levels of FDI, and leverage the potential opportunities for incentivising investment from overseas businesses than hitherto the UK is best served by remaining a member of the EU.

25. The UK must look to all overseas territories to trade. EU enlargement and access to the Common Market benefits 4.7 million small and medium sized British businesses (SME) by bringing them into contact with a pool of 500 million potential customers, as well as ready access to skilled workers who can complement and enhance the UK's own workforce. The UK export market is currently valued at around £100bn per annum,<sup>23</sup> but according to UK Trade & Industry (UKTI) only one in five of the UK's small and medium-sized businesses currently export.<sup>24</sup> The government has been keen to increase the number of SMEs that export as a driver of economic growth. However limited or restricted access to the EU market would be an impediment to growth, job creation and innovation for the UK economy.
26. The UK must also ensure that access to both large and growing markets are maintained and fostered. Currently the EU and USA represent over half the global economy and between them 30% of global trade. According to the Centre for Economic Policy Research, a successful conclusion to negotiations on the EU-US Transatlantic Trade and Investment Partnership may result in benefits to the EU economy in the region of £104bn per annum, equivalent to £477 per household.<sup>25</sup> Non-EU markets and bi-lateral trade relationships also offer attractive export opportunities for UK businesses. The Office of National Statistics found that between 2009 and 2012 exports to non-EU countries increased by 60%.<sup>26</sup> These markets should be sought and developed further. Equally the government should not ignore the highly lucrative trade opportunities that exist from remaining a member of the EU. The international nature of science means that the UK must be willing and able to collaborate with both European and international partners.

### Impact on Regulation

27. Regulation across Europe can act as a spur as well as a barrier to innovation. Getting the right balance between too little and too much regulation is vital to enable innovation to flourish. Compared to national legislation requirements, the EU regulatory process can be cumbersome and lengthy. In the food sector for example it can take at least 3 years for a new food ingredient or additive to be approved and in practise it is often considerably longer. The overly bureaucratic system of regulation and approval stops innovative companies from investing in research and development because they know that the time delay before approval is granted makes investment economically unviable, which in turn deters companies from putting new products on the market in Europe. There are also concerns that the different interpretation, implementation and enforcement of individual member states often to the disadvantage of the UK.
28. An additional disadvantage has been the lack of communication between the EU and the food industry. This concern has been articulated by the Institute for Science and Technology, which said that the European Food Safety Authority (EFSA) has the potential to help industry put new improved ingredients on the market with benefits for all stakeholders. However it currently acts more as a barrier which disincentivises industry and prevents technological advances. This has been particularly true for genetically modified organisms where the application of the precautionary principle has discouraged research, and the examination and assessment of new technologies. However the European Commission's Chief Scientific Advisor, Anne Glover has said that there is no

<sup>22</sup> [http://unctad.org/en/PublicationsLibrary/wir2013\\_en.pdf](http://unctad.org/en/PublicationsLibrary/wir2013_en.pdf)

<sup>23</sup> <http://www.publications.parliament.uk/pa/ld201213/ldselect/ldsmall/131/131.pdf>

<sup>24</sup> <http://www.ukti.gov.uk/uktihome/aboutukti/aimsobjectives/corporatestrategy.html>

<sup>25</sup> [http://trade.ec.europa.eu/doclib/docs/2013/march/tradoc\\_150737.pdf](http://trade.ec.europa.eu/doclib/docs/2013/march/tradoc_150737.pdf)

<sup>26</sup> <http://www.ons.gov.uk/ons/rel/elmr/economic-review/december-2012/sty-exports-overtake.html>

substantiated case of any adverse impact on human health, animal health or environmental health from the consumption of genetically modified foods.<sup>27</sup>

29. Increased dialogue at an early stage on regulatory projects with industry would be advantageous. The elimination of confidentiality for potential new products to be evaluated also deters innovation as the information has to be made available to the competition which has borne none of the development costs.
30. One of the primary objectives of REACH (Registration, Evaluation, Authorisation and restriction of Chemicals), the European regulation of chemicals legislation is to enhance competitiveness and innovation with the EU.<sup>28</sup> A review<sup>29</sup> of REACH in 2012 found that while the regulations for manufacturers and importers had a positive impact on competitiveness, the costs for registration were greater than originally projected. The total cost for all companies involved in the registration process was around €2.1 billion, twice as much as anticipated for the first registration period and almost as much as implementation was expected to cost through to the 2018 deadline. One further finding was that SMEs, which make up 96% of the companies in the sector struggle with the costs and administrative burden. The EU is the world's leading importer and exporter of chemicals.<sup>30</sup> Continued and unabated access to this market is essential for UK SMEs to drive economic growth.

#### **UK science bodies engagement with the EU**

31. One of our members' primary concerns with the UK government's current engagement strategy with the EU on science policy is that access to formal European networks remains limited to government-funded organisations. For example UK membership of the European Science Foundation is limited to the seven Research Councils which focus mainly on research and academia, sometimes at the expense of the wider application of science. The UK science community comprises a rich and diverse network which includes professional bodies, learned societies, higher education and other non-government organisations and institutions that could provide a more diverse and accurate picture of the UK science landscape. It is our members' opinion that these networks have not hitherto been utilised to their fullest.
32. Our members have also stated that they have had little success in engaging with European Members of Parliament (MEP). The Science Council acknowledges that the science community has not been as proactive as it could have been in engaging with individual MEPs and the wider European science policy community. A dedicated point of contact or formal network that could maximise the knowledge and expertise of the wider UK science community to engage better with MEPs and European policy-makers would be greatly beneficial.
33. Overall the Science Council view is that the capacity of the EU to foster cooperation and collaboration between Member States has led to a wide range of positive initiative across many areas of science and research.

Chief Executive

August 2013

<sup>27</sup> <http://www.euractiv.com/innovation-enterprise/chief-scientific-adviser-policy-p-interview-514074#comments>

<sup>28</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:136:0003:0280:en:PDF>

<sup>29</sup> [http://ec.europa.eu/enterprise/sectors/chemicals/files/reach/review2012/market-final-report\\_en.pdf](http://ec.europa.eu/enterprise/sectors/chemicals/files/reach/review2012/market-final-report_en.pdf)

<sup>30</sup> <http://www.cefic.org/Documents/FactsAndFigures/2012/Facts-and-Figures-2012-The-Brochure.pdf>

## Member Bodies of the Science Council August 2013

1. Association for Clinical Biochemistry and Laboratory Medicine\*
2. Association of Neurophysiological Scientists\*
3. Association for Science Education\*\*/ \*\*\*
4. British Academy of Audiology
5. British Association of Sport and Exercise Science
6. British Computer Society\*
7. British Psychological Society\*
8. British Society of Soil Scientists\*
9. Chartered Institution of Water and Environmental Management\*
10. College of Podiatry
11. Energy Institute\*
12. Geological Society of London\*
13. Institute of Biomedical Science\*/ \*\*
14. Institute of Brewing and Distilling\*
15. Institute of Corrosion\*
16. Institute of Food Science and Technology\*/ \*\*
17. Institute of Marine Engineering, Science and Technology\*
18. Institute of Materials, Minerals and Mining\*
19. Institute of Mathematics and its Applications\*
20. Institute of Measurement and Control
21. Institute of Physics and Engineering in Medicine\*/ \*\*
22. Institute of Physics
23. Institute of Science and Technology\*\*
24. Institute of Water\*
25. Institution of Chemical Engineers\*/ \*\*
26. Institution of Environmental Sciences\*
27. London Mathematical Society
28. Mineralogical Society\*
29. Nuclear Institute\*
30. Oil and Colour Chemists' Association\*
31. Operational Research Society
32. Physiological Society
33. Royal Astronomical Society
34. Royal Meteorological Society
35. Royal Society of Chemistry\*/ \*\*
36. Royal Statistical Society\*
37. Society for Cardiological Science and Technology
38. Society for General Microbiology
39. Society of Biology\*/ \*\*
40. Society of Dyers & Colourists
41. The Organisation for Professionals in Regulatory Affairs

\* Licensed to award Chartered Scientist (CSci)

\*\* Licensed to award Registered Scientist (RSci) and Registered Science Technician (RSciTech)

\*\*\*Licensed to award Chartered Science Teacher (CSciTeach)