

Russell Group response to House of Lords Science and Technology Committee inquiry:

The relationship between EU membership and the effectiveness of science, research and innovation in the UK

1. Summary

- Science is a global pursuit and is most effective when ideas and people are mobile across borders. The free movement of talent, the networks, collaborations, critical mass of research activity and the irreplaceable source of funding that we gain from EU membership are important to underpin the competitiveness of our leading universities and the UK economy as a whole.
- The UK should remain at the heart of a modernised, competitive and outward-looking European Union to drive world-leading research and innovation and bring significant returns for the UK economy.
- However, we support calls for reforms to the EU particularly those which enhance our universities' ability to benefit further from forging productive collaborations across Europe. For example: further simplification of some processes in Horizon 2020, changes to VAT rules that currently hamper scientific collaboration and ensuring a sensible Data Protection regime that does not compromise important research.
- The UK's membership of the EU brings a number of advantages for science, research and universities in particular:
 - Membership of the EU allows us to be part of a wider network with a critical mass of excellent researchers working together, making us even more competitive with the likes of the US and others.
 - The ability of universities to recruit staff and to attract students from other EU countries without having to negotiate the UK visa system, with the attendant expense and administrative burden for both parties, is very valuable.
 - The UK leads Europe in the quality of our research and drives excellence across Europe. Our researchers have won many more awards from the European Research Council (ERC) than our nearest competitor – the UK wins 22% of ERC grants (with the Russell Group winning 17% of the total on its own), compared to Germany's 14%.
- Exit from the EU would mean that the UK would lose its seat at the table in Europe, thus minimising the influence we are able to exert. What is more, we may continue to be bound to many EU rules, particularly around trade and those which impact the Single Market, without having a say on their formation.
- Whilst we can only speculate about the impact of withdrawing from the EU, since we have no precedent to guide us, what we know for certain is that, for all the reasons set out in this paper, our membership of the EU to date has been of significant benefit to science, research and innovation in the UK.

2. EU-level collaboration is critical for UK research

- 2.1 **Science is a global pursuit and is most effective when ideas and people are mobile across borders.** Indeed, international collaboration and researcher mobility have been identified as being core to the maintenance and further development of the UK's world-leading position as a research nation.¹ Nearly half of all UK academic articles result from international collaboration and these articles typically have a higher impact.² The EU provides an essential platform for these important collaborations to take place, which are underpinning the strength of the UK's own science base.
- 2.2 The UK has considerably higher collaboration with EU research partners than with those in the rest of the world.³ Indeed, over 80% of the UK's internationally co-authored papers are written with partners from other EU countries.⁴ Although not all collaborations will be the direct result of EU-funded projects, the benefits of being able to work with colleagues across Europe, to create networks, travel to other workplaces and share equipment with ease must not be underestimated.
- 2.3 Under Framework Programme 7 (FP7, 2007-2013), the UK made nearly 100,000 collaborative links with other EU Member States.⁵ Networks initially created through EU programmes or initiatives can form the basis of much longer-term collaboration between researchers, institutions and nations and are at the heart of wider international engagement. Furthermore, the partnerships created between institutions through EU programmes can be beneficial for raising the profile and reputation of a UK university abroad.
- 2.4 EU funding is often targeted at larger, cross-border projects that promote research mobility and thus national funding schemes, even with increased budgets, could not directly replace or compete with EU research programmes. It is important for the UK to be a key participant in these types of projects as one of the leading scientific nations in Europe.
- 2.5 The EU also invests in key research infrastructures which would not be possible to build at a national level, for example due to the scale of funding needed, the critical mass of usage needed to justify its construction, or because the risk to one nation would be too great. This allows the UK to access and take advantage of large-scale infrastructures and also avoids duplication of efforts. An example of this can be seen in **Annex A**, which describes the University of Southampton's engagement with an EU project to develop an ultra-deep-sea research robot.
- 2.6 Another pertinent example is that of ELIXIR, the European infrastructure for biological information, which brings together life science organisations across Europe to manage and safeguard the enormous amounts of data being generated every day by publicly-funded research. The ELIXIR hub is based in Hinxton, Cambridge. As Professor Dame Janet Thornton, former Director of EMBL-EBI and coordinator of the preparatory phase of ELIXIR said: 'This funding puts Europe in a uniquely strong position to solve some of society's most pressing problems, with the UK right in the middle of the action.'⁶

¹ International Comparative Performance of the UK Research Base – 2013 A report prepared by Elsevier for the UK's Department of Business, Innovation and Skills (BIS).

² International Comparative Performance of the UK Research Base – 2013. For further evidence that the best science comes from international collaboration see: 'The fourth age of research', *Nature* 497, 557-560 (2013).

³ Review of the Balance of Competences between the UK and the EU: Research and Development.

⁴ International Comparative Performance of the UK Research Base – 2013.

⁵ Seventh FP7 Monitoring Report.

⁶ <http://www.elixir-europe.org/news/uk-invests-%C2%A375-million-european-research-infrastructure-support-knowledge-based-economy>

Free movement of people

- 2.7 The strength of UK higher education internationally lies in its quality and diversity, including the ability to attract the most talented staff and students from within and outside the EU.

Staff

- 2.8 Russell Group universities employ staff from every EU Member State, totalling over 20,650 employees. These staff members make up 20% of the academic workforce at our universities.⁷ In fact, Russell Group universities employ a third more academic staff from EU countries than non-EU countries and prominent European academics are involved in cutting-edge research at our universities, generating the innovation that will create the jobs of the future for the UK.
- 2.9 Were the UK to leave the EU, the researchers and academics that universities currently recruit from EU nations may become subject to current immigration restrictions through the Tier 2 (Highly Skilled) route, including the annual cap on visas of 20,700, which is already over-subscribed. Whilst PhD level positions are prioritised within the cap, bringing in applications from EU nationals in future would significantly increase the pressure on the cap and may mean that PhD level positions could be negatively affected. Such an outcome may also make it much harder for universities to recruit to highly specialist non-PhD roles, such as project engineers, software developers and technicians, from both the EU and other non-EU countries.
- 2.10 A recent report produced for the Department of Business, Innovation and Skills (BIS) found that the primary driver of research excellence is excellent researchers. It also identified one of the potential impediments to excellence as the actual or expected time and effort associated with recruiting individuals that need a visa to work in the UK.⁸
- 2.11 If the numbers of EU researchers were to drop as a result of the UK's withdrawal from the UK, it is not necessarily the case that they could be replaced easily by UK nationals (particularly in the short term), who are unlikely to have the specialist skills, expertise and experience to match those brought to the UK by excellent European academics.

Students

- 2.12 Excellent international students are indispensable for world-class universities, contributing to a diverse student body and a thriving society, culture and economy. If we are to maintain our place as a global leader in higher education and research then the UK must continue to attract the very best students from across Europe. International students make a vital contribution to the success of our universities and are often highly motivated and entrepreneurial.
- 2.13 Furthermore, an international environment with a diverse mix of people is conducive to delivering the most original and innovative ideas. It promotes cross-cultural dialogue, enriches our communities and enhances the student experience. A recent survey

⁷ HESA staff data 2013/14.

⁸ *Growing the best and brightest: The drivers of research excellence*, a report produced for the Department of Business, Innovation and Skills (BIS) by Economic Insight (2014).

found that 87% of students agree that studying alongside students from other countries will improve their world view and benefit their own education.⁹

Potential impact

- 2.14 The costs to the higher education sector of Tier 4 student visa compliance in 2012/13 was estimated at over £66.8 million; but these costs have risen even further over the last year due to the significant number of policy changes since this figure was calculated.¹⁰ There are over 55,000 EU students at Russell Group universities, so visa costs would rise substantially if these EU students also had to enter the UK via the Tier 4 route. At the same time, universities would almost certainly need to pick up the costs of Tier 2 visas for EU staff: the cost of a three-year Tier 2 visa for skilled international staff is £564, so if EU staff numbers can be maintained then this would add a further £12 million in visa costs alone, plus associated compliance and administration costs.
- 2.15 But EU staff and student numbers could fall significantly if the UK were to leave the EU. Of course we do not believe that all recruitment of European staff and students would come to a halt; even without EU membership the UK's leading universities would continue to attract some EU students and staff. However, the extent to which this would have an impact on numbers is not known and would inevitably add significant costs, uncertainty and bureaucracy into the system.
- 2.16 **The ability of universities to recruit staff and to attract students from other EU countries without having to negotiate the UK visa system, with the attendant expense and administrative burden for both parties, is very valuable.** Requiring EU staff to go through the UK visa system would not only be a potential deterrent for prospective staff, but it would add significant costs, red tape and bureaucracy for universities.

Business collaboration

- 2.17 Many EU-funded projects bring together both academic and industry partners from across Europe and the CBI has highlighted that EU funding can support business-university partnerships that might not have been possible otherwise.¹¹ Eight Russell Group universities are partners in the Graphene Flagship project, for example, alongside a wide range of UK and European businesses. This multi-disciplinary network of scientists and companies will work on a whole series of graphene applications, with the aim of creating new products, ideas and jobs with resultant economic impact. More information on this and other examples are provided in **Annex A**, including Queen's University Belfast's collaboration with Novartis and others.
- 2.18 The European Institute of Innovation and Technology (EIT) also has as an explicit aim to facilitate collaboration between academic and business partners. Imperial College London is one of the six co-location centres of the EIT's Climate KIC. Working with a network of over 200 European private, public and academic partners the KIC is working to accelerate and stimulate innovation in climate change mitigation and adaptation by integrating innovation, education and entrepreneurship.

⁹ 'What do prospective students think about international students?' HEPI report 74 (March 2015).

¹⁰ *Final Report: Cost and benefit analysis project on immigration regulation*, Higher Education Better Regulation Group (July 2013).

¹¹ CBI evidence submitted to Balance of EU Competences Review: Research and Development.

Attracting private investment

- 2.19 The UK is the number one destination for Foreign Direct Investment (FDI) in Europe and is increasingly popular as a location for R&D: FDI projects involving R&D increased by 10% last year. In addition, UK Trade & Investment (UKTI) supported the delivery of 34 R&D collaborations involving UK research institutions and organisations, which in their own words are 'creating the building blocks for future growth'.¹²
- 2.20 The UK is more reliant on foreign investment in R&D than many of its competitors: in 2013 over 20% of gross expenditure on R&D conducted in the UK was financed from abroad (compared to around 4% in Germany and the US and the OECD average of 6%).¹³ On the one hand, this is clearly a reflection of the quality, breadth and depth of the UK science base in being able to attract inward investment. But it also shows how dependent the UK is on the ongoing ability to attract this investment; and our continued membership of the EU may well have a significant impact on investment decisions of foreign companies.
- 2.21 In fact, uncertainty over the UK's continued membership of the EU may have a negative impact on foreign investment: EY found that 31% of investors will freeze or reduce investment in the UK leading up to the EU referendum.¹⁴
- 2.22 One of the main reasons foreign companies choose to invest in R&D in the UK is of course due to the excellence of our research-intensive universities and the strength and efficiency of the UK's research base. However, for those outside of Europe, being able to access other European countries and markets from the UK is also an important consideration. This is emphasised in a report produced by UKTI, which describes some of the benefits of locating overseas Life Sciences investment in the UK by stressing our close link to Europe and the EU.¹⁵
- 2.23 This view has been echoed by the Centre for Economic Reform (CER) who explain that market size is a major determinant of the size of FDI flows, and membership of the EU expands the UK market.¹⁶ Locating business in the UK also gives multinational enterprises a platform from which they can influence EU policy-making, which would no longer be the case if we withdrew our membership.

Collaboration beyond the EU

- 2.24 We have not found any evidence that collaborations have been inhibited by the UK's membership of the EU. Indeed, the EU facilitates collaboration with non-EU countries; the EU has science and technology agreements with 20 countries and researchers from many of these countries participate in Horizon 2020 and previous programmes.¹⁷ EU collaborations can attract partnerships with other international partners, such as the US, producing a collaborative rather than competitive approach in certain cases.

¹² UKTI Inward Investment Report 2014 to 2015: <https://www.gov.uk/government/publications/ukti-inward-investment-report-2014-to-2015/ukti-inward-investment-report-2014-to-2015-online-viewing>

¹³ OECD Main Science and Technology Indicators, 2013 (GERD financed from abroad). OECD average figure quoted is from 2012 as the 2013 figure is not available.

¹⁴ EY 2015 UK attractiveness survey.

¹⁵ *Unlock Your Global Business Potential: The New UK Life Science Prospectus* – UKTI guide providing an overview of the UK's life science industry including opportunities for investment for overseas organisations (April 2014)

¹⁶ *The economic consequences of leaving the EU* (June 2014).

¹⁷ For example, in the first 18 months of Horizon 2020 US partners submitted 911 eligible proposals, in particular focusing on Marie Skłodowska-Curie Actions.

- 2.25 The EU can also provide a mechanism for involvement in global initiatives. For example in the African Monsoon Multidisciplinary Analysis project (see details in **Annex A**) allowed Europe to take the lead in an area normally dominated by the US.¹⁸
- 2.26 However, it should be noted that whilst UK universities collaborate extensively with partners outside the EU, our institutions are also in competition with those countries. **The UK's membership of the EU allows us to be part of a wider network with a critical mass of excellent researchers working together, making us even more competitive with the likes of the US and others.**
- 2.27 In 2013 the UK spent about \$40 billion on R&D, less than a tenth of the US spend in the same year (\$457 billion). The 28 EU Member States together, however, spent \$342 billion – still less than the US, but a much more comparable figure.¹⁹ Added to this is the EU's own research funding budget, around €11 billion (roughly \$14.5 billion) in 2013. Whilst national research projects and programmes in the different EU Member States boost research capacity and expertise, the EU programme provides an additional mechanism (and funding) to bring together the leading experts from across the continent to collaborate on a scale that is globally competitive.
- 2.28 In addition, the EU's framework programme, freedom of movement rules and other structures actively promote and facilitate collaboration and mobility of researchers between EU countries, which is not the case for partnerships with the US, for example, where arrangements can be of a more *ad hoc* nature.²⁰ There can also be issues of 'double jeopardy', where two different national funders need to agree to support a project (thus requiring some synchronisation in funding cycles), which can be a barrier to international collaboration that is not an issue for collaborations funded by the EU.
- 2.29 The diversity of Europe is also a major factor for collaborating with our closest neighbours. This diversity takes many forms, such as different approaches to research, ways of working and different types of expertise that can deliver unpredictable outcomes; or the diversity of the populations that allow researchers to make novel discoveries in relation to our health or our societies. This diversity cannot be matched by bilateral collaborations with China or the US, for example.

3. Access to EU-level investment

- 3.1 Robust UK Government funding for research, development and innovation remains crucial to the health of the UK economy and to our future global competitiveness, but EU funding is complementary to this. EU level funding enables the pooling of Member States' resources to address global challenges such as climate change and food security. The scale and multinational scope of such work could not be funded by the UK alone and EU involvement provides real added value.
- 3.2 **EU funding is an irreplaceable and increasingly important source of research funding for UK universities.** Russell Group universities won over half a billion pounds (£539 million) in research grants and contracts in 2013/14 from EU sources, an increase of 16% compared to the previous year.²¹ EU government research grants

¹⁸ As noted in the University of Leeds' response to the Balance of Competences Review on R&D.

¹⁹ OECD Main Science and Technology Indicators – Gross Domestic Expenditure on R&D (current PPP \$)

²⁰ This point is noted by Sir Gareth Roberts in his paper 'International partnerships of research excellence: UK–USA academic collaboration': <http://www.immagic.com/eLibrary/ARCHIVES/GENERAL/OXFORD/O060427R.pdf>

²¹ EU sources includes EU government, EU industry and EU charities where grants have to be won competitively – HESA finance data.

and contracts alone now account for 13% of the collective research grant income to Russell Group universities, almost double the proportion compared to 2007/08 (7%).²²

- 3.3 The EU is equivalent to an eighth Research Council for Russell Group universities: in 2013/14 they won more in research grants and contracts from EU government bodies (£473 million) than from any of the seven UK Research Councils.²³
- 3.4 The UK has had an outstanding level of success in Framework Programme 7 (FP7) and this has provided significant intellectual and economic value to the UK, on which we can build in Horizon 2020:
 - The UK secured €6.94 billion from FP7, second only to Germany.²⁴
 - The UK hosts the highest number of European Research Council (ERC) grants of all Member States: 22% of all ERC grants (including 17% at Russell Group universities) compared to 14% in Germany, our nearest competitor.²⁵
- 3.5 As well as boosting key areas of research and facilitating activity at a larger scale than might be supported in the UK alone, EU funding can also help to sustain areas of research when funding is not available at a national level. For example, Russell Group universities have received EU funding in areas such as cosmology and anthropology, which has been provided on a level that would not have been possible through UK sources alone. In this way, EU funding allows UK researchers to maintain a core of excellent research capability and capacity in a range of areas even if they may not be national priorities at the time, allowing excellence in particular fields to flourish.
- 3.6 The approach of the ERC is especially complementary to the UK's national approach as it focuses on excellence and does not prescribe policy-driven outputs. The success of ground-breaking ERC-funded projects has also prompted action by the UK Government, such as investment in graphene. Furthermore, the UK's success in securing these grants, which are only awarded to the absolute best in Europe, gives a clear indication to the rest of the EU of the excellence of the UK's research base. This creates a positive feedback effect since the prestigious nature of the awards attracts the top researchers to the UK, which then further enhances the UK's science base.
- 3.7 In 2014/15, 17% of the ERC's annual budget was allocated for social sciences and humanities (SSH), equating to approximately €283 million.²⁶ This is almost the same as the combined budgets of the AHRC (£98 million) and ESRC (£153 million) – which together were only allocated 10% of total UK Research Council funding for that year.²⁷ The ERC has therefore provided a very valuable platform from which SSH research can excel in the UK. This is the area in which the UK outperforms other European countries to the greatest extent, winning a third of ERC SSH grants between 2007 and 2014 (171 in total, compared to 72 in the Netherlands, our nearest competitor).²⁸
- 3.8 The ERC is also relatively efficient: only around 2.3% of its operational budget was spent on administration in 2013²⁹. We have not been able to find evidence of the proportion of the overall Horizon 2020 budget spent on administration to make a broader comparison of efficiency. Whilst the research and innovation framework

²² HESA finance data.

²³ HESA finance data.

²⁴ Seventh FP7 Monitoring Report (March 2015).

²⁵ ERC statistics (2007-2014) <http://erc.europa.eu/projects-and-results/statistics>

²⁶ ERC Work Programme 2014.

²⁷ Document produced by BIS: The allocation of science and research funding 2011/12 to 2014/15.

²⁸ ERC Statistics (2007-2014)

²⁹ Seventh FP7 Monitoring Report (March 2015).

programmes have been criticised for being overly bureaucratic in the past, the European Commission is striving to simplify the programme. The new structure of Horizon 2020 has simplified the architecture of the programme, as well as the funding rules and the streamlining of application and award administrations has resulted in efficiency savings. **There is still progress to be made in order to simplify further the Horizon 2020 programme and improve the efficiency with which funds are allocated and distributed**, but the European Commission has shown willingness to work on addressing some of the outstanding problems and this is something we are following-up.

4. Regulation

- 4.1 There are a number of EU regulatory frameworks that adversely affect the science and research community. It is possible that if the UK were to leave the EU the UK may have more flexibility to set its own regulations which may be beneficial for science and research. For example, **the UK is bound by EU rules on VAT which can hamper scientific collaboration.**³⁰ In theory as a non-EU member the UK could relax some of the rules to better facilitate university-business and university-university collaborations.
- 4.2 There are also potential threats to UK research from EU regulations in the future, for example **potential changes to data protection rules could have serious consequences for research using personal data, making it at best unworkable and at worst illegal.** Another example concerns the realisation of the European Research Area (ERA). The ERA is currently being achieved through a voluntary approach between Member States, which allows the UK to maintain its high quality research practices and share good practice with other countries; but there has previously been discussion of imposing regulation in this area.³¹ **Legislating for the ERA could potentially have negative impacts on the UK's currently world-class research system by adding bureaucracy, burden and unnecessary new rules.**
- 4.3 However, in many cases, our membership of the EU allows the UK to influence regulations to the benefit of the UK and the rest of Europe. The Russell Group alongside other research organisations such as the Wellcome Trust and Cancer Research UK have worked together to raise awareness of the serious concerns for research in proposed in amendments to the draft Data Protection Regulation and have worked to influence and inform MEPs, European Commission officials and UK representatives in the Council. Although the final agreement on the Regulation has yet to be reached, we are hopeful for a much more positive outcome for research using personal data as a result of UK engagement and influence, which would benefit not just the UK, but research – and by extension competitiveness – all across Europe. The UK has also been a vocal opponent of legislation on ERA, ensuring this approach has been resisted so far.
- 4.4 The UK has played a key role in shaping the design and implementation of the EU's research programmes to ensure funding is allocated on the basis of excellence rather than diverted to less research-intensive regions of Europe to build research capacity. We have been able to share existing good practice in the UK to help EU science and research to be as effective as possible. This has helped strengthen the research base

³⁰ Interpretation of VAT legislation has hindered equipment sharing between institutions as it requires an institution to levy VAT when charging to another institution's grants, significantly reducing the financial benefits of equipment sharing – unless special arrangements such as cost sharing groups are established. In addition, universities can only benefit from zero-rate VAT on new buildings if 95% of the use is for non-business use, thus deterring collaboration between universities and businesses.

³¹ The former Commissioner for Research and Innovation Máire Geoghegan-Quinn said she 'wouldn't rule out the legislative route'.

across Europe by providing a competitive system that drives excellence. If we were to leave the EU, we would lose the direct ability to influence the way in which science is conducted in Europe and would simply become a ‘passenger’ for regulation imposed at EU-level, which would nonetheless affect UK researchers and institutions through collaborations with European partners.

- 4.5 In addition to the framework programme for research and innovation, there are other examples of European regulations which are of direct benefit to science and innovation in the UK. For example, the development of the Unitary Patent means that a university, a spin-out, start-up or a larger company can protect its innovation ideas with a single patent that covers 25 different EU countries. The European Commission estimates this will cost the applicant less than €5,000 in renewal fees over 10 years compared to the previous level of around €30,000, as well as reducing the administrative burden of patent applications.³²
- 4.6 UK scientists have actively engaged in informing and influencing EU public policy on a range of issues. For example, they played a key role in ensuring that the budgets for the ERC and Marie Skłodowska-Curie Actions were protected from cuts in the recent negotiations on the establishment of the new European Fund for Strategic Investments (EFSI). In addition to the Russell Group and other UK research organisations raising concerns and engaging with policymakers, UK or UK-based Nobel Laureates and Laureates of other international prizes also fought to protect these budgets and Sir Paul Nurse, President of the Royal Society, had a high-level meeting with President Juncker on the issue.
- 4.7 **Exit from the EU would mean that the UK would lose its seat at the table in Europe, thus minimising the influence we are able to exert particularly to achieve the reforms we want. What is more, we may continue to be bound by many EU rules, particularly around trade and those which impact the Single Market, without having a say on their formation.**

5. Conclusions on EU membership and research and innovation

- 5.1 This paper aims to illustrate some of the benefits to UK research and innovation through our membership of the EU, including:
 - (a) Free movement of people, which allows the UK’s research-intensive universities to recruit the very best staff and students from across the continent without having to negotiate the UK visa system, with the attendant expense and administrative burden for both parties
 - (b) Access to the EU networks, infrastructures and the research programme, which provide a platform for international collaboration and an important source of funding
 - (c) The ability to influence research-related policies and decisions by having a seat at the negotiating table and through the mobilisation of UK scientists, research organisations and other groups to ensure UK views are heard and represented in Brussels
 - (d) The opportunity to raise the quality of research across Europe, driving excellence for the benefit of the UK and EU economies and our global competitiveness.

³² Statement by Internal Market and Industry Commissioner Elzbieta Bieńkowska on the Unitary Patent (25 June 2015).

- 5.2 The question is whether some or all of these benefits could be maintained if the UK were to withdraw membership of the EU. In some cases, it is difficult to know because we do not know what 'out' means for the UK and what the UK Government might be able to negotiate with the EU if we were to leave.
- 5.3 In this respect, it is in theory possible we could still access Horizon 2020 or future EU research programmes as an Associated Country. However, this cannot be taken for granted and Switzerland provides a fitting example of this. Following Switzerland's referendum in February 2014 on immigration quotas, the EU revoked Swiss access to Horizon 2020 and Erasmus+. The Swiss were able to negotiate partial access to Horizon 2020, but only for 2014-2016 (not for the duration of the programme, which runs until 2020) and they are only eligible to participate on Associated Country terms for one part of the programme (the Excellent Science pillar) – they therefore only have access to less than a third of the total budget. Perhaps more importantly, Swiss researchers cannot access the most collaborative elements of Horizon 2020 on the more favourable Associated Country terms such as the Societal Challenges calls.³³
- 5.4 It is possible that the UK could try to maintain some form of free movement with the EU, but again, this cannot be taken for granted and we do not know what terms or conditions could be put in place or what the impact would be on the UK's leading universities in terms of their ability to attract and recruit the best and brightest people from across Europe. It is safe to assume that if EU staff and students had to go through the current visa system in the same way as non-EU internationals must, it would add considerable cost, time and burden to universities and could well act as a significant deterrent to coming to study or work at a UK university. In turn, this would have real knock-on consequences on the excellence of the UK's research base, on our economy and on our global competitiveness.
- 5.5 However, one of the most important aspects that we would certainly lose if the UK were to leave the EU is strong UK influence on EU policies and regulations (which may continue to impact us even if we were no longer an EU Member State). Whether we were to operate as part of the European Economic Area, alongside Norway, negotiate bilateral agreements, similar to Switzerland, or agree a bespoke arrangement for the UK, in practice we would not be able to maintain the currently strong influence the UK has in Europe.
- 5.6 The UK was ranked at the top of a recent soft power index. As explained in the accompanying report, this is because from the G-7 to the UN Security Council to the European Union, Britain has a seat at virtually every table of international consequence.³⁴
- 5.7 **The EU is not perfect by any means and we would support EU reforms particularly those which enhance our universities' ability to benefit further from forging productive collaborations across Europe.** One of the Prime Minister's key areas of reform is to boost the competitiveness and productivity of the EU; research and innovation should be at the heart of this, as key drivers of growth and jobs. There

³³ Following the result of the Swiss referendum the Head Physician of Basel University Hospital made the following remark about an application for a large EU project on diabetes which would involve 22 European countries and the US: 'This is really the type of work we cannot do without international collaboration because in a country the size of Switzerland we can never enrol enough patients for such a large trial. And there is no other single institution to finance such a large project': http://www.swissinfo.ch/eng/horizon-2020_eu-snub-leaves-swiss-research-community-in-limbo/38369904

³⁴ Another key component leading to our number one ranking is our ability to attract international students. Index compiled by McGlory, J., *The Soft Power 30: a global ranking of soft power* (July 2015).

is also a focus on cutting red tape, which would be welcome, particularly if the regulatory burden on UK universities could be reduced.

- 5.8 Whilst we can only speculate about the impact of withdrawing from the EU, since we have no precedent to guide us, what we know for certain is that, for all the reasons set out in this paper, our membership of the EU to date has been of significant benefit to science, research and innovation in the UK.**
- 5.9 The UK should remain at the heart of a reformed, modernised, competitive and outward looking European Union to drive world-leading research and innovation and bring significant returns for the UK economy.**

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Annex A – Examples of Russell Group engagement in EU projects

EU and UK investments are supporting the development and application of graphene

In 2007, Manchester University scientist Konstantin Novoselov received one of the first European Research Council (ERC) starting grants to investigate the 'Physics and Applications of Graphene'. With fellow Manchester professor Andre Geim he went on to win the 2010 Nobel Prize for Physics for his work. The ground-breaking work on graphene at Manchester led to the establishment of the National Graphene Institute at the University, which was officially opened in March 2015 and is part of a wider £90 million UK government investment in graphene. Alongside this, the European Commission has invested €54 million into a Graphene Flagship project and will be investing a further €50 million a year from 2016. The **Universities of Manchester, Cambridge, Nottingham, Oxford, Sheffield, University College London, Queen Mary University London and Imperial College London** are all partners in the Flagship project.

Tackling disease: why cross-border projects are so essential

Health research particularly benefits from large-scale international collaboration facilitated by EU programmes. Here are just three examples why connecting data, research, knowledge and expertise from many sources across Europe is so important:

- **University College London (UCL)** is one of the leading partners in an EU-funded network of European HIV cohorts and collaborations. Using data from over 300,000 HIV-positive people from many different settings in Europe and beyond, the network's multidisciplinary approach has carried out crucial research on improving the management and life of HIV-positive individuals, whilst exploring differences within sub-groups.
- Researchers at **Queen's University Belfast** are leading a €50 million, Europe-wide project to develop new drug treatments that could improve the lives of patients with cystic fibrosis and bronchiectasis. The consortium, which comprises world-leading lung specialists from 20 organisations across eight European countries and includes industry partners Novartis and Basilea, will develop new 'inhaled antibiotics' to manage chronic lung infection. The programme will also establish the first European patient register for bronchiectasis, providing a unique platform to improve the quality of care for patients across Europe, as well as making it easier to develop and trial new drugs.
- The EU is investing €6 million through Horizon 2020 into a new programme aimed at developing better diagnostic tests and treatments for patients with non-alcoholic fatty liver disease. The project will be coordinated by **Newcastle University**, who will work with partners from the **University of Cambridge**, as well as those in France, Italy, Denmark, Finland and Germany. This will be the largest ever study of its kind to connect research from across the continent in liver disease, which is hoped will enable a greater understanding into the genetic and environmental factors linked to the development of the life-threatening illness.

Working together to improve border controls across Europe

The Oxford Internet Institute at the **University of Oxford** is a partner in FASTPASS, a four-year EU-funded project aiming to find a solution to facilitating quick and easy border crossings for travellers, whilst ensuring border guards can use the range of technological

identification tools to secure against illegal immigration and other threats. The project brings together key stakeholders across the supply chain, including research institutions, system component producers, government authorities and end users, with partners from the UK, Austria, Germany, Finland, Poland, Latvia and Greece. As one of the Oxford researchers involved in the project has commented:

“Each element of this research could be funded separately at a national level, however it is through the direct collaboration and integration of these elements and with these stakeholders, throughout the life of the projects, that accelerates the knowledge and implementation required to develop a global standard.”

Developing equipment and expertise for shared European use and understanding

The **University of Southampton**, along with the UK National Oceanography Centre (NOC), universities in Cyprus and Portugal and nine SME partners from the UK and other European countries are working together to develop the continent’s first ultra-deep-sea robot glider with an €8 million grant from the European Commission. The sole European underwater glider ‘SeaExplorer’ will be modified and improved so it can reach at least 75% of the ocean. Its enhanced capabilities will be able to be used for submarine environmental monitoring, as well as in the oil and gas and sea mining industries to conduct environmental impact assessments for potential sea bed mining and exploration. This kind of large-scale project would not be possible without international collaboration drawing on the best specialist knowledge and expertise from across Europe. In addition, developing this kind of technology at European rather than national level is far more cost-effective and resource-efficient, avoiding duplication of efforts.

International university-business collaboration makes the UK a key player in space science

Alongside scientists from across Europe, three Russell Group universities – the **University of Edinburgh**, the **University of Cambridge** and **University College London** – are key project participants in Gaia, the European Space Agency satellite launched in 2013 which will provide the first 6-Dimensional census of the Milky Way. Gaia is funded by the European Space Agency and the EU’s FP7 Programme. The UK has major roles in the Gaia satellite mission, both in building the spacecraft and delivering the science. In addition to Russell Group universities, UK industry won some €80 million of industrial contracts to build Gaia. The UK also played a central role in developing the Radial Velocity Spectrometer, engineered at the Mullard Space Science Laboratory, University College London, which measures the speed, temperature, size and age of over a billion stars in our galaxy. It is only through academic-business collaborations all across Europe that we can be competitive with other big players in space technology and research, such as the US, Russia and China.

EU funding delivers global collaboration to study global problems

The African Monsoon Multidisciplinary Analyses project (AMMA), co-funded by the European Commission, was established to improve the predictability of weather and climate in West Africa and Southern Europe. Over 140 European, African and American laboratories gathered data for the better understanding of the reasons behind disturbances of the African monsoon. The **Universities of Leeds, Liverpool, Manchester, Oxford, Cambridge, York, Imperial College London and UCL** all participated in the project and a large number of African research institutions also benefitted from the EU funding. Thanks to their effort the mechanisms regulating the monsoon and its societal impacts have started to be unravelled. This project allowed Europe to take the lead in an area normally dominated by the US.