Higher Education Policy Institute

Horizon Europe and Plan B research funding: Turning adversity into opportunity

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Introduction

While Horizon Europe, the ninth European Union's Framework Programme for Research and Innovation (EU-FP), is about to start its third year, the participation of researchers based in the United Kingdom (UK) remains uncertain. This uncertainty, which can be dated back to June 2016 with the success of the Brexit referendum, led overall to less participation in and coordination of EU-funded projects.[1]

The EU-UK Trade and Cooperation Agreement, in late 2020, seemed to clear the way towards UK access to Horizon Europe.[2] Unfortunately, over a year and a half later, the UK is still not associated to the Programme because the EU is not willing to finalise the agreement as long as the Northern Ireland Protocol dispute is ongoing.

While hopes for a full association are fading, the Department of Business, Energy and Industrial Strategy (BEIS) has provided further details on transitional measures and a long-term alternative to Horizon Europe, the so-called Plan B.[3] Indications about the budget can be found in the 2021 *Spending Review*, which set aside £6.9 billion for the association or an alternative until 2025.[4] This situation takes place in a context where policymakers have frequently stated an ambition to make the UK a 'science and technology superpower'. Concerns were however raised by a House of Lords Committee on the lack of concrete plans to make such aspirations become reality.[5] Maintaining strong research ties with the EU through concrete measures, regardless of whether the UK is associated or not, can only contribute to the UK Government's aim.

Even though a full association to Horizon Europe remains preferable, given its size and relatively simple framework for cross-border and multi-sectoral collaboration, setting up a new research and innovation programme from scratch is also an opportunity to address the flaws associated with EU-FPs and propose even more attractive conditions for researchers.

In this Policy Note, I provide a series of recommendations that could best align Plan B with the ambition to maintain and strengthen the UK's position as a global science and technology superpower.

1. What is lost in the case of non-association?

Before going further into details, it is worth clarifying what is lost for UK-based researchers if the UK does not get associated to Horizon Europe. A non-association is expected to result in the demotion of the UK to the status of 'Third Country' – in other words, the same status as the United States, Canada and Japan. Although participation in most of the Programme remains possible, third country-based researchers are usually not eligible for the following:

i Research institutions based in third countries are not eligible to host European Research Council (ERC) and Marie Skłodowska-Curie Actions Postdoctoral Fellowships (MSCA-PF) grantees, except for the outgoing phase of an MSCA-PF Global Fellowship.

ii Researchers from third countries can participate in most Horizon Europe calls but must seek alternative sources of funding, sometimes offered by their respective governments.

iii Researchers based in third countries cannot coordinate collaborative projects, as their institutions cannot sign grant agreements with the European Commission.

2. Foreseen transitional measures and the long-awaited Plan B

In its communication of July 2022, BEIS proposed specific transitional measures to minimise immediate losses in the event of a non-association, such as:

i the commitment to fund all UK-based participants involved in successful Horizon Europe consortia signing grant agreements before 31 March 2025;

ii the organised evaluation of ERC and MSCA-PF proposals submitted before the point of non-association;

iii additional funding for enhancing existing talent schemes from UKRI and National Academies; and

iv formula funding for institutions that are the most affected by the barriers to participation in Horizon Europe.

Most importantly, BEIS shared a first peek into an alternative to Horizon Europe if the UK is not associated. It is structured into the four following pillars:

i **Top Talent:** Funding of long-term fellowships hosted by UK universities, as alternatives to the ERC grants and MSCA-PF.

ii **End-to-End Innovation:** Investments in industrial research and innovation, notably through domestic and international collaboration.

iii **Global Collaboration:** Bottom-up funding for international collaboration within and beyond Europe. This includes continued Third Country participation in Horizon Europe.

iv **Research and Development (R&D) System:** Support for the development of research infrastructures, digital research capabilities, and R&D clusters across the country.

BEIS stated that Plan B would build upon the best features of Horizon Europe and propose more attractive funding schemes with less bureaucracy than the EU programme.

3. How to make the best out of Plan B

Designing such an ambitious programme implies determined policy choices, from the allocation of funding across the various components of the programme to the size and length of grants and the consideration of different trade-offs. We build upon insights from the public research funding literature and experiences from other countries to develop a series of recommendations for a Programme that is attractive to researchers within and outside the UK.

Excellence, cohesion and inclusion

When EU-FPs are discussed at the EU Parliament, debates often centre around the trade-off between rewarding 'excellence' and reducing the gap between the western and eastern regions.[6]

Excellence remains an ill-defined concept, often associated with citation-related metrics.[7] Its use as an international standard to allocate funding and privileges tends to concentrate funding in a limited number of organisations, which are often the ones with the highest capacities and most resources.

This occurs noticeably in EU-FPs, where funding is concentrated in 'closed clubs' of regular participants.[8] It is also salient at the UK level, where about one-third of the funding acquired by UK universities in Horizon 2020 was obtained by only four universities: the University of Oxford, the University of Cambridge, University College London and Imperial College London. Former polytechnics collect only about 5% of all UK universities' participation. As a transitional measure, BEIS proposed introducing formula funding to compensate universities that are the most affected by access limitations to Horizon Europe. However, those that are the most affected are the ones that participate the most and thus benefit from cumulative advantages linked to the continuous accumulation of EU-funded projects. Therefore, **we also recommend introducing support schemes for universities that tend to participate less to mitigate their cumulative disadvantages and favour their integration into the European research and innovation landscape**. The MSCA Staff Exchange scheme, in which UK universities can still participate, fosters knowledge exchange and networking of research and administrative staff between organisations, independent of their size and status. **The participation of less resourced UK universities in such staff exchange schemes should be encouraged and / or incentivised**.

It has also been shown that the 'excellence regime' may encourage questionable and even fraudulent research practices and discourage replication studies, which are critical for the continued process of science.[9] By introducing specific rules and adapting evaluation processes, funding programmes can contribute to improving research environments and reducing individual and institutional bias. To make access to funding fairer and less reliant on performance metrics, the Australian Research Council introduced the Research Opportunity and Performance Evidence (ROPE) criterion. This enables researchers to explain their career trajectories and mention potential career interruptions due to family obligations when applying for funding. A recent study also demonstrated how status bias affects peer review. In this study, thousands of researchers were invited to review the same paper, jointly written by a Nobel Laureate and an early-career researcher, but were shown either a version with only the Nobel Laureate's name, a version with only the early-career researcher's name or an anonymised version. Only 23% recommended 'reject' when the prominent researcher was shown, 48% did so when the paper was anonymised, and 65% when only the early-career author was shown.[10] To minimise such bias, some funding authorities have introduced anonymised applications, in which evaluators do not have access to the applicant's name and publication record and can therefore focus solely on the project idea. This was implemented by the Swiss National Science Foundation's Spark Programme. **We suggest that Plan B also include pilot experiments to reduce or eliminate bias and make the allocation of funding more inclusive**.

Top-down versus bottom-up

Funding opportunities in research and innovation either have pre-defined topics (top-down) or leave the choice of the research topic and methods to the applicant (bottom-up).

Top-down calls can address the most urgent needs for society, as identified by the funding agency and other stakeholders. When the scope of the call is too specific, however, it narrows researchers' perspectives and possibilities.[11] Concerns have also been raised about their tendency to promote incremental thinking rather than fostering scientific breakthroughs.[12] The identification of research problems and methodologies suggested in top-down calls can be seen as a negotiation process between the funding agency, which holds the resources and aims to achieve policy goals,

and researchers, who possess relevant scientific knowledge and competencies but who generally strive to pursue their own research agendas.[13] This opportunity to shape the content of top-down calls is usually reserved for a few elite researchers who are in a position of authority in their respective communities.[14] Applicants then need to adapt their proposal and / or methodology if they wish to compete. **When opting for top-down calls, we recommend being as broad as possible to enable a sufficient level of flexibility for applicants to develop their research ideas and methodologies**. Broader calls are likely to reduce the chances of success, as they usually lead to a higher number of applicants. However, they enable a more diverse set of approaches on how to solve research problems. Lower success rates may also be better tolerated by applicants if the proposal preparation process is less time-consuming.

Giving 'carte blanche' to applicants may be perceived by some as a risky investment of public funding. However, the COVID pandemic has shown how society can benefit from bottom-up and flexible research. The co-founder of the vaccine producer BioNTech used part of its work funded by the strictly bottom-up ERC to develop the first COVID-19 mRNA vaccine. **I recommend giving higher priority to bottom-up calls, but with the opportunity for applicants to highlight the societal relevance of their proposed project.**

Basic versus applied research

When it comes to basic research, the UK higher education system is one of the most reputable in the world. Despite the current situation of uncertainty regarding its association with Horizon Europe, the UK remains the preferred destination for MSCA-PF applicants.[15] However, the picture for applied research is mixed. This is a result of deliberate policy choices to de-emphasise applied research in favour of basic science, along with an underinvestment of the private sector in R&D.[16] Plan B, which includes a pillar dedicated to industrial research, can be an occasion to foster private investment in applied research. In applied research projects, **the UK government could cover a certain percentage, such as 50% or 70%, of large companies' budgets**. Further, as in some European partnerships in Horizon Europe, such as the Circular Bio-based Europe Joint Undertaking or the Innovative Health Initiative, **there could be funding schemes co-funded by the UK government and the private sector**.

Individual versus consortia

Some funding agencies provide support for both individual and relatively large teams of researchers, i.e. research consortia. In Horizon Europe, most calls require the building of consortia, including a minimum of three partners from three different EU member states or associated countries. **Since two of the major losses resulting from non-association are the loss of eligibility for prestigious individual grants and the coordination of consortia-based projects, Plan B should come to include sufficient funding opportunities for both types of settings.**

Both approaches have advantages and disadvantages. In individual-led projects, applicants are relatively free to choose their approach and methods, but the lack of diverse perspectives may limit the impact of research outcomes.[17] Consortium-led projects, on the other hand, have the advantage of integrating a variety of perspectives, notably from sectors outside of academia. However, the risk of scientific conservatism is higher, and some partners may be selected to maximise the chances of getting funded rather than for their expected contribution.[18] **To alleviate such risks, we suggest limiting the size of consortia.** When it comes to conducting potentially disruptive research, smaller teams have proven to be more effective.[19] Some calls may require larger consortia, for example, to conduct clinical studies in several hospitals or to test a certain technology in multiple real-life settings. In these cases, we also recommend that relevant funding

authorities set limits: first, because applicants may otherwise build unnecessarily large consortia and core partners would become underfunded; and secondly, because this would leave more resources for funding more projects.

Funding of third countries

An alternative UK funding programme that supports international collaboration within Europe and beyond raises questions about the funding of non-UK entities. The UK alternative must not only be attractive to UK-based entities but also to potential non-UK partners. The funding of non-UK participation by the UK government would ensure less bureaucracy for the projects than having multiple governmental sources of funding. Nonetheless, the UK alternative must, above all, benefit the UK, and allocating a significant amount of funding outside the country may be controversial. **To compensate for the loss of coordination in Horizon Europe projects, UK-based partners must be in the lead.** In most of Horizon Europe, project consortia are required to be composed of at least three partners from three different EU member states or associated countries. **The UK alternative should establish similar requirements for international collaborations; for example, one-third of the consortium must be based in the UK.**

If non-UK participants are not funded by the UK government, negotiations with other governments to ensure co-funding are necessary. Convincing EU member states to allocate funding for collaboration with the UK, on top of their contribution to Horizon Europe, may be challenging. **Guaranteeing EU-based entities' eligibility for UK funding, at least in specific areas, could circumvent such challenges, partly compensate losses due to non-association to the EU Programme and potentially pave the way to regaining full association.** In Horizon Europe, entities based in the United States (US) are eligible for EU funding in health projects, as EU-based researchers are also eligible for funding in the US National Institute of Health (NIH) programme.

Proposal length and administration

The length and complexity of grant proposals vary substantially across and sometimes within funding programmes. From Horizon 2020 to Horizon Europe, the European Commission reduced the page limit in most calls for collaborative projects from 70 to 45 pages. In the same programme, the page limits for the European Innovation Council's Pathfinder Scheme and for the MSCA Doctoral Networks are 17 and 34 pages, respectively.

Proposal length can be an indicator of the effort required by applicants. Shorter proposals alleviate the burden on applicants and also make their evaluation less time-consuming for reviewers. On the other hand, funding agencies must ensure that reviewers have enough information to make informed decisions. Aside from the core part of the proposal describing the proposal idea, methodology and impact, applicants often need to complete other documents, such as administrative information, researchers' curricula vitae (CVs), support letters and details of the predicted budget. Such requirements can also influence the amount of time and energy required by applicants throughout the proposal preparation process.[20]

The ERC Starting Grant, for example, requires applicants to submit a short proposal including a summary, a five-page extended synopsis, their CV and track record and a detailed proposal of a maximum of 15 pages, including the objectives and methodology. ERC applicants, therefore, spend a significant amount of time on this, knowing that about 90% of them will be rejected. **For Plan B's top talent schemes, we advocate for a single short and simple proposal** – for example, a maximum of 10 pages with applicants' CV, track record, and the possibility to describe their journey.

In Horizon Europe, the proposal evaluation process has either a single stage, with a proposal length of up to 45 pages, or two stages, with the submission of a pre-proposal of 10 pages and, if

successful, a full proposal of 45 pages. The submission of single-stage proposals by R&D consortia requires intensive coordination work that is often likely to be in vain. **To alleviate applicants' time burdens, large-scale proposals should follow a two-stage evaluation procedure.**

Other funding agencies, such as the Engineering and Physical Sciences Research Council (EPSRC) and the US National Science Foundation's Division of Earth Sciences Directorate, have eliminated application deadlines. This may relieve researchers from deadline pressure and increase the quality of applications. However, some scientists may prefer having deadlines to plan their work better.[21] This can be debated and is perhaps worthy of experimentation.

Peer review process

Grant peer review is often heavily criticised and, in certain cases, generates distrust and frustration among unsuccessful applicants.[22] Funding authorities also struggle to attract motivated and competent reviewers willing to serve as gatekeepers of science, a role that is all the more important when it comes to funding research with public money. How the peer review process is perceived by applicants can strongly influence the attractiveness of a funding scheme. Hence, it is important to set up grant-writing processes that are deemed acceptable by both applicants and reviewers.

Even in funding schemes that are meant to target 'innovative research', the outcomes of grant peer-review processes have often been associated with scientific conservatism, as they discourage novel and interdisciplinary approaches and instead provide strong incentives for incremental research that follows established canons within disciplinary domains.[23] According to some studies, this even applies to ERC grants, which are supposedly targeted at exploratory and potentially ground-breaking research.[24] **To foster interdisciplinary and novel research, we suggest guaranteeing disciplinary / methodological diversity within panels, while making sure that panellists share enough competencies to discuss the key ideas of the proposed projects.**

Ideally, an evaluation report should help applicants improve aspects of their research projects in view of resubmissions to the same or other funding schemes. This is difficult to achieve when, in some cases, evaluators contradict each other. **The appointment of a moderator among the panel members is key to ensuring a coherent and constructive evaluation report.** In UK's fellowships and ERC grants, pre-selected applicants are interviewed by a panel of experts. This may add further stress to both applicants and reviewers and be subject to bias linked to applicants' personal traits (such as gender, ethnicity, and extroverted or introverted personality). In other funding schemes, rebuttal procedures have been introduced to allow applicants to respond to the first draft of evaluations. **As in Horizon Europe, we suggest testing a right-to-reply procedure in specific funding schemes, while keeping the applicants' level of effort at a minimum, perhaps introducing a one or two page limit.**

Conclusion

Establishing a valid alternative to Horizon Europe that is attractive to both UK and non-UK applicants requires both the consideration of researchers' needs and substantial investments. Plan B can draw on lessons from existing funding schemes and how these affect researchers' well-being and, subsequently, research outcomes and their impact on society. We believe that this could be done by making application processes lighter for both applicants and reviewers and more sensitive to status and other biases. Funding authorities also need to ensure that reviews are constructive and coherent.

Currently, the UK has a low R&D intensity, as measured by private and public R&D expenditure as a percentage of gross domestic product (GDP). In 2019, this was less than 1.8%, while the OECD

average was close to 2.7% in 2020. The UK Government has the ambition to increase total R&D investment to 2.4% of GDP by 2027. Considering that 2.4% is still lower than the OECD average and the R&D intensity of other leading nations such as Israel and South Korea (both over 4%) or Japan and Switzerland (over 3%), much more investment is needed for the UK to maintain and strengthen its position as a science superpower.[25] If well designed, notably by offering enhanced support to basic and applied research, Plan B is a unique opportunity to progress, as it can also enhance private investment in applied research and provide an attractive framework for international collaboration to tackle current and future societal challenges.

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