AT A GLANCE

Requested by the ITRE committee

Study in Focus

European Parliament

Europe – the Global Centre for Excellent Research

The original full study[1] analyses the **EU's potential to be a global centre of excellence** for research as a driver of its future growth in a complex global science and technology (S&T) landscape, and **how EU public resources, most notably its research and innovation Framework Programmes, can contribute to this**. The European Union has firmly embedded research and innovation (R&I) as an engine of growth. However, the EU must face an increasingly multipolar world since other economies have increased their R&D and education spending, with China the most significant case. This will arise challenges and opportunities for the European Union. While competition for resources will intensify at the global scale, increased global S&T capacity offers opportunities for faster S&T advancement: it offers the possibility of mobilising a large pool of global talent and of building deep research strengths through specialisation and collaboration.

Check out the original full study by scanning this QR code!

Background

The first part of the study starts with assesment of the global research trends and the EU's position in the gobal context, and illustrates in particular the very **fast rise of China, in terms of total scientific output and of top-cited research**, though the US and the EU retain for now the leading positions in terms of research excellence. While the vast majority of the world's top universities are American, EU universities have improved their positions, but Chinese universities are increasingly appearing in the rankings.

Moreover, international collaborative research produces higher-quality publications. While EU researchers are most likely to collaborate with foreign colleagues, China remains quite closed to international cooperation. Private-sector R&D expenditure is highly concentrated among a few large corporations, with US firms in leading positions, followed by EU firms. Chinese companies are however making their way up the list of the top 2,500 R&D spenders, especially in digital technologies. A similar trend can be seen for patents, with the number of Chinese patent filings rising rapidly, though China is still lagging behind the US, the EU and Japan when it comes to patent quality.

Second, the study looks at the EU's R&D spending through an assessment of the Seventh Framework Programme (FP7) and Horizon 2020 (H2020). **FP7-funded projects are of significantly higher quality than the world average, as measured by field-weighted citation impact**. FP7-funded projects are also more likely to be result in publications that enter the top 1 percent of most-cited publications; this is even more so for publications funded by the European Research Council, the most excellence-oriented of FP instruments. These publications, when involving cross-border collaboration, were overwhelmingly the result of intra-EU partnerships. However, evidence shows that publications co-written by EU and non-EU researchers achieved an even greater citation impact than EU-only partnerships.

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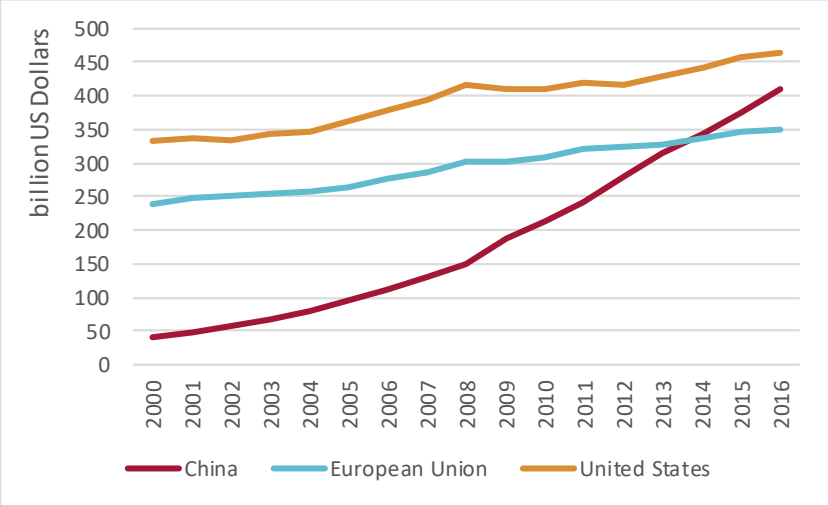
Key findings

This report analyses the EU's potential to be a global centre of excellence for research by assessing global research trends and the EU's position in a global context and looking at the EU's R&D spending. To be a global centre for excellent research, the EU and its Framework Programme must support the further integration of the intra-EU excellent research pole and at the same time being open for foreign talent and internationally connected with strong extra-EU partners. Based on this assessment a number of recommendations for the Framework Programme, Horizon Europe, are included:

- First, a **long-term commitment** should be made to increase the EU budget for research and innovation. The evidence from past Framework Programmes shows that the EU budget has contributed to supporting the EU's improvement in research excellence, most importantly by improving internal integration by improving intra-EU collaboration and the intra-EU mobility of researchers.
- Second, the potential for **extra-EU connectedness and extra-EU talent** should be better exploited, something previous Framework Programmes fell short of achieving. Horizon Europe should be open to the rest of the world and able to benefit from this openness.
- Third, as research excellence is critical in terms of openness and benefitting from it, **research excellence should be the major criteria** for selecting and evaluating the impact of Framework Programme projects under all of its pillars.
- Fourth, **targeting specific areas** in which Europe could become a global centre of research excellence, if done, should be embedded in an overall balanced allocation of funding to bottom-up and top-down programmes.
- Finally, Horizon Europe should be **systematically monitored and evaluated** to assess the impact of the programme overall and that of its individual instruments. The evaluation should be done one the basis of three criteria: a) contribution to research excellence; b) contribution to pathways leading to research excellence (i.e. international research collaboration and mobility); and c) improvements in research excellence stemming from development of these pathways.

Figure 1: Gross Domestic Expenditure on R&D



Source: Bruegel based on data from OECD (2018a).

Note: European Union as composed in 2018. GERD at constant 2010 prices and PPP US Dollars.

[1] https://www.europarl.europa.eu/RegData/etudes/STUD/2019/631062/IPOL_STU(2019)631062_EN.pdf

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