

27 November 2015

Royal Society submission to the House of Lords Science and Technology Committee inquiry into the Relationship between EU Membership and the Effectiveness of Science, Research and Innovation in the UK

Summary

- The European Union is one of the major research funders in Europe alongside individual European countries, charities and businesses. The European research landscape is complex. Researchers collaborate with each other and on the international stage.
- The UK is one of the largest recipients of research funding in the EU: it receives a greater amount of EU funding for research and development than the proportion of its contribution analysis suggests is earmarked for this.
- There are two major routes by which the EU directly funds research in the UK – Framework Programme funding and Structural funds. The UK is more successful in attracting Framework Programme funding, particularly that allocated for excellence, than structural funding, which is largely targeted at building capacity in the least economically developed regions of the EU. If you consider Framework Programme funding alone, the UK was the second largest recipient after Germany in the most recent Framework Programme (FP7). The UK remains a high performer when adjusting for the size of each country's economy, with Germany performing less well. If you also take into account structural funds, Poland is second and the UK comes fourth out of the 28 countries eligible for both Framework Programme and structural funding.
- The UK is the top performer among participating countries in attracting European Research Council and Marie Skłodowska-Curie Actions funding, receiving respectively 22.4% and 25.5% of the total budget for these programmes.
- UK universities attracted 71% of the total Framework Programme funds awarded to the UK during Framework Programme 7.
- UK businesses attracted 18% of Framework Programme funding awarded to the UK. This is below the EU average and much lower than countries such as Germany and France where businesses secured 33% and 27% of Framework Programme funding awarded to them.
- EU funding is of increasing importance to UK universities. Since the last UK spending review, universities have seen their total research income rise slightly, despite experiencing a drop in UK government funding for research through the Higher Education Funding Council and the Research Councils, due to increases in research income from several sources including the private sector and the EU.
- The monetary value of a funding stream is not the sole guide to its value for research. Small amounts of funding in areas where little funding is available, or that offer researchers mobility and encourage collaborations can have a bigger impact than its monetary value might suggest. For example the EU has provided seed funding in areas where the UK now has a reputation for global excellence. This value is difficult to quantify.
- As a European Union Member State, the UK is represented on the European Council, and in the Parliament, through which it can influence the shape of EU research funding and regulation.
- The UK takes part in a number of collaborations with other European countries including joint programmes and sharing research infrastructure. The EU plays a role in many of these collaborations.

- Science is international and researchers commonly move across borders to take new jobs, collaborate with researchers or access scientific infrastructure. Freedom of movement within the EU facilitates this. The Society is undertaking further work to better understand the mobility of researcher.
- Harmonised regulation across the EU offers opportunities for facilitating research collaborations and attracting global investors but it must be developed with input from the research community to ensure it does not have unintended, prohibitive consequences for research.
- The Society welcomes the Commission's renewed commitment to obtaining high-quality scientific advice with the creation of the new Science Advice Mechanism and believes could offer a powerful instrument to deliver effective scientific advice to EU policymakers. As the new system is still in the process of being established, it is too early to assess its effectiveness

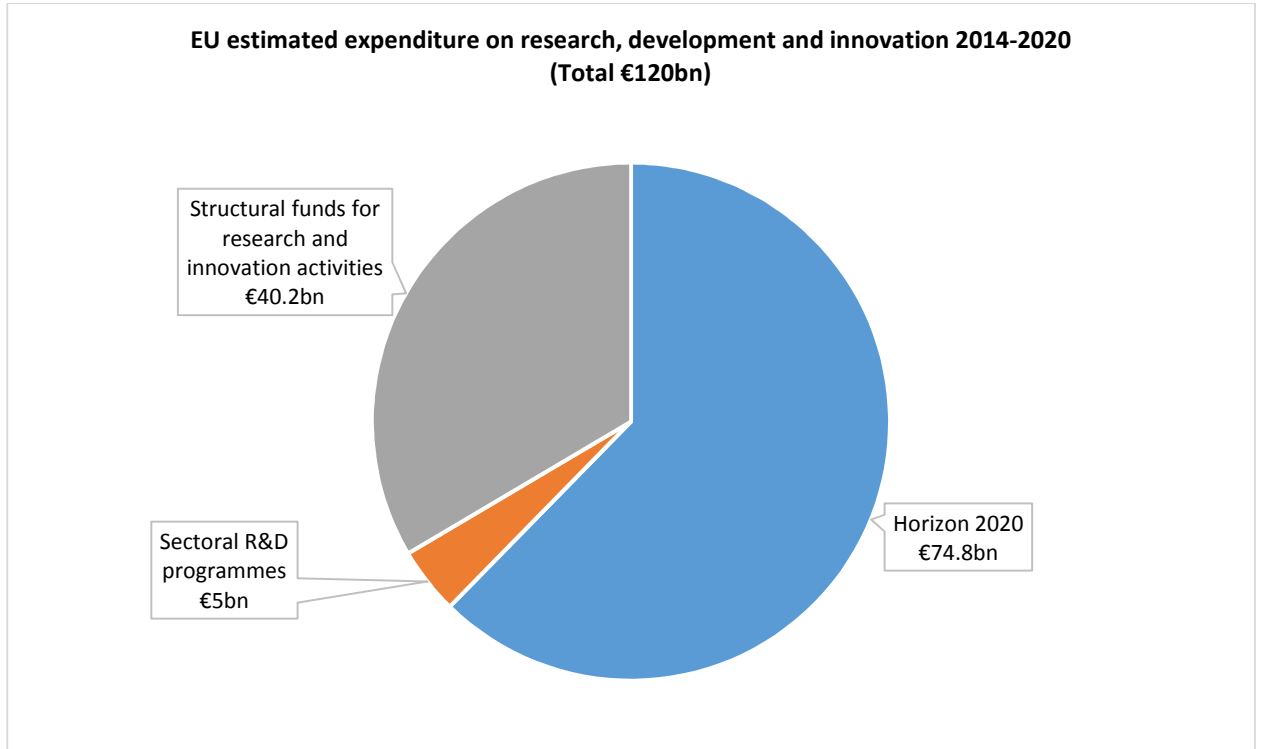
Introduction

1. The Royal Society welcomes the opportunity to submit evidence to this inquiry on the relationship between EU membership and the effectiveness of science, research and innovation in the UK. The Society is the UK's national academy of science. It is a self-governing Fellowship of many of the world's most distinguished scientists. The Society draws on the expertise of the Fellowship to provide independent and authoritative advice to UK, European and international decision makers.
2. This submission focuses on the most recent two cycles of EU research funding. This response includes an overview of the European research landscape and the role of the EU within this. It focuses on issues of funding but also addresses questions regarding collaboration, regulation and scientific advice.

Funding

Overview of EU research funding

3. The EU plays an important role in the European research landscape, by funding and supporting research, but is not the only actor playing this role in Europe. The European research landscape is complex. Regional, national and international actors interact at multiple levels. These actors range from individual researchers, regional institutions, national governments and research communities, businesses, NGOs, intergovernmental organisations and the EU and its institutions. According to estimates by the League of European Research Universities (LERU), 15% of publicly funded research conducted by EU Member States comes from, or is coordinated by, the EU or by intergovernmental organisations.¹
4. For the period 2014-2020, the EU will provide a total estimated budget of €120bn to directly support research, development and innovation activities. This includes Framework programme funding, sectoral research and innovation programmes that fund research in specific sectors such as space and nuclear energy, and structural funding directed towards research and development. This figure does not capture indirect investment in research and development through EU programmes such as COSME, some of which supports small and medium enterprises to develop R&D capabilities, and Erasmus+, which supports student mobility.



5. The following table provides an indicative breakdown of Horizon 2020 funding, subject to the annual budgetary procedure.²

	EUR million in current prices
I Excellent science, of which:	24 232,1
1. European Research Council (ERC)	13 094,8
2. Future and Emerging Technologies (FET)	2 585,4
3. Marie Skłodowska-Curie actions	6 162,3
4. Research infrastructures	2 389,6
II Industrial leadership, of which:	16 466,5
1. Leadership in enabling and industrial technologies	13 035
2. Access to risk finance	2 842,3

¹ Sources:

ERC: <http://erc.europa.eu/about-erc/facts-and-figures>

MSCA: http://ec.europa.eu/research/mariecurieactions/about-msca/actions/index_en.htm

Structural funds: EU Cohesion Funding, Available Budget 2014-2020 : <https://cohesiondata.ec.europa.eu/>

Sectoral programmes: European Parliamentary Research Service (EPRS) 2015 briefing Overview of EU funds for research and innovation. [http://www.europarl.europa.eu/RegData/etudes/BRIE/2015/568327/EPRS_BRI\(2015\)568327_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2015/568327/EPRS_BRI(2015)568327_EN.pdf)

² Official journal of the European Union, 2015 Regulation EU 2015/1017 <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32015R1017&from=EN>

3.	Innovation in SMEs	589,2
III	Societal challenges, of which	28 629,6
1.	Health, demographic change and well-being	7 256,7
2.	Food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the bioeconomy	3 707,7
3.	Secure, clean and efficient energy	5 688,1
4.	Smart, green and integrated transport	6 149,4
5.	Climate action, environment, resource efficiency and raw materials	2 956,5
6.	Europe in a changing world – Inclusive, innovative and reflective societies	1 258,5
7.	Secure societies – Protecting freedom and security of Europe and its citizens	1 612,7
IV	Spreading excellence and widening participation	816,5
V	Science with and for society	444,9
VI	Non-nuclear direct actions of the Joint Research Centre (JRC)	1 855,7
VII	The European Institute of Innovation and Technology (EIT)	2 383
TOTAL		74 828,3

6. Framework programme funding is agreed at the outset of the Framework for the entire period of its operation. These funds are allocated to specific projects during its operation and subject to annual budgetary procedures. This means that changes to the agreed funding can be politically easier than they might be for other EU budgets that are allocated to specific countries at the outset. In 2015 €2.2bn of agreed Horizon 2020 funds was redeployed to form part of €16bn of seed funding for the new European Fund for Strategic Investments³ (EFSI, also known as the Juncker Plan is intended to leverage €315bn of investments). It is proposed that EFSI will fund projects related to research and innovation. However it is as yet unclear how this will operate and concerns have been raised over restrictions on access to this⁴.

Access to EU research funding

7. In addition to the 28 EU member states, non-EU countries are also able to participate in, and receive funding from, EU Framework Programmes through a number of mechanisms.
8. Thirteen countries (including Norway, Israel and Switzerland) enjoy 'Associated Country' status and contribute to framework programme budgets proportionally to their GDP. This enables their researchers and organisations to apply for Horizon 2020 projects with the same status as those from EU Member States.⁵

³ European Commission, 2015, *The European Fund for Strategic Investments* http://ec.europa.eu/priorities/jobs-growth-investment/plan/efsi/index_en.htm

⁴ Research Fortnight, 2015, *Doubts grow over university access to EFSI* <https://www.researchprofessional.com/0/rr/news/europe/universities/2015/11/Doubts-grow-over-university-access-to-Efsi.html>

⁵ EPRS 2015, EU scientific cooperation with third countries. [http://www.europarl.europa.eu/RegData/etudes/BRIE/2015/564393/EPRS_BRI\(2015\)564393_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2015/564393/EPRS_BRI(2015)564393_EN.pdf)

9. 'Associated countries' are not represented on the European Council or in the European Parliament so have limited ability to influence the direction of European research funding.
10. **Case study - Switzerland.** Switzerland is not an EU member state but is partially associated to with the EU Framework Programmes until the end of 2016. During this time, researchers based in Switzerland can access some parts of Horizon 2020 funding. Extension of this access through till 2020 is dependent on Switzerland's ratification of an agreement on free movement of people related to Croatia joining the EU.
11. **Case study – Norway.** Norway is not an EU member state but is an official 'Associated Country' meaning it participates in Framework Programmes under the same conditions as EU Member States⁶. The nature of the agreement signed between Norway and the EU means that terms do not need to be renegotiated with each new Framework Programme. Mechanisms also exist to enable non-associated countries to participate in EU research funding under specific criteria. In some circumstances they may receive direct funding while others are required to establish match-funding to finance their contribution.

EU research funding in the UK

12. Methodological note: All graphs in this section refer to the period 2007-2013, the most recent completed EU financial framework, unless otherwise stated. All figures are in euros unless otherwise stated. This is done for ease of comparison as EU funding follows 7 year cycles, year-on-year data is not always available and exchange rates have fluctuated significantly over the period in question.
13. Overall the UK is a net contributor to the total EU budget. Over the period 2007-2013, the UK contributed €77.7bn to the EU (10.5% of the total EU income from member states), and received €47.5bn in EU funding (6% of the total EU expenditure to member states of €802.7bn).⁷
14. However the UK is one of the largest recipients of research funding in the EU and, although national contributions to the EU budget are not itemised, analyses suggest that the UK receives a greater amount of EU research funding than it contributes. The UK Office of National Statistics has produced an indicative figure for the UK's contribution to EU research and development expenditure of €5.4bn over the period 2007-2013⁸. During this time, the UK received €8.8bn in direct EU funding for research, development and innovation activities. The Society recommends that the Committee seeks advice from HM Treasury and the ONS to better understand how this figure is derived and the robustness of this.
15. The UK received 8% of total direct EU expenditure on research, development and innovation⁹, over the period 2007-2013, the fourth largest share in the EU-28. This includes €6.9bn of FP7 funding and €1.9bn of EU structural funds for research, development and innovation activities.¹⁰ Structural funds and Framework Programmes have different objectives and awarding criteria, and support different activities, but funding from the two programmes are increasingly coordinated and synergies are encouraged.

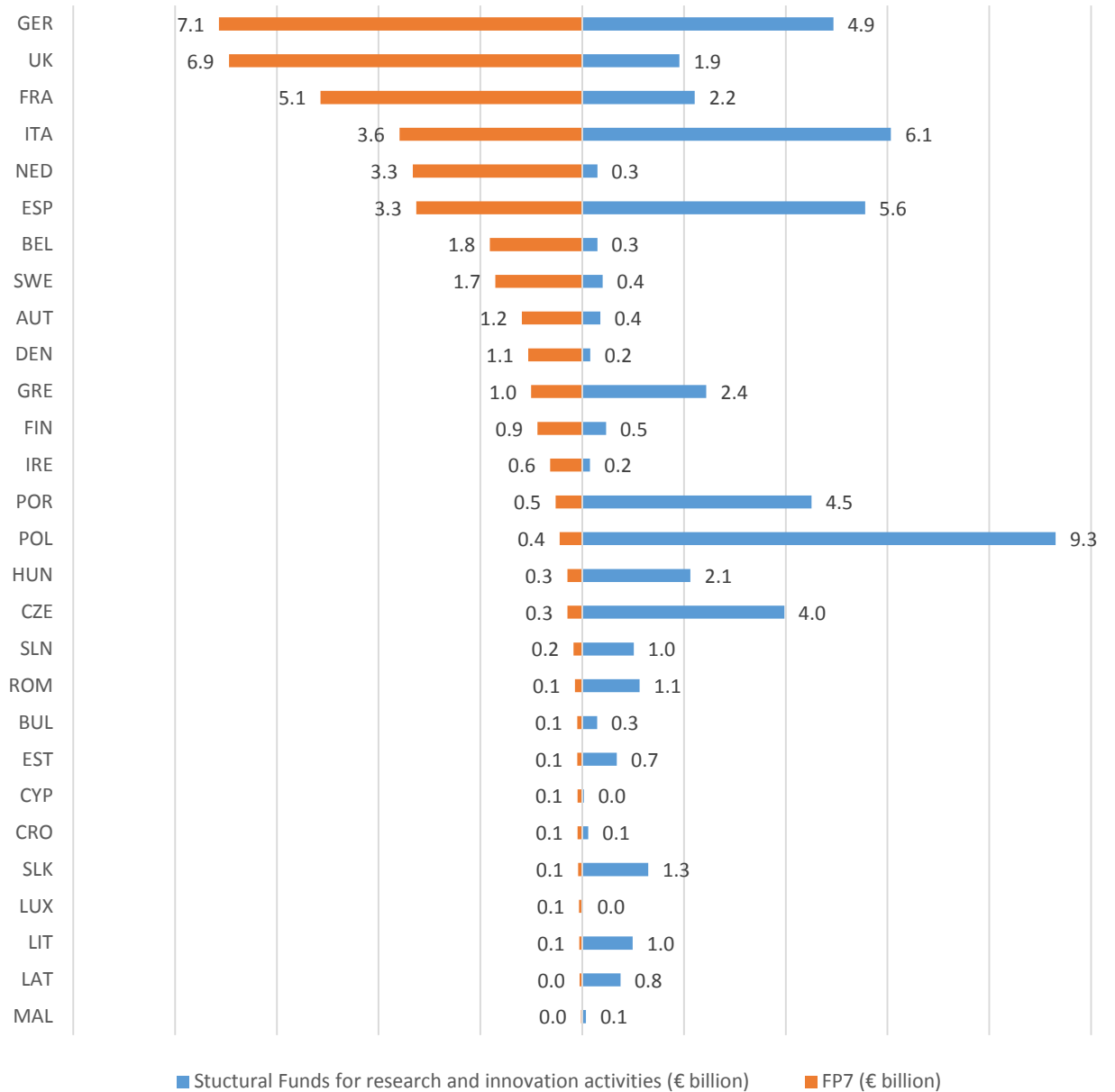
⁷ Source: EU expenditure and revenue 2007-2013. http://ec.europa.eu/budget/figures/2007-2013/index_en.cfm

⁸ See UK Government Expenditure on SET 2013, ONS. <http://www.ons.gov.uk/ons/rel/rdit1/science--engineering-and-technology-statistics/2013/stb-set-2013.html>. Exchange rates from UKforex.co.uk

⁹ This figure includes Framework Programme and Structural funding but not sectoral research programmes

¹⁰ European Commission Cohesion policy data. <https://cohesiondata.ec.europa.eu/> (accessed 28/08/2015)

Distribution of EU expenditure on research, development and innovation (Framework Programme 7 and structural funds) in EU-28 countries. 2007 – 2013 (€ billion).



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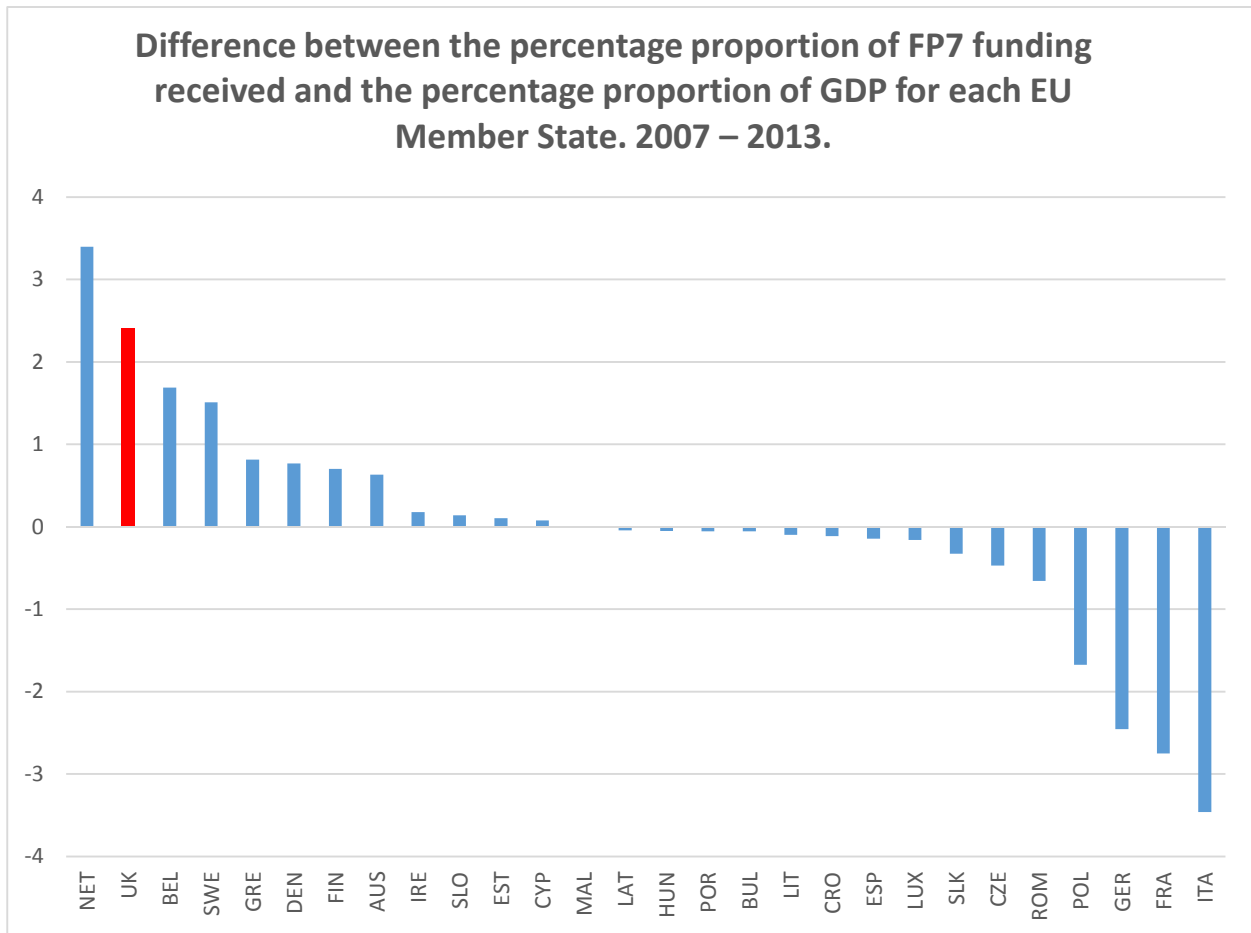
¹¹ Sources:

European Commission, 2015, *EU Cohesion Funding, Available Budget 2014-2020*. <https://cohesiondata.ec.europa.eu/>

European Commission, 2015, *Seventh FP7 Monitoring Report*

https://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/7th_fp7_monitoring_report.pdf

16. These figures do not take into account the relative size of each country's economy. Adjusting the Framework Programme 7 figures for GDP shows that the UK performs well for the size of its economy, second only to the Netherlands. In contrast, Germany, France and Italy perform less well. A similar adjustment for structural funds shows that those countries with lower GDP perform better relative to the size of their economy, as would be expected for funds targeted at building capacity in the least economically developed regions of the EU. Indeed, the UK, France and Germany are the three lowest ranking EU countries in this ranking.



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17. In terms of Framework Programme 7 funding, which is awarded on a competitive basis, the UK was the second largest recipient after Germany, securing €6.9bn out of a total of €55.4bn (12.5%).¹³

18. Breaking down further to look at specific streams of Framework Programme 7 funding, the UK is the top performer among participating countries in attracting European Research Council and Marie Skłodowska-Curie Actions funding. These are awarded solely on the basis of scientific excellence. Researchers based in the UK received €1.7bn for European

¹² Source:

European Commission, 2015, *Seventh FP7 Monitoring Report*

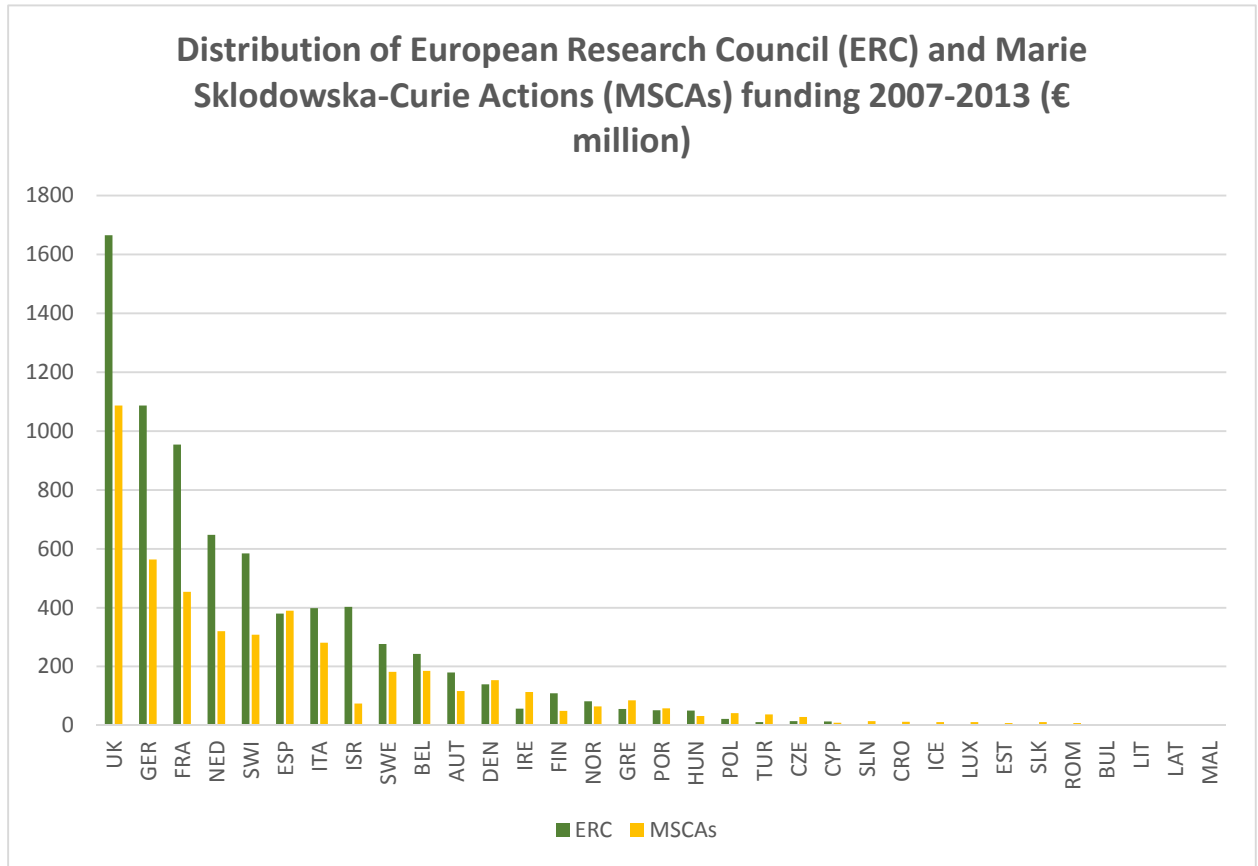
https://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/7th_fp7_monitoring_report.pdf

European Commission, 2015, *Eurostat*

<http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tec00001&plugin=1>

¹³ European Commission, March 2015, *Seventh FP7 Monitoring Report*

Research Council grants and €1.1bn for Marie Skłodowska-Curie Actions, respectively 22.4% and 25.5% of the total budget for these programmes.¹⁴



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19. Framework Programme funding is mostly allocated on a competitive basis, similarly to Research Council funding in the UK. Calls for applications are issued regularly and proposals are peer-reviewed by a panel of experts. Depending on the specific funding stream, different criteria are applied to the calls. For example, calls can be linked to specific scientific or technological themes or address specific challenges.
20. Calls usually require the proposed project to be collaborative and span across different countries and sectors. Other calls, for example those from the European Research Council, are relatively less restricted and evaluated solely on the basis of the scientific excellence of the applicant and of the proposed project.

¹⁴ European Commission, 2015, *ERC funding activities 2007-2013*

http://erc.europa.eu/sites/default/files/publication/files/ERC_funding_activities_2007_2013.pdf

¹⁵ Sources:

European Commission, 2015, *ERC funding activities 2007-2013*

http://erc.europa.eu/sites/default/files/publication/files/ERC_funding_activities_2007_2013.pdf

European Commission, 2015, *FP7-PEOPLE Marie Curie Actions Country fact sheets*

21. Over the years that Framework Programmes have been in operation, concerns have been raised by the research community about what is perceived as the sometimes excessive bureaucracy of the application and reporting processes for EU funding.¹⁶ In addition most EU funding projects are collaborative with at least three organisations from different countries and building these consortia can pose challenges.
22. The Commission has undertaken evaluations¹⁷ to address many of these concerns in subsequent Framework Programmes and, although not yet resolved, the situation appears to be improving in the current Framework Programme Horizon 2020. At a national level, the system of UK National Contact Points provide advice on how to build a consortium and apply for Framework Programme funding.
23. The UK higher education sector has developed considerable expertise in applying to EU research funding and institutions often employ specialised staff to deal with the application and management of EU research grants. The system of UK National Contact Points play a key role in providing advice on how to apply for Framework Programme funding and a number of organisations, such as the UK Research Office in Brussels (UKRO), also inform and assist the UK research community in accessing such funding.
24. Turning to look at the role of EU research, innovation and development funding in the UK, EU funding from Framework Programme 7 represents 3% of the total UK expenditure on R&D in the period 2007-2013.¹⁸ This figure does not include EU funding from structural funds for research and innovation activities, as only some of these activities fall under the ONS definition of R&D used to calculate the data below. The total proportion of UK R&D expenditure coming from the EU is therefore likely to be higher than 3%.

¹⁶ Department of Business, Innovation and Skills, 2011, *Funding for EU research and innovation from 2014: a UK perspective*

¹⁷ European Commission, 2014, *Study on Assessing the Research Management Performance of Framework Programme Projects*

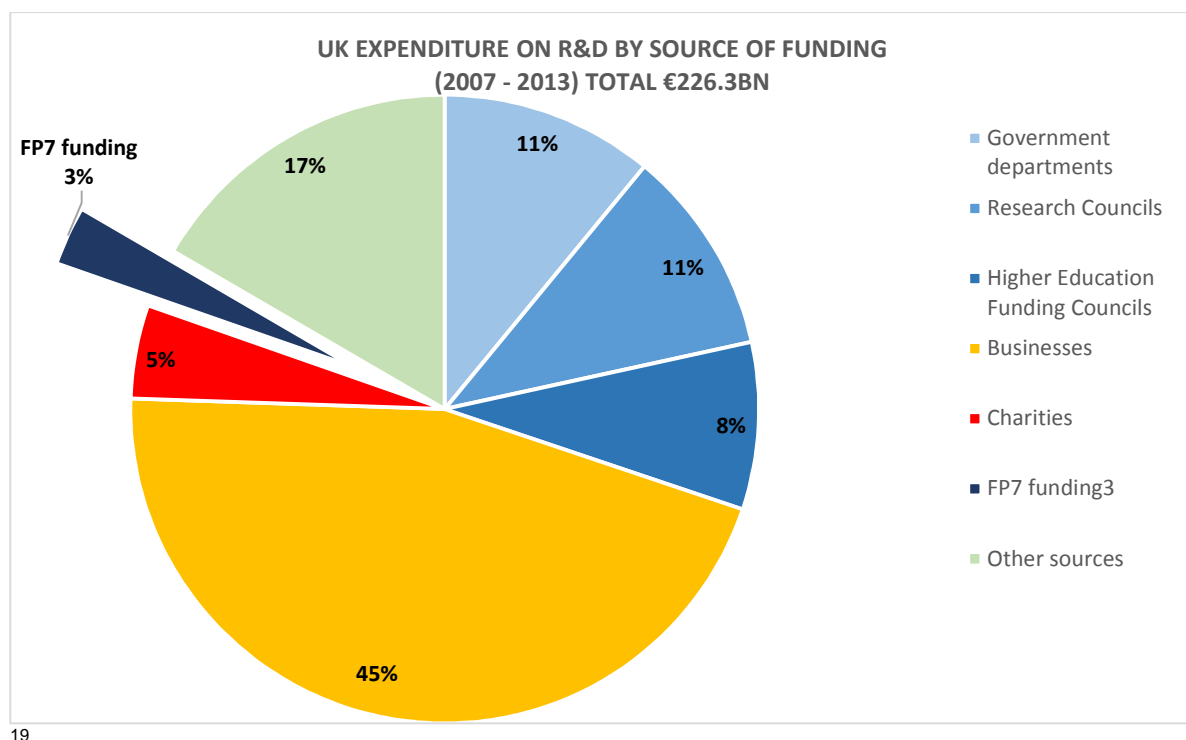
¹⁸ Data from:

Office for National Statistics, 2013, *UK Gross Domestic Expenditure on Research and Development*,

<http://www.ons.gov.uk/ons/rel/rdit1/gross-domestic-expenditure-on-research-and-development/2013/stb-gerd-2013.html>

European Commission, 2015, *Seventh FP7 Monitoring Report*.

https://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/7th_fp7_monitoring_report.pdf



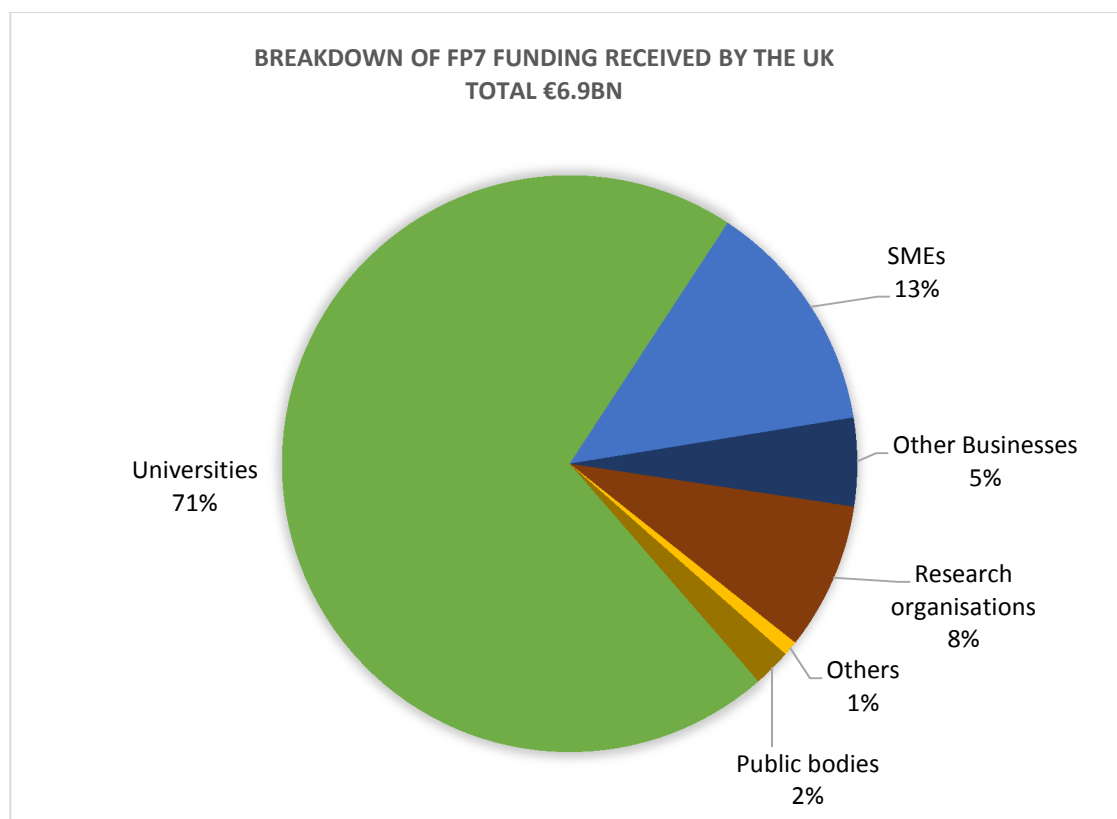
- 25.** In the UK, the university sector is by far the largest beneficiary of EU research funding, receiving 71% of total Framework Programme 7 funding awarded to the UK over the period 2007-2013 (€4.9bn out of a total of €6.9bn). Breakdown by sector is not available for structural funds.

¹⁹ Sources:

Office for National Statistics, 2013, *UK Gross Domestic Expenditure on Research and Development*, <http://www.ons.gov.uk/ons/rel/rdit1/gross-domestic-expenditure-on-research-and-development/2013/stb-gerd-2013.html>

European Commission, 2015, *Seventh FP7 Monitoring Report*.

https://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/7th_fp7_monitoring_report.pdf



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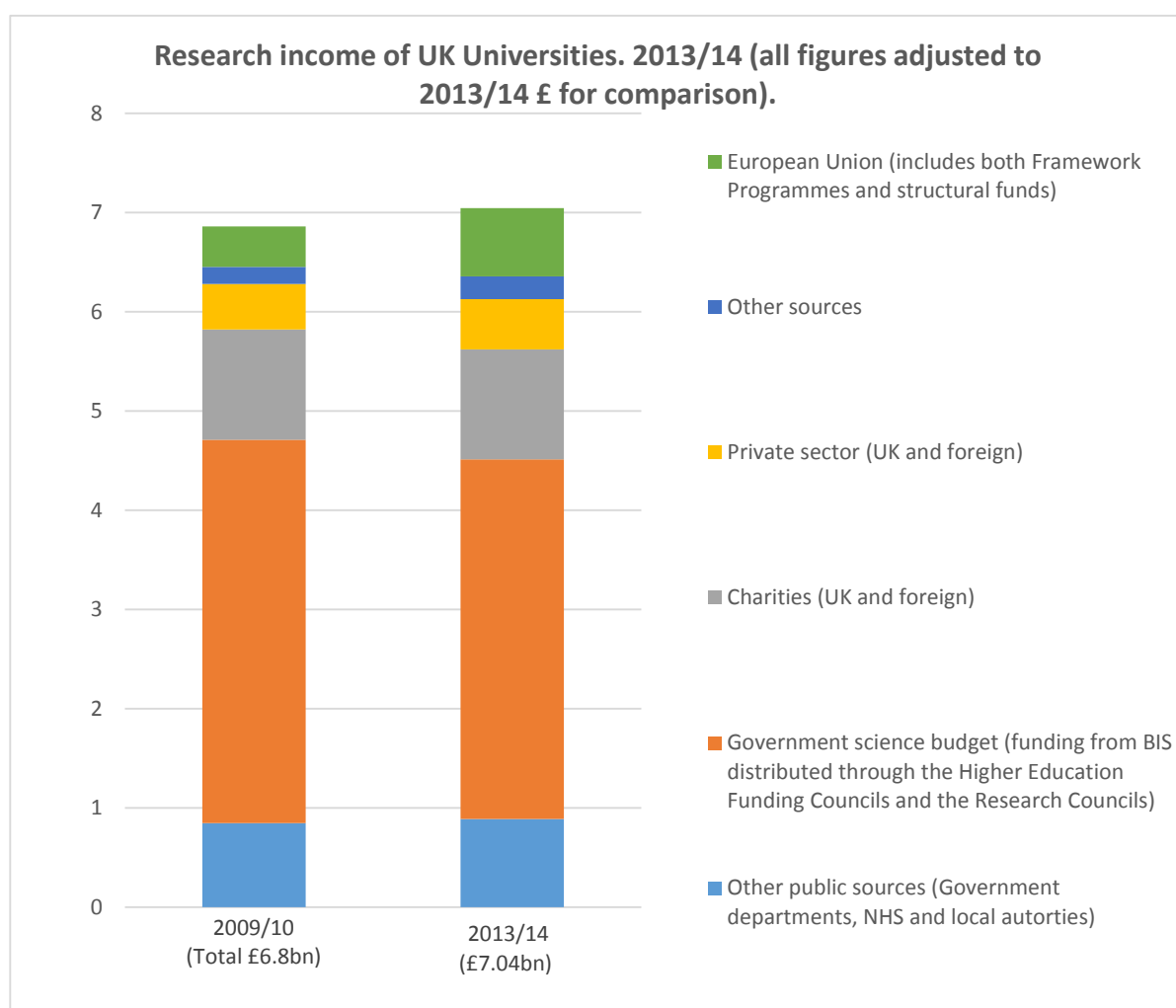
26. Oxford, Cambridge, Imperial College and UCL are the top four European universities in terms of their number of participations in Framework Programme 7 projects, and a total of 13 UK universities are present in the top 25. It is important to note that research architecture varies across participating countries, with research strength in some countries being concentrated in institutes rather than universities.
27. 64% of UK research and development is conducted by businesses²¹ yet UK businesses attracted just 18% of the total funds awarded to the UK through Framework Programme 7. This is below the EU average and much lower than countries such as Germany and France where businesses secured respectively 33% and 27% of the Framework Programme 7 funding received by the country. In the rankings of private-for-profit organisations, 2 UK companies (NEC Europe Ltd and Rolls Royce) were ranked in the top 50 European companies in terms of FP7 participations.
28. This relatively low rate of UK private sector participation in EU research funding was highlighted by the Confederation of British Industries in their 2013 submission to the UK Government Review of the Balance of Competences between the UK and EU.²²
29. EU funding plays an increasingly important role in the research activities of UK universities, helping mitigate the impact of domestic fiscal constraints in recent years. The EU's seven year funding cycle provides a more predictable and longer-term source of funding than

²⁰ European Commission, 2015, *Seventh FP7 Monitoring Report*
https://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/7th_fp7_monitoring_report.pdf

²¹ Office for National Statistics, 2015, *UK Gross Domestic Expenditure on Research and Development 2013*

²² Confederation of British Industry, 2013 *Review of the Balance of Competences between the UK and the EU: Research and Development* http://www.cbi.org.uk/media/2344170/balance_of_competences_review_r_d_-_cbi_response.pdf

domestic funding. In 2013/14 (latest data available), EU funding²³ represented 9.7% of UK universities' total research income²⁴, an increase of almost 4 percentage points from 6% in 2009/10 (the year of the last UK spending review). Over the same period, research income from BIS 'science budget'²⁵ has declined by 4.5 percentage points, from 56% to 51.5%. In real terms, income from EU funding has increased by 68.2% over this period, while income from BIS has declined by 6.2%. Overall research income has increased by 2.7%. However, it is important to note that an increase in EU research funding does not represent replacing like with like - EU funding does not always cover the full cost of research overheads, meaning that recipients will need to meet such costs from other sources of research income, such as QR funding or endowments.



²³ This includes both Framework Programmes funding (FP7 and Horizon 2020) and other EU sources, such as structural funds.

²⁴ Total research income is defined here as the sum of recurrent research income from funding councils (HEFCs QR) and research grants and contracts

²⁵ This include research grants from the Research Council's, Royal Society, British Academy, RSE and Higher Education Funding Councils

²⁶ Source: HESA, 2015 *Finances of Higher Education Providers 2013/14*, https://www.hesa.ac.uk/component/pubs/?task=show_pub_detail&pubid=1719 GDP deflator from ONS.

30. Participation in EU programmes has also historically performed a capacity building function, providing seed funding to develop research expertise in areas where the UK has later won a reputation for global excellence. For example, European research programmes have enabled the UK to become a global leader in the academic study of climate change impacts. Programmes such as Groundwater Resources and Climate Change Effects (GRACE) and Production of Precipitation Scenarios for Impact Assessment of Climate Change in Europe (POPSICLE), both pursued by the University of Newcastle with funding from the third Framework Programme (1990-1994), gave UK researchers early opportunities to build research excellence and forge strong links with European partners. The networks and research capacity engendered by this early EU funding have helped UK researchers to secure further EU funding, produce cutting-edge research, and establish the UK as an internationally recognised leader in this field.²⁷

Collaboration

31. Collaborations are vital for science, and scientists want to work with the best in their field irrespective of their geographical location and institutional affiliation. Mobility is a key part of the research endeavour and the UK historically has had a strong track record of attracting the best researchers, however, institutional frameworks can enable, facilitate and promote these collaborations. Most EU funded research is intrinsically collaborative, bringing together experts from different sectors and countries to share knowledge and expand networks. For example, researchers in different countries might operate on different funding cycles, which makes collaborations difficult. By pooling resources together and distributing them in a centralised way, EU funding can simplify this.²⁸

32. To facilitate collaborations and the mobility of researchers and scientific ideas, work is underway to create a European Research Area (ERA). This is intended to be: "a unified research area open to the world based on the Internal Market, in which researchers, scientific knowledge and technology circulate freely and through which the Union and its Member States strengthen their scientific and technological bases, their competitiveness and their capacity to collectively address grand challenges."²⁹ The aim of the European Research Area is to maximise the return on research investment for both the EU and individual Member States; avoid unnecessary duplication of research and infrastructure investment at national level; and improve the effectiveness and efficiency of the European research community.

33. Research is international and the UK attracts an international research workforce. Of the total academic staff employed by UK Higher Education Institutions in 2013/14 (including both teaching and research staff), 15% were non-British EU nationals and 11% non-EU nationals.³⁰ European funding can support this mobility. Over Framework Programme 7 (2007-2013), 3454 UK based researchers received funding from Marie Skłodowska-Curie Actions, and 8120 overseas researchers received Marie Skłodowska-Curie Action funding to visit UK organisations.³¹

²⁷ Royal Society, British Academy, Academy of Medical Sciences and Royal Academy of Engineering joint response, *Government review of the Balance of Competences between the United Kingdom and the European Union*

²⁸ Royal Society, British Academy, Academy of Medical Sciences and Royal Academy of Engineering joint response, *Government review of the Balance of Competences between the United Kingdom and the European Union*

²⁹ European Commission, 2012, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – A Reinforced European Research Area Partnership for Excellence and Growth*: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0392&from=EN> (accessed 20/10/15)

³⁰ HESA (2015) *Overview of 2013/14 staff data*

³¹ European Commission, 2015, *FP7-PEOPLE Marie Curie Actions Country fact sheets*

34. In addition a number of specific EU initiatives seek to promote and support bilateral and multilateral research collaborations between member states. These include Joint Programming Initiatives (JPIs), Joint Technology Initiatives and a number of European intergovernmental agreements and frameworks.

Research infrastructure

35. Broadening access to different pieces of research infrastructure (RI) also represents an important part of the European and international research landscape. The research value of national research infrastructures can be greatly increased by creating international networks and granting reciprocal access to researchers based elsewhere. Different countries, including the UK, play host to the headquarters of international research facilities. The EU provides a forum, the European Strategy Forum on Research Infrastructures (ESFRI), for member states to plan and coordinate international research facilities and provides some start-up funding while operating costs are usually borne by participating countries. Framework Programme 7 earmarked €1.85bn for research infrastructures and Horizon 2020 about €2.4bn.³²
36. Over the course of FP7, 3539 UK-based researchers have been supported to access 1055 European RIs.³³ Moreover, 107 UK national RIs receive support from the EU to grant access to international researchers, fostering collaborations and the exchange of ideas.³⁴ EU funding is also available to create and coordinate Europe-wide networks of RIs in the same research area.³⁵
37. The UK hosts the headquarters of 6 pan-European RIs, with facilities distributed across multiple participating countries.³⁶ The UK also hosts 10 facilities that are part of Pan-European RIs headquartered in other European countries³⁷ and is a member of pan-European RIs entirely based beyond its borders, such as the European Hard X-Ray Free Electron Laser (European XFEL) based in Germany. They are funded by participating countries but the EU can support planning and coordination of these through the European Strategic Forum on Research Infrastructures (ESFRI). The 6 UK-headquartered pan-European RIs are:
- a. High Power Laser Energy research Facility (HiPER) - Harwell, Oxfordshire (Central Laser Facility)³⁸
 - b. ELIXIR (European Life-science Infrastructure for Biological Information) - Hinxton
 - c. Integrated Structural Biology Infrastructure (INSTRUCT) - Oxford
 - d. Infrastructure for Systems Biology-Europe (ISBE) – London (Imperial College)
 - e. Square Kilometre Array (SKA) – Manchester (Jodrell Bank)
 - f. European Social Survey (ESS ERIC) – London (City University)

³² European Commission website https://ec.europa.eu/research/infrastructures/index_en.cfm?pg=framework_prog Accessed on 20 November 2015

³³ Direct communication from the European Commission

³⁴ European Commission, map of national research infrastructures. Accessed on 21 Aug 2015.
https://ec.europa.eu/research/infrastructures/index_en.cfm?pg=mapri

³⁵ A list of FP funded networks of RIs can be found at
https://ec.europa.eu/research/infrastructures/index_en.cfm?pg=ri_projects_fp7

³⁶ European Commission, map of Pan European research infrastructure. Accessed 21 Aug 2015.
https://ec.europa.eu/research/infrastructures/index_en.cfm?pg=mapri_european

³⁷ European Commission, map of Pan European research infrastructure. Accessed 21 Aug 2015.
https://ec.europa.eu/research/infrastructures/index_en.cfm?pg=mapri_european

³⁸ The HiPER project is currently in planning phase and the location of the actual facility has not yet been established. The Central Laser Facility in Harwell currently coordinates the project.

38. The UK is also a part of 12 European intergovernmental research organisations. Each of these organisations has its own institutional arrangements and membership rules, and the EU plays a different role in each. Some, such as the ITER fusion experiment, are directly managed by the EU. Others predate the EU itself and receive only a marginal part of their budget from the EU, such as CERN.
39. It is difficult to quantify the role of the EU in establishing these bilateral and multi-lateral collaborations and whether they would develop in its absence. For example, the European Organisation of Nuclear Research (CERN) was not an EU-initiated project. However it developed at the same time as the European Union was forming and was one of Europe's first joint ventures so should not be considered in isolation. The EU has 'observer status' at CERN and, while its direct investment is relatively low, EU-funded research projects conduct work at CERN and collaborate with researchers working there. Similarly the European Space Agency (ESA) is not an agency or body of the EU but maintains close ties with it. The two organisations have jointly developed a European Space Policy. Roughly 23% of ESA's funding in 2015 was provided by the EU, which is more than an individual member nation.
40. Another example is the European Molecular Biology Organisation (EMBO). This led the creation of the European Molecular Biology Laboratory (EMBL) in 1974 that is now housed in 5 sites in Europe including the European Bioinformatics Institute in Hinxton, UK. EMBL is funded by its individual member nations with additional contributions coming from external private investment. EMBO and EMBL work closely with the EU but are independent of it.
41. As part of its work to better understand the impact of the UK's membership of the EU on UK research and its international scientific collaborations, the Society is planning to gather information on the mobility of researchers. The Society will share its findings with the Committee in due course.

Regulation

42. The Royal Society plans to do further work to analyse issues around regulation and will keep the Committee informed of progress. Below we comment on a few specific examples that the Society has engaged with over recent years.
43. The introduction of EU legislation and regulation across the 28 Member States can foster cross-border collaborations by harmonising the procedures under which research is conducted. However it must be carefully designed so as not to be unnecessarily prohibitive for research. For example, the 2001 Clinical Trials Directive aimed to harmonise the standards of trials in the EU, facilitating multi-centre collaborations and promoting multi-national trials. However there were difficulties with its implementation in practice, leading to the development of a Clinical Trials Regulation in 2014 to replace it.
44. Current plans to revise EU data protection legislation with a General Data Protection Regulation have raised concerns that the proposals could prevent important research making use of personal data. The original draft Regulation provided research exemptions allowing for research using personal data, subject to certain safeguards. However, amendments introduced by the Parliament removed these. Negotiations are expected to conclude shortly and the Regulation will, if adopted, be directly binding in all member states. This illustrates the need for Government and UK stakeholder groups to maximise their engagement with all the European institutions to ensure that new legislation, particularly that which is not directly focused on research, does not result in unintended consequences for research.
45. It is important to note that non-EU countries that access EU research funding are obliged to conform to relevant EU regulation.

46. The Society is currently following other areas where the EU plays a regulatory role including intellectual property, copyright and open access.

Scientific advice

47. Policy making is increasingly dependent on complex evidence that could help unlock solutions of great economic and social value. It is crucial that policymakers can access independent expert advice and structures must be in place to ensure they can do so.
48. Currently, the European Commission receives advice from a number of arms-length agencies (such as the European Food Safety Authority, EFSA), expert committees and its own in-house research service, the Joint Research Centre (JRC). Other EU institutions also need and receive expert advice. The European Parliament for example, has a dedicated in-house Research Service, the EPRS. Its functions are similar to the Library services of the UK parliament and the UK Parliamentary Office of Science and Technology (POST). Moreover, informal mechanisms exist to provide scientific advice to EU policymakers. For example, scientific academies and their European networks can brief EU parliamentarians and civil servants on scientific issues of policy relevance.
49. The Society welcomes the Commission's renewed commitment to obtaining high-quality scientific advice with the announcement in May 2015, of a new Science Advice Mechanism (SAM), replacing the expired post of Chief Scientific Advisor to the President of the Commission. The Society was pleased to contribute to the development of this new advisory mechanism. It is particularly welcome that this will be adequately resourced by a secretariat of around 25 officials from the Commission.
50. By institutionalising the role of the European networks of scientific academies to engage with the SAM, and providing financial support to enable them to do so, this new structure could offer a powerful instrument to deliver effective scientific advice to EU policymakers. The Society will engage with the SAM through its membership of two European academies networks, EASAC (European Academies Science Advisory Council) and ALLEA (All European Academies).
51. As the new system is still in the process of being established, it is too early to assess its effectiveness.
52. Many international agreements could benefit from the input of scientific evidence during their development. National governments and the EU provide routes by which this may be possible. For several international conventions the EU exercises its right to vote "en-bloc" on behalf of its Member States (MS). However the EU's negotiating power can be limited if member states cannot agree the negotiating position. For example, the EU Negotiations at the Conference of the Parties (COP) meeting in Copenhagen, December 2009 broke down at least partly due to the lack of flexibility for the EU to change its position - unanimous support of member states was required to change the agreed negotiating position.
53. With The Lisbon Treaty – signed in December 2009 – the European Parliament gained the right to veto future international agreements, which may serve to strengthen the influence of EU member states in global negotiations. The Warsaw Conference of the Parties in 2013, involved a delegation of 10 Members of the European Parliament, accompanied by members of Committee secretariats including Environment, Public Health and Food Safety. They entered into a series of bilateral meetings with MPs, NGOs and charities, and also received briefings from think tanks.

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