Under the Trade and Cooperation Agreement announced by the UK and EU on 24 December 2020, the UK will no longer operate under the European Economic Area regulations for cross-border trade in goods and services and will have to pay to remain within the European Research Area.

**Implications for trade in tech and services**
The trade deal exempts British companies from paying tariffs on exports of goods to the EU from 2021 onwards* but erects non-tariff barriers: British exporters are required to provide paperwork for customs proving that their goods meet rules of origin. Although it is part of the UK, Northern Ireland will remain in the Single Market for goods, in order to avoid a hard border with the Republic of Ireland.

Some 43% of British exports of goods and services went to the EU in 2019. The top six categories for goods were: petroleum products (11.8%), road vehicles (10.2%), other transport equipment (5.8%),* miscellaneous manufactured goods (5.5%), medicinal and pharmaceutical products (5.4%) and electrical machinery and appliances (4.0%). More than half of UK imports (52%) came from the EU (House of Commons, 2020).

The UK services sector accounts for about 80% of GDP. Under the trade deal, the UK no longer benefits from passporting rights, which had given the services sector automatic access to the EU market. These companies will now need to negotiate bilateral agreements with each EU country, including those in fintech and other digital industries, which may impede their access to the EU’s Digital Single Market. Business and financial services accounted for respectively 33.1% and 20.3% of all services exported to the EU in 2019 (House of Commons, 2020).

**New institutional arrangements**
In a speech on 2 March 2018, the UK prime minister affirmed the government’s intention of remaining part of EU agencies ‘that are critical for the chemicals, medicines and aerospace industries,’ in order to ensure that newly developed products need only undergo one series of approvals.

The government has also, repeatedly, affirmed the importance of co-operation on defence and security, which would normally mean participation in the European Defence Agency.

Since a third country may not host an EU agency, the European Medicines Agency has already moved its headquarters from London to Amsterdam.

However, the UK’s refusal to be subject to the European Court of Justice will also exclude it from membership of EU agencies. Without membership, British companies will need to respect both UK and EU rules for their goods if these parallel systems’ regulations diverge, in future.

In July 2020, the UK withdrew its April 2018 ratification of the agreement for a Unified Patent Court (2013). Participation is linked to membership of both the EU and the European Court of Justice, as the common court will apply EU law once the last two member states agree to be bound by the protocol.

The UK’s membership of the European Space Agency will not be affected by Brexit, as it is not an EU body. The same applies to the European Organization for Nuclear Research (CERN).

The UK will be reimbursing the £ 23 million it received from the European Regional Development Fund towards construction of the National Graphene Institute at Manchester University in 2013. This fund is part of the Structural Funds which help to ensure even-handed development across the EU by investing in regions where the need is greatest. The UK plans to replace the EU’s Structural Funds with a new UK Shared Prosperity Fund, as outlined in the Internal Market Act which received royal assent in December 2020 (Institute for Government, 2020).

The British government has pledged to raise gross domestic expenditure on R&D (GERD) from 1.7% to 2.4% of GDP by 2027 to maintain domestic competitiveness post-Brexit.

**An associate member of Horizon Europe**
As a third country, the UK will need to negotiate a separate agreement with the EU to participate in Horizon Europe (2021–2027) as an associate member. The UK has left the European Atomic Energy Community (Euratom) but has come to an agreement with the EU regarding its continued participation, as a Fusion Energy partner, in Euratom’s Research and Training Programme and in the International Thermonuclear Experimental Reactor*

The UK will also continue to participate in the Copernicus Earth Observation programme but not in the Galileo space navigation programme, which is developing an alternative to the US Global Positioning System. The Royal Society has urged the government to participate in both the European Research Council (ERC) and the new European Innovation Council (RS, 2020). However, the UK will be excluded from the European Innovation Council, as its withdrawal from the EU automatically ended its membership of...
the European Investment Bank, which can no longer invest in UK companies. The Council has an accelerator fund that offers companies grant funding of up to €2.5 million, as well as the option of equity investments of up to €15 million backed by European Investment Bank funds (Kelly, 2020a).

That leaves the ERC. UK scientists will be entitled to compete for ERC grants, in return for an upfront financial contribution, but will no longer have the right to influence the shape of the ERC’s research programme.

Under Horizon 2020, the UK received one-fifth of ERC grants, a greater share than any other country. Each ERC grantee employs, on average, six researchers. In 2020, there were 840 ERC grantees in the UK, 43% of whom were British and 37% from the EU (Institute for Government, 2020).

Implications for scientific and student mobility
The trade agreement relegates Mutual Recognition of Professional Rights to the past; this means that the qualifications of specialists such as doctors, scientists, engineers and architects are no longer automatically recognized. Europeans wishing to work in the UK will only obtain a work permit if they score highly on a points-based scoreboard. In January 2020, 9.1% of hospital doctors in the UK were EU citizens (Baker, 2020).

The UK has opted to pull out of the EU’s Erasmus+ scheme, which allows students to study in other European countries. The UK plans to create a replacement scheme named after British mathematician Alan Turing to ensure that its citizens can still study abroad but without UK universities hosting any European students themselves.

In 2018/2019, around 18,000 students and trainees from the UK participated in Erasmus+, compared to around 30,000 continental Europeans who studied in the UK.** In December 2020, the Irish foreign affairs minister pledged to finance Erasmus+ grants for students from Northern Ireland.

From now on, Europeans studying in the UK will pay the same fees as other international students (ca £18,000 per year), about double the current amount. More than half of postgraduate students (54%) in the UK are foreigners (Institute for Government, 2020).

Already less scientific co-operation with the EU
The UK is highly invested in international scientific collaboration: the share of publications with a foreign co-author rose from 58% to 65% between 2015 and 2019 (see Chapter 1).

Between 2014–2016 and 2017–2019, the UK’s top scientific partners remained the USA, Germany, France, Italy and China but China moved up from fifth to third place (Figure 9.4).

Between 2015 and 2018, UK applications for research funding under Horizon 2020 (2014–2020) fell by 40%.

Over the same period, there was a 35% drop in the number of scientists coming to the UK on the EU’s Marie Sklodowska-Curie Fellowships. Around half (48%) of academics who left British universities to work or study overseas in 2018 were non-British EU citizens (RS, 2020).

Source: compiled by Susan Schneegans

**Both the incoming and outgoing mobility of students and trainees under the Erasmus scheme has been lower for the UK than for France, Germany and Spain. See: https://tinyurl.com/Erasmus-incoming-outgoing

Table 9.1: Impact of Brexit on the European Union, 2019

<table>
<thead>
<tr>
<th>EU27 + UK</th>
<th>Population, 2019 (millions)</th>
<th>GDP (PPP$ trillions), 2019</th>
<th>GDP per capita, 2019 (PPP$)</th>
<th>Total GERD, 2018 (PPP$ billions)</th>
<th>GERD/GDP ratio, 2018</th>
<th>Researchers, 2018 (FTE, in thousands)</th>
<th>Researchers (FTE) per million inhabitants, 2018</th>
<th>Volume of scientific publications, 2019</th>
<th>Volume of IPS patents, 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU27</td>
<td>514.3</td>
<td>23.0</td>
<td>44170</td>
<td>330.8</td>
<td>2.03</td>
<td>2081.7</td>
<td>4069</td>
<td>752472</td>
<td>172266</td>
</tr>
<tr>
<td>Change (%)</td>
<td>-13.0</td>
<td>-15.1</td>
<td>+0.6</td>
<td>-12.2</td>
<td>+7.9</td>
<td>-148</td>
<td>-20</td>
<td>-143</td>
<td>-117</td>
</tr>
<tr>
<td>EU27</td>
<td>447.5</td>
<td>21.1</td>
<td>44436</td>
<td>290.6</td>
<td>2.18</td>
<td>1772.7</td>
<td>3988</td>
<td>644547</td>
<td>152164</td>
</tr>
</tbody>
</table>

Note: The EU27 refers to the 27 member states of the European Union as of February 2020.

Source: UNESCO Institute for Statistics; for population and GDP (in constant 2017 PPP$): World Bank’s World Development Indicators, January 2021; for publications: Scopus (Elsevier), excluding Arts, Social Sciences and Humanities, data treatment by Science-Metrix; for IPS patents: see Figure 9.10 for details