IN-DEPTH ANALYSIS
Requested by the ITRE committee

Brexit and Horizon Europe

Workshop Proceedings
Abstract

This document summarises the presentations and discussions of the workshop on “Brexit and Horizon Europe”, which was held on 21 November 2018. The effects of Brexit on the Horizon Europe Programme were assessed. This document was provided by the Policy Department for Economic, Scientific and Quality of Life Policies, at the request of the Committee on Industry, Research and Energy (ITRE).
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>EFPIA</td>
<td>European Federation of Pharmaceutical Industries and Associations</td>
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<td>ERC</td>
<td>European Research Council</td>
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<td>FP</td>
<td>Framework Programme</td>
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<td>IMI</td>
<td>Innovative Medicines Initiative</td>
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<td>HE</td>
<td>Horizon Europe</td>
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<td>LERU</td>
<td>League of European Research Universities</td>
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<tr>
<td>MSCA</td>
<td>Marie Skłodowska-Curie Actions</td>
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EXECUTIVE SUMMARY

The workshop consisted of three presentations on the topic of Brexit in relation with Horizon Europe, respectively given by Reinhilde Veugelers, Senior Fellow at Bruegel, Katrien Maes, Deputy Secretary-General at the League of European Research Universities, and Elizabeth Kuiper, Executive Director Public Affairs at the European Federation of Pharmaceutical Industries and Associations (EFPIA).

Reinhilde Veugelers gave a general presentation about the potential impact of Brexit on Horizon Europe, and of the European research landscape. She started by showing how the research environment in which Horizon Europe would be implemented was evolving; in particular, research was becoming increasingly multipolar, with the US as a traditional frontier pole, China as a fast-rising star, and Europe as a third major pole, especially quantitatively, but catching up qualitatively. She then highlighted the importance of excellence in that multipolar world. She identified two crucial pathways to excellence: first, openness to scientific talent; and second, the capacity to engage in research partnerships. She then emphasised the role of the Framework Programme in enhancing Europe’s ability to be open and to attract talent, thus reinforcing its central position. Finally, she showed that the UK strongly contributed to Europe’s position on the research scene, especially because of its openness to research. In order to keep its status as an international research pole, the EU should ensure that research mobility and exchanges with the UK were hindered as little as possible after Brexit.

In her presentation, Katrien Maes discussed the specific topic of Brexit’s impact on universities and research institutions. She insisted that all five UK members of the League of European Research Universities (LERU) were willing to stay as close as possible to their continental counterparts after Brexit. In line with Ms Veugelers’ presentation, she described an open research setting as a win-win situation; and therefore, the absence of a deal as a “lose-lose”. She welcomed the fact that Horizon Europe included enhancing international collaboration, which reflected the present-day reality that cutting-edge research took place in a global system; and reminded the audience that LERU advocated for the possibility of associate Horizon Europe membership for neighbouring countries such as Switzerland. She concluded by urging the institutions to act as early and as quickly as possible, in order to prevent Horizon Europe from getting a late start – as had been the case for Horizon 2020.

Ms Kuiper then presented the impact that Brexit could have on the pharmaceutical sector and corporate research. She started by stating the importance of the UK for the whole pharmaceutical industry. She underlined the importance that the sector was giving to patients and public health issues, and presented data showing the importance of its Research and Development (R&D) spending. She reminded the audience about the importance of trade flows between the EU and the UK. Every month 45 million packages are shipped from the UK to the EU27, and 37 million packages travel from the EU27 to the UK. Moreover, the UK contributes 10% of the EU28’s total production; and represents approximately 20% of the EU28’s total R&D spending. She continued by describing the importance of the UK for the continent’s competitiveness, and the mutually beneficial nature of their relationship: while the UK indeed benefited from EU funding, it also enjoyed top-quality research facilities which, in turn, strengthened the EU scientific output. She then argued that researchers’ mobility, as emphasised by other speakers, should be preserved, because it enhanced the quality of research, and because talented individuals should be able to build a fruitful career. She concluded by saying that the UK’s continued participation in Horizon Europe and researchers mobility were both of the highest importance for the pharmaceutical sector; not only for business, but ultimately for the sake of patients and public health.

The three presentations were followed by a questions and answer session.
1. WORKSHOP PROCEEDINGS

The workshop on the impact of Brexit on the Horizon Europe Programme was chaired by Ms Patrizia Toia, Vice-Chair of the Committee on Industry, Research and Energy. She introduced the three speakers and welcomed the fact that presentations were given by three female speakers. She invited Reinhilde Veugelers to start with a general overview of the potential impact of Brexit on Horizon Europe.

1.1. The impact of Brexit on research mobility

Reinhilde Veugelers, Senior Fellow at Bruegel

Professor Veugelers started by acknowledging that it was difficult to talk about Brexit and its impact, given the high level of uncertainty about future developments. Her contribution gave recommendations about how Horizon Europe should ideally be developed in a post-Brexit European Union.

First of all, she showed how the research environment in which Horizon Europe would be implemented was evolving; in particular, that the research was becoming increasingly multipolar, with the US as a traditional frontier pole, China as a fast-rising star and Europe as a third major pole, especially quantitatively, but catching up qualitatively. It remained though less dynamic than China. She described the implications that this multipolarity had for Europe and European research. There, the importance of excellence had to be highlighted. She identified two crucial pathways to excellence: first, openness to scientific talent; and second, the capacity to engage in research partnerships. This last pathway was not only important for science excellence, but also for the positioning of Europe as a pole of its own. She then emphasised the role that the Framework Programme could have in enhancing Europe’s ability to be open and to attract talent, thus reinforcing its central position. The last point discussed Europe’s position on the research scene after the departure of one of its major players.

The first slide showed how the new geography of research was actually playing out. At the world scale, Europe’s share of most cited publications is comparable to the US’, which though still dominates. The evolution of that indicator over time clearly shows the rise of China: but, more than Europe, it is the US who seem to have given space to the Chinese rise, and saw a decline in their own share – though they remain the largest player. The UK’s contribution to maintaining Europe’s position is very significant, but excellence is still well distributed across EU countries, and some countries are expected to rise in the future.

How then do we build excellent science? The first way is to attract talents: mobility plays a crucial role. In Europe, Switzerland is among the countries that are most open to talent inflows; the UK is also very open. Germany and France are too, though it is less visible in the data because of their size. It appears that countries that attract more foreign talents achieve higher scores in research excellence, and that being excellent attracts even more talents, resulting in a virtuous circle. That is namely why the US manages to be a top player. On the continent, that is also why Switzerland and the UK are in a top position. In China, the narrative is different: the inflow is strong, and includes a lot of returnees, but its quality is still lower than the US’. Outflows’ quality on the other hand is significantly higher: China is building up excellence by sending out its best elements, mostly to the US, in the hope that they will then return.

Another important pathway is the ability to collaborate with the best researchers, wherever they are. Scientific output emerging from international collaboration is generally of much higher quality than
when based on national collaboration, or the absence of any. That is visible in the cases of the UK and Germany.

In that context, to what extent do our policy instruments, and namely our Framework Programmes, allow to ensure mobility of talent and international collaboration? The data shows that international collaboration happening within the Framework Programmes remains mostly intra-EU, and therefore limited. Until today, the EU countries most involved in collaborating with the UK were big players such as Denmark, Norway, The Netherlands, Germany, Switzerland; they would be the ones to suffer the greatest loss from Brexit in terms of research partnerships.

Regarding the ability to attract talent, the European Research Council (ERC) is another important tool for mobility, thanks to the portability of the grant it provides. The UK fares very well in the ERC, attracting talents from the EU, in particular from Italy, Germany, and Spain. In that aspect too, these countries would suffer from the UK’s departure.

The last question raised by Ms Veugelers was what the implications of Brexit for Horizon Europe were. The priority should be to keep building excellence in order to stay at the frontier; and in order to achieve that goal, to engage in openness and talent attraction as well as collaboration, within the EU but also with the rest of the world. Irrespective of the precise role the UK would play in the near future (either as an associated or a third country), what matters for the EU is to remain open enough to maintain fruitful exchanges with the UK, allowing to continue building excellence.

Patrizia Toia thanked Professor Veugelers for her very specific presentation, which provided a somewhat concerning picture of the future of European research. She then gave the floor to Katrien Maes, who was going to present Brexit’s potential impact, this time from the specific perspective of the European Research and Technology Organisations.

1.2. The potential impact of Brexit on the HE Programme - perspectives for European Research and Technology Organisations

Katrien Maes, Deputy Secretary-General at League of European Research Universities (LERU)

Katrien Maes started her presentation by presenting the League of European Research Universities, a network of 23 universities in 12 European countries, of which five are based in the UK (Cambridge University, Oxford University, Imperial College London, University College London, Edinburgh University) and two in Switzerland (University of Geneva, University of Zurich), and therefore also associated to the Framework Programme. LERU is involved in advocacy in Brussels on a variety of research, higher-education and innovation issues.

At their biannual meeting in Dublin in November 2018, the LERU rectors discussed the latest Brexit developments. UK members would remain members of LERU regardless of the outcome of Brexit and reaffirmed their wish to maintain their involvement in the Framework Programme. At the same time, they were also setting up bilateral partnerships with continental universities, in order to continue collaboration with them in the post-Brexit world.

Nothing had changed since LERU’s first Brexit statement in 2016: LERU supported its UK members and their engagement in Europe, and wanted to ensure that the outcome of the negotiations allowed cooperation to continue. For LERU and EU27 universities, being able to partner up with the UK actors was a win-win situation; if they were out, it would be a lose-lose.

That position was reiterated by LERU in a statement earlier that year, in May 2018, shortly after Ms May’s speech in which she confirmed the UK’s desire to remain fully involved in Horizon Europe post-Brexit.
LERU is convinced that universities have a crucial role to play in addressing global challenges and that working collaboratively on research across borders in an open manner is essential. To enable this, it is crucial to find a way that will allow the UK to remain a key partner in the production of open research.

LERU calls on the UK government and on the EU27 to make science and innovation a high priority in the Brexit negotiations, and to reach an agreement that will allow researchers and universities to participate in all aspects of the European research area after Brexit. Ms Maes acknowledged that this was difficult to deliver until progress was made on other aspects of the negotiations; but as Professor Veugelers highlighted, this directly concerned the mobility of academic staff, which was a crucial issue for European research.

In July 2018, LERU issued 10 key messages for Horizon Europe (HE). One of these was to enhance international collaboration: the Commission’s plan to do so in Horizon Europe was therefore welcome. LERU would also want to make associate membership to HE possible for all countries that were close to the EU, including the UK and Switzerland; for Switzerland, under the same conditions as before; for the UK, if certain financial conditions were met. In its report, LERU provided some amendments pushing in that direction. It was also stated that LERU did not support limiting the access to some mono-beneficiary schemes – like the Marie Skłodowska-Curie actions (MSCA) – to a small number of associated countries.

Another statement was released earlier in November 2018, jointly signed by 13 European associations representing Europe’s universities, including, next to LERU, EUA (European University Association), CESAER (Conference of European Schools for Advanced Engineering Education and Research), the Coimbra Group, Unica (Network of Universities from the Capitals of Europe), the Guild, and several others. The statement expressed concern about the recent developments in the EP negotiations, which seemed to be undermining the fundamental objectives of the Framework Programme (FP). The FP should continue to set the standards for research excellence in Europe. The fact that a former Commissioner, Ms Geoghegan-Quinn, came forward to say that “HE should stay HE”, and “shouldn’t be allowed to become Cohesion Europe” was quite striking in that regard.

Finally, LERU urged the institutions to act as early as possible. Of course, this was dependent on the Brexit negotiations, and on some aspects of Horizon Europe itself; but it would be regrettable for Horizon Europe to take a late start – that was the case for Horizon 2020, and was certainly not ideal. LERU hoped that any gap in access to the programmes for the UK, while almost inevitable, would be as short as possible; and that all parties would realise that an early win for research would send a good signal for the future EU-UK relationship.

Patrizia Toia thanked Katrien Maes and introduced the next speaker, Elizabeth Kuiper, who was going to address Brexit’s implications for corporate research, on the pharmaceutical sector in particular, a crucial sector for the European continent.

1.3. The potential impact of Brexit on the HE Programme - perspectives for European corporate research

Elizabeth Kuiper, Executive Director Public Affairs at the European Federation of Pharmaceutical Industries and Associations (EFPIA)

Ms Kuiper started her presentation by affirming that from the very beginning of the Brexit negotiations, the pharmaceutical sector had been in constant touch with its UK members, agreeing on the need to keep on working together from a global industry perspective. She underlined that one of the sector’s particularities was that not only the business aspect mattered, but patients and public health issues
were very important too. That was the reason why EFPIA tried to reach out to Mr Barnier at the very beginning of the negotiations, insisting that collaboration with the UK should be maintained. Another very positive point would be to have the pharmaceutical sector – because of its particularities – included in the political declaration that was going to be adopted on Sunday [25 November 2018], allowing it to build on that later on.

Research & Development (R&D) is a major concern for the pharmaceutical industry: in fact, it is the starting point for the development of medicines. That characteristic appears very clearly in the data. It is estimated that the industry spends €35 billion on R&D, and employs 754,000 people in Europe. As Europe is getting prepared for the possibility of a no-deal Brexit, supply chain issues are obviously a major concern as every month 45 million packages come from the UK to the EU, while 37 million packages are shipped from the EU27 to the UK; but research issues are equally concerning, especially given the industry’s global perspective. The UK is a key player: it makes up 10% of the EU28’s total production; it is also contributing approximately 20% of the EU28’s total R&D spending.

The terms of the UK’s withdrawal deal that were going to be adopted on Sunday [25 November 2018] and the stance it was taking on the UK’s participation in HE would have major implications for the pharmaceutical sector’s competitiveness. The UK has unique research facilities that strengthen EU science: that is precisely what makes the EU-UK relationship mutually beneficial. For example, the Wellcome Trust centres is a high-quality institution that has an important role to play for UK researchers that benefit from EU funding. EFPIA together with the European Commission is part of a major public-private partnership, the Innovative Medicines Initiative (IMI) that shows the importance of working together, and of striking a balance between academia and private investment. It is additionally important to maintain venture capital that has been provided by the European Investment Fund and yields high returns.

As pointed out in the previous presentations, the issue of researchers’ mobility is crucial. In the context of IMI, many pharmaceuticals firms, that have hired a great number of foreign researchers, must be able to keep that flexibility post-Brexit, and researchers to move freely between the UK and the EU.

EFPIA strongly supports a system that facilitates the movement of persons. If a scientist has the opportunity to go to the UK, to another EU country, or has access to a global position, the procedure to do so should not be deterrent, but rather pragmatic and straightforward. The pharmaceutical sector relies on highly-skilled scientific staff, and mobility of researchers is therefore of high importance; not only for researchers, but also the future generations that we need to care about. Approximately 16,000 students from EU countries are already registered in UK higher-education institutions; from these, 6,500 will become post-graduates. This underlines the need for a mobile ecosystem for the generations to come.

With the political declaration happening in a few days, it was important that the Council ensured that the UK would be able to participate in Horizon Europe; however of course, such an outcome did not only depend on the Council and the Parliament. Ms Kuiper hoped that common sense would prevail on the UK’s side too.

She concluded by saying that ensuring participation of the UK in Horizon Europe and the European Investment Bank, and ensuring researchers mobility were of the highest importance for the pharmaceutical sector; not in its quality of industry, but ultimately for the sake of patients and public health.

Patrizia Toia thanked Elizabeth Kuiper for her presentation that certainly called for action. The floor was then open for debate; the first person to intervene was Mr Nica.
2. QUESTIONS AND ANSWERS SESSION

The three presentations summarised above were followed by a Questions and Answers session, in which the speakers were asked by the Members of the Committee to elaborate further on certain points.

**Dan Nica:** Mr Nica regretted that those presentations could not have been given before Brexit, and thought that the R&D perspective was not sufficiently taken into account in the negotiations. He underlined that the Parliament had little power now, and that the final decision on the UK’s involvement in Horizon Europe would be taken by the UK government. The Parliament had done what it could, and took the decisions necessary to keep the UK within Horizon Europe. Reacting to the presentations emphasising the importance of researchers’ mobility, Mr Nica also highlighted that a core value of the EU was the free movement of all citizens, and not only that of researchers. He then noted that, in line with Ms Veugelers’ presentation, excellence was a core aspect of Horizon Europe, in particular through a strong focus put on transparency.

**Theresa Griffin:** Ms Griffin agreed with the speakers on the importance of excellence and researchers’ mobility, and welcomed the reminder by Mr Nica that the vote on the UK’s participation in Horizon Europe received cross-partisan support during the Parliament’s vote. She asked how much the speakers thought they were actually listened to by the UK government.

**Clare Moody:** Picking up on the pharmaceutical supply chain issues raised by Ms Kuiper, Ms Moody recalled that a problem of insufficient medical supplies was encountered in the aftermath of Ariana Grande concerts’ terrorist attack in Manchester; and that this problem was solved because additional supplies could have been flown in very quickly from other EU member states. She agreed on the importance of mobility as a fundamental principle. She did not believe that no deal was an option, or that the current deal was satisfactory for the UK; in her opinion, it would only be fair to get back to the British people, and to allow them to make an informed decision about what Brexit would really imply.

**Jonathan Bullock:** Mr Bullock started by reminding the audience that contrary to what was announced at the time, the UK’s economy did not collapse after choosing not to join the Eurozone; neither did it in the immediate aftermath of the referendum. He insisted that supply chain problems raised by Ms Kuiper could be overcome, as was currently the case between the UK and non-EU countries. He stated that a second referendum would be a denial of the people’s will expressed in the first one, especially since the government explicitly stated at the time that the outcome of the vote would be implemented.

**Igor Gräzin:** Mr Gräzin started by saying that if, as the speakers and MEPs seemed to be suggesting, the EU wanted the UK to remain and the UK wanted to remain within the EU, then Brexit was quite inexplicable. In his opinion, MEPs should try and identify the EU’s flaws, and figure out how to correct them. He reckoned that the lack of connection between political elites and the people was a root of the problem.

**Answer from Reinhilde Veugelers:** Ms Veugelers was not convinced that an analogy could be established between the British choice not to join the Eurozone and that of preventing collaborative research: indeed, collaborative research was clearly mutually beneficial for both parties, as shown by extensive evidence on this topic. Brexit seemed difficult to undo, but it was in the interest of both parties to obtain a deal that allowed research to be as open as possible. Obviously, this would depend on how much each party was willing to pay for such a deal. In that context, one should be careful not to focus primarily on the monetary aspect of the question, but rather to include the whole, global benefits. Finally, irrespective of the final form the deal with the UK would take, the status of third countries should more generally be discussed in order to enhance research collaboration.
Answer from Katrien Maes: Ms Maes got back to the issue of mono-beneficiary grants, for example in the case of MSCA fellowships, who benefited only one person. It should be remembered though that research nowadays was almost never done by one person, but rather through collaborative effort: that was the case too for MSCA beneficiaries (and other “mono-beneficiary” schemes, such as the ERC), who did not conduct research alone, but were surrounded by an international team of doctoral and postdoctoral researchers. She was in favour of strong support for MSCA in Horizon Europe: MSCA fellowships encouraged mobility, which ultimately contributed to making Europe stronger. The benefits were even stronger if the UK was in.

Answer from Elizabeth Kuiper: Ms Kuiper acknowledged that there was a lot of understanding on the MEPs’ side of the need for research openness and collaboration; but she was aware that the political nature of Brexit made it hard to apply that understanding to the reality of the negotiations. Reacting to Mr Bullock’s statement about supply chain issues, she underscored that though the industry was indeed used to tackle such problems, the two-year interval of the Art. 50 negotiations was rather challenging, as the pharmaceutical sector had been building on the general convergence taking place at European level over the last decades. Brexit would put an end to that process and would instead lead to divergence, which was less desirable for both EU27 and the UK.

Patrizia Toia closed the session, mentioning in conclusion that, regarding MSCAs, it would be interesting in the future to discuss a way in the new Framework Programme to avoid the risk of fragmentation; in other words, a way to create stronger synergies, giving more cohesion to the individual actions funded by the programme.
ANNEX 1: AGENDA

Workshop on
Brexit and the Horizon Europe Programme

Organised by Policy Department for Economic, Scientific and Quality of Life Policies
at the request of the Committee on Industry, Research and Energy (ITRE)

European Parliament, Brussels
21 November 2018, 17.00 - 18.00
Room József Antall (JAN) 4Q2

Final programme

Opening remarks by Patrizia Toia, ITRE Vice-Chair

Presentation #1 | Overview of the potential impact of Brexit on the Horizon Europe (HE) Programme
By Reinhilde Veugelers, Senior Fellow at Bruegel

Presentation #2 | The potential impact of Brexit on the HE Programme - perspectives for European Research and Technology Organisations
By Katrien Maes, Deputy Secretary-General at League of European Research Universities (LERU)

Presentation #3 | The potential impact of Brexit on the HE Programme - perspectives for European corporate research
By Elizabeth Kuiper, Executive Director Public Affairs at the European Federation of Pharmaceutical Industries and Associations (EFPIA)

Questions and Answers with Members

Closing remarks by Patrizia Toia, ITRE Vice-Chair
ANNEX 2: SPEAKER BIOGRAPHIES

Reinhilde Veugelers, Senior Fellow at Bruegel

Professor Dr. Reinhilde Veugelers is a full professor at KULeuven (BE) in the Department of Management, Strategy and Innovation. She has been a Senior Fellow at Bruegel since 2009. She is also a CEPR Research Fellow and a member of the Royal Flemish Academy of Belgium for Sciences. She currently serves on the ERC Scientific Council. She is a member of the "Research, Innovation, and Science Policy Experts" (RISE) high level group advising Commissioner Carlos Moedas.

Katrien Maes, Deputy Secretary-General at League of European Research Universities (LERU)

Katrien joined LERU in 2004. She has been involved in LERU’s policy development and advocacy activities in many areas, ranging from research funding, management and evaluation, to research careers, doctoral education, professional development, gender equality and diversity issues, research integrity, and more. Katrien is an expert in EU research, innovation and higher education policies, in particular with regard to the European Research Area, ‘Open Science, Open Innovation, Open to the World’ and the Framework Programmes. Katrien has served on many EU expert groups and committees. She is the current chair of the MSCA advisory group to the EC. Originally from Belgium, Katrien lived and worked in the US from 1986 until 2002, first as a doctoral researcher in linguistics, then as an assistant professor of Italian language and foreign language pedagogy at the University of Delaware.

Elizabeth Kuiper, Executive Director Public Affairs at the European Federation of Pharmaceutical Industries and Associations (EFPIA)

Elizabeth Kuiper is currently Executive Director for Public Affairs at EFPIA, the European Federation of Pharmaceutical Industries and Associations. In this role, she leads the advocacy and public affairs of EFPIA and maintains a strong network of contacts with policymakers and other stakeholders. She reports directly to EFPIA’s Director-General and works together closely with the other EFPIA directors active on the Brussels scene.

A Dutch national, she is fluent in English, French, and German.
ANNEX 3: PRESENTATIONS

Presentation by Reinhilde VEUGELERS

Presentation #1 | Overview of the potential impact of Brexit on the Horizon Europe (HE) Programme

Overview of the potential implications of Brexit for EU27 Horizon Europe Program

Reinhilde Veugelers
Senior Fellow at Bruegel
Professor at KU Leuven

Workshop at the European Parliament on
“Brexit and Research Policy”

22 November 2018
Outline

Trends in the Global Research Environment: A multipolar global research world
- The US as a frontier pole
- China as a new very fast rising star pole
- EU/ERA as the largest pole quantitatively, catching up with US at the frontier, but less dynamic than China and losing power without the UK

A multipolar global science world: implications for science
- Shifting flows of scientific talent
  - Open poles at the frontier attract top talent, which helps keep them at the frontier
- Shifting partners for scientific collaboration
  - Poles at the frontier are strong partners for international scientific collaboration which helps keep them at the frontier

A multipolar global science world: impact beyond science
- New technologies, innovations, firms created where science hotspots are
- Firms (multinationals) locating R&D labs close to where hotspots are

Multiple poles in an open global science world with mobility of talent and international cooperation: a win-win for science and innovation?

Implications for Horizon Europe post Brexit

Mapping the new geography of research: the EU pole with/without the UK scientific top publications

Country’s Share in World Top 10% most cited publications

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Source: Bruegel calculations based on OECD, STI 2017; OECD calculations based on Scopus Custom Date, Elsevier, Version 4, 2017, July 2017
For more evidence: see background slides
Brexit and Horizon Europe

Mobility of Talent: a gateway to higher excellence

International mobility of scientific authors, 2016
As a percentage of authors, by last main recorded affiliation in 2016

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Expected citation impact of scientific authors, by mobility profile in 2016
Average 2015 Scimago Journal Rank (SJR) scores

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<td>2.11</td>
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<tr>
<td>UK</td>
<td>2.25</td>
<td>1.92</td>
<td>1.98</td>
<td>1.96</td>
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<tr>
<td>GER</td>
<td>2.26</td>
<td>2.07</td>
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<tr>
<td>FRA</td>
<td>1.80</td>
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<tr>
<td>ESP</td>
<td>1.85</td>
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<td>1.36</td>
<td>1.98</td>
</tr>
<tr>
<td>ITA</td>
<td>1.60</td>
<td>1.55</td>
<td>1.33</td>
<td>1.95</td>
</tr>
</tbody>
</table>


Partners for scientific collaboration: a gateway to higher excellence

Co-authorship links and citation impact in biomedical research

Quality of INAT copubs relative to DOM pubs, World
1.26

Quality of INAT copubs relative to DOM pubs, UK
1.39

<table>
<thead>
<tr>
<th>Country</th>
<th>Share of pubs with international co-authorship</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRA</td>
<td>47.28</td>
</tr>
<tr>
<td>GER</td>
<td>44.69</td>
</tr>
<tr>
<td>ITA</td>
<td>40.87</td>
</tr>
<tr>
<td>SUI</td>
<td>61.76</td>
</tr>
<tr>
<td>UK</td>
<td>44.05</td>
</tr>
<tr>
<td>USA</td>
<td>28.96</td>
</tr>
</tbody>
</table>

Germany 4.19
UK 4.47
6.96
France 4.00
EU’s framework programs: a gateway to excellence?  
Collaborative ties through FP7

For all collaborative projects in the FP7 period a total of about 1.5 million pairings were supported (European Commission, 2014).

- Only 0.4 percent involved a US partner
- Only 0.2 percent involved a Chinese partner

**Source:** E-CORDA

### Collaborative projects in FP7 with UK

<table>
<thead>
<tr>
<th>Above par UK partners</th>
<th>At par UK partners</th>
<th>Below par UK partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>for FP collaboration (in descending order)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DK, IE, NO, NL, DE, CH, SE, FR, BE</td>
<td>ES, IT, IL, PL, EL, CY</td>
<td>BG, FI, EE, PT, LT, AT, CZ, HU, SK, HR, SI, LU, RO, MT, LV</td>
</tr>
</tbody>
</table>

**Source:** Bruegel calculations on basis of E-Corda; Positions above/below/at par are calculated by the ratio of the share of the country in UK’s FP nodes relative to the share of the country in world international pubs

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### Attracting talent through ERC

#### Nat of PI  | Country of HI  | Share of Nat PI to UK  | Success Rate  | Share of Nat PI to UK
--- | --- | --- | --- | ---
UK | UK | 87.8% | 13.5%
UK | DE | 2.0% | 24.3%
UK | IE | 1.5% | 4.3%
UK | FR | 1.5% | 15.9%
UK | NL | 1.2% | 18.3%
UK | CH | 1.1% | 19.3%
UK | SE | 0.9% | 9.2%
UK | ES | 0.7% | 17.9%

#### Nat PI | Country of HI | Succ Rate | Share of Nat PI to UK | % Nat PI STAY
--- | --- | --- | --- | ---
IT | UK | 13% | 7.8% | 5.30% | 75%
DE | UK | 16% | 10.5% | 14.70% | 66%
ES | UK | 11% | 5.3% | 7.50% | 85%
FR | UK | 15% | 5.3% | 15.30% | 81%
NL | UK | 17% | 6.5% | 15.70% | 80%
EL | UK | 9% | 15.3% | 4.10% | 65%
IE | UK | 14% | 25.3% | 10.30% | 63%

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18 PE 631.042
A multipolar global research world: implications for Horizon Europe after Brexit

Engaging in globalisation and managing to benefit

**Excellence in S&T capacity**
- as a hub for in- and outflows,
- as a bargaining chip for scientific cooperation, trade and ideas networks
- as absorptive capacity

**Open circulation intra-EU**
- to allow specialization in hot spots,
- to attract foreign talent
- to allow diffusion of results
  > while avoiding circulation diversion

**Openness at borders (IN & OUT with non-MS partners, incl UK after Brexit)**
- International students & scholars
- Collaboration

A step change in extra-EU openness in Horizon Europe needed compared to the past

Background material
Shifts in the global R&D landscape: the rise of China

<table>
<thead>
<tr>
<th>Year</th>
<th>United States</th>
<th>EU</th>
<th>China</th>
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</thead>
<tbody>
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<tr>
<td>2010</td>
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</tr>
<tr>
<td>2015</td>
<td>2.74</td>
<td>1.96</td>
<td>2.07</td>
</tr>
</tbody>
</table>

GERD (constant PPP $)

- US accounts for 26% of global R&D in 2015
- US and China account for 47% of global R&D in 2015
- US, China and EU account for 67.5% of global R&D in 2015

Source: Bruegel calculation based on NSF, SEI 2018

Mapping the new geography of research: a multipolar global world with China a new rising star scientific (top) publications

Share in World S&E articles (all fields)

Share of US & EU & China of all SciPub in 2016 is 63%

Share in Top 1% S&E Articles

Share of US & EU & China of all TOP SciPub in 2016 is 90%

Source: NSF, S&E Indicators 2018
Mapping the new geography of research: a multipolar global world with China as a new rising star training the next research workforce

S&E First University degrees (all fields)

![Bar chart showing S&E First University degrees for different countries](chart)

Source: Own calculations on basis of NSF, SEI 2018
EU-6: FR, DE, UK, IT, ES, PL
EU-5: FR, DE, IT, ES, PL

Mapping the new geography of research: Universities at the global frontier

### Number of Universities in Top ANRU Ranking

<table>
<thead>
<tr>
<th>Year</th>
<th>Top 20</th>
<th>Top 100</th>
<th>Top 200</th>
<th>Top 500</th>
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<td>United States</td>
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<td>United Kingdom</td>
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<tr>
<td>China</td>
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<td>2012</td>
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<tr>
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<td>Switzerland</td>
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<tr>
<td>China</td>
<td>7</td>
<td>42</td>
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### Number of Universities in Top ANRU Ranking: By Field

<table>
<thead>
<tr>
<th>Field</th>
<th>Top 20</th>
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<th>Top 500</th>
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<td>SCI</td>
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<td>MED</td>
<td>SOC</td>
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<tr>
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<tr>
<td>United Kingdom</td>
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<td>3</td>
<td>3</td>
</tr>
<tr>
<td>China</td>
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<tr>
<td>SCI</td>
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<tr>
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<tr>
<td>China</td>
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</tbody>
</table>

Source: Own calculations based on ANRU (sourced 5/2018)
The UK attracting foreign students

<table>
<thead>
<tr>
<th></th>
<th>94-95</th>
<th>13-14</th>
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<tbody>
<tr>
<td>% foreign students in UK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduates (All S&amp;E fields)</td>
<td>8.8%</td>
<td>13.7%</td>
</tr>
<tr>
<td>Share from Top 4 EU countries</td>
<td>35%</td>
<td>28%</td>
</tr>
<tr>
<td>(Greece, Ireland, Germany, France)</td>
<td></td>
<td>(Greece, France, Germany, Roumanea)</td>
</tr>
<tr>
<td>Share from Top 4 Asia countries</td>
<td>23.4%</td>
<td>13%</td>
</tr>
<tr>
<td>(Malaysia, HK, Sing, China)</td>
<td></td>
<td>(China, HK, Mal, India)</td>
</tr>
<tr>
<td>Share from US</td>
<td>3.5%</td>
<td>3.2%</td>
</tr>
<tr>
<td>% foreign students in UK</td>
<td>28.9%</td>
<td>47.5%</td>
</tr>
<tr>
<td>Graduates (All S&amp;E fields)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share from Top 4 EU countries</td>
<td>19.7%</td>
<td>13.9%</td>
</tr>
<tr>
<td>(Greece, Ger, Ire, France)</td>
<td></td>
<td>(Ger, Greece, Italy, France)</td>
</tr>
<tr>
<td>Share from Top 4 Asia countries</td>
<td>15.6%</td>
<td>30%</td>
</tr>
<tr>
<td>(Mal, China, HK, Sing)</td>
<td></td>
<td>(China, India, S.Arabia, Mal)</td>
</tr>
<tr>
<td>Share from US</td>
<td>3.8%</td>
<td>4.3%</td>
</tr>
</tbody>
</table>

Source: Own calculations on basis of NSF, SEI 2016

Some Bruegel References


Presentation by Katrien MAES

Presentation #2 | The potential impact of Brexit on the HE Programme - perspectives for European Research and Technology Organisations
University of Amsterdam
Universitat de Barcelona - University of Cambridge
University of Copenhagen - Trinity College Dublin - University of Edinburgh
University of Freiburg - Université de Genève - Universität Heidelberg
University of Helsinki - Universiteit Leiden
KU Leuven - Imperial College London - University College London
Lund University - University of Milan - Ludwig-Maximilians-Universität München
University of Oxford - Pierre & Marie Curie University
Université Paris-Sud - University of Strasbourg - Utrecht University
University of Zurich

HORIZON EUROPE & BREXIT

Prof Dr Kurt Deketelaere
Secretary-General, LERU
Full Professor of Law, KU Leuven
Chairman, Sustainability College Bruges
Academic co-operation with the UK remains essential for Europe
14.07.2016

In LERU we fully support our five UK members, will continue to support their ongoing engagement in Europe, and seek to ensure that the outcome of the renegotiated relationship between the UK and the EU enables cooperation to continue. We will draw on the experiences of LERU members to communicate the benefits of international collaboration and show how it is enhanced by the movement of talented staff and students between nations.

LERU statement on the future of European Science and Innovation post Brexit
23.05.2018

LERU believes that the world’s greatest problems will ultimately be solved by universities and other agencies working collaboratively and effectively across multiple national borders, applying open science and open innovation in a way that is open to the world.

In that context it is essential that a way forward is found that allows UK science to continue to be a key contributor to science and innovation in Europe. Over many years of full membership of the EU, the UK has become an integral part of the European research and innovation ecosystem. This has been essential to the development of Science and Innovation, and to prosperity, health, and wealth of citizens in the UK and throughout Europe.
LERU therefore calls upon both the UK government and the EU27 to make science and innovation a high priority in the Brexit negotiations and to reach a solution that will allow scientists and researchers from the UK to continue to participate in all elements and instruments of the European Research Area after Brexit. This is a win-win for both European and UK science with clear positive benefits for all our citizens.

We recognise that this is difficult to deliver until further progress is made on many other aspects of the Brexit negotiations. We appeal to both the UK and the EU27 to find a way forward that leads to a series of workable solutions that are acceptable to both parties. Mobility of academic staff and researchers, for example, remains a critical issue that must ultimately be resolved and in this respect Prime Minister May’s recent speech is very much to be welcomed.
The future co-operation agreement between the UK and EU27 must allow European science and innovation to continue to flourish at the very highest levels of international excellence and to have a major impact on the world we live in. We encourage those involved in negotiations from both the UK and the EU27 to consider the bigger picture. What is at stake here is our combined ability to make a major contribution to the frontiers of knowledge and to the future of humankind.

1. The Framework Programme should continue to set the standard for excellence in Europe

Excellence should be promoted wherever it occurs. Excellent researchers and innovators from all European countries should be stimulated to participate in the FP. We acknowledge that the current R&I divide is pressing, however it should be addressed through the reinforcement of synergies with regional funds and national measures, rather than be treated as a specific objective of the FP.
2. International collaboration between EU member states and other countries must be stimulated

Research activities are in essence international. The FP should stimulate and facilitate participation of third countries. Furthermore, all associated countries should be allowed to fully participate in the FP. This will guarantee the attractiveness of the FP for researchers and innovators and ensure the desired impact.

“UK and Switzerland must be able to associate to, and participate for 100% in, Horizon Europe”

Prof. Kurt Deketelaere
Secretary-General
LERU
Presentation by Elizabeth KUIPER

Presentation #3 | The potential impact of Brexit on the HE Programme - perspectives for European corporate research

Impact of Brexit on Research and Development

21 November 2018, Elizabeth Kuiper Executive Director EFPIA
Overview of EU Pharmaceutical R&D

* The pharmaceutical industry is one of the EU’s most important and fastest growing industries, investing an estimated €35bn in R&D in Europe, employing 745,000 people.

![Ranking of industrial sectors by overall sector R&D intensity](chart)

Science and Research - industry priority for Brexit

* EFPIA has identified science and research as a key policy priority for Brexit.

* Objective: Scientific research collaboration between the UK and EU should be maintained after the UK leaves the EU. EU/UK scientific collaboration strengthens the EU’s global position in life sciences, attracting global life science investments to the EU.

* The UK is a key player in European pharmaceuticals, consisting of 10% of the EU’s total production and contributing approximately 20% of the EU’s total R&D.

* Every €1 of European Investment Fund investment attracts a further €6 of private funds, totalling €16.1bn between 2011 and 2015.
Science and Research - industry priority for Brexit

The terms of the UK’s withdrawal from the EU should include continued participation in Horizon Europe and participation in the European Investment Bank and European Investment Fund.

Doing so will ensure that the EU’s life sciences sector remains globally competitive.

- The UK plays a significant part in strengthening EU science research. UK contributed to 20% of total research work carried out by EU health programmes between 2007 – 2016.
- The UK has unique research facilities which strengthen EU science. These include biorepositories such as the Mary Lyon Centre and the Wellcome Trust Sanger Institute.
- UK venture capital provides significant financial returns for the European Investment Fund. The combined venture capital of UK and Switzerland now make up 55% of European total.

Impact of Brexit on mobility of scientists and researchers

Mobility of researchers, scientists and other employees of the pharmaceutical industry is also a key Brexit priority for EFPIA.

Objective: Agree a straightforward immigration system that allows pharmaceutical companies to employ the best talent from around the world, and that facilities skilled UK and EU nationals working across Europe.
Impact of Brexit on mobility of scientists and researchers

- EFPIA supports an immigration system that facilitates ease of movement for employees, researchers and students.
- This system should be needs based, straightforward, and rapid – avoiding additional costs to industry.
- The life sciences sector relies on highly skilled, scientific staff and the ability to move people across borders to meet business needs. Any restriction in this area will impact on the levels of efficiency and innovation of the industry across Europe.
- The UK contributes significantly to the global research workforce, second only to the USA in terms of the numbers of science graduates trained. Approximately 16,000 students from other EU countries are registered on biomedical courses at UK higher educational institutions, of whom around 6,500 are postgraduates.

Scenarios for future UK – EU Cooperation

- The UK should be able to access long-term European funding and participation in EU wide collaboration programmes for science.
- Reaching an agreement to maintain full access to Horizon Europe. The UK/EU government report in December 2017 stated the UK “may wish to participate in some Union budgetary programmes of the new MFF post-2020 as a non-Member State”. Access to EU R&D funding could be retained through the UK gaining “associate member” status for Horizon Europe. This would also allow UK-based academics to lead and participate in EU-wide collaborations.
- Participation in the European Investment Bank and European Investment Fund, including shareholding and financial contributions;
- The UK should honour all existing intellectual property protections.
This document summarises the presentations and discussions of the workshop on “Brexit and Horizon Europe”, which was held on 21 November 2018. The effects of Brexit on the Horizon Europe Programme were assessed. This document was provided by the Policy Department for Economic, Scientific and Quality of Life Policies, at the request of the Committee on Industry, Research and Energy (ITRE).