COUNCIL FOR
SCIENCE AND
TECHNOLOGY

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Prime Minister
10 Downing Street
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30 October 2018

Dear Prime Minister

A global endeavour: the future of UK international research and innovation collaboration

As the UK negotiates to leave the EU it is timely to consider the future of the UK's international scientific collaboration. The EU-UK research and innovation relationship has been a highly productive one, and we welcome the Government's ambition for a deep science partnership with the EU, set out in your speech at Jodrell Bank, following your meeting with us in May this year. A strong, cross-government approach to international collaboration will be essential to the UK retaining its position as a global leader in science and research and as a magnet for companies engaged in research and development.

We welcome the commitment in the Industrial Strategy to develop an international research and innovation strategy, in consultation with other government departments. This letter is intended to support its development and encourage that an ambitious and government-wide strategy is agreed and implemented. We attach a note which recommends four actions on cross government coordination, communicating with international partners, practical mechanisms to support collaboration, and immigration policy. The Council believes these measures would help the UK remain one of the best places in the world with which to engage for research and innovation.

We would be pleased to discuss these recommendations further with you or your Ministerial colleagues. We are copying this letter to the Chancellor, Home Secretary, Secretary of State for Business, Energy and Industrial Strategy, Minister of State for Universities, Science, Research and Innovation, Cabinet Secretary, Permanent Secretary at the Treasury, Permanent Secretary at the Home Office, Permanent Secretary at the Department for Business, Energy and Industrial Strategy, Permanent Secretary at the Department for Education and Permanent Secretary at the Department for International Trade.

Dr Patrick Vallance

Co-Chair

Professor Dame Nancy Rothwell

Co-Chair

The future of UK international research and innovation collaboration

1. Research and innovation are increasingly global endeavours. International collaboration is increasing in all countries and across all disciplines[1]. Global research and development (R&D) spend has also grown[2] reflecting the importance of research and innovation for economic growth. A large proportion of this increase has been in advanced economies but emerging economies are also investing heavily in national R&D, and hence rapidly closing the gap with more developed countries.

2. The UK is one of the most globally collaborative and successful nations in research and through this we exercise influence, leverage soft power, access new markets, and facilitate trade and inward investment. International collaboration is vital to maximise the value of the UK's increasing investment in science, research and innovation and essential to tackling complex global challenges such as climate change and clean energy.

Recommendation 1: All relevant government departments should be involved in developing and implementing the UK's international research and innovation strategy to ensure it supports Government priorities.

A strong statement of strategic intent must be accompanied by a detailed implementation plan, clearly aligned with the UK's industrial, trade, diplomatic and aid strategies, and can play a significant role in the on-going work to realise the ambition of 2.4% GDP investment in R&D by 2027.

3. The benefits of international collaboration apply at all stages of research and innovation, from blue skies research to commercialisation. International collaboration drives excellence in our research base, through the exchange of knowledge and people. Excellent science, combined with an enabling research environment, attracts excellent scientists. This in turn leads to huge opportunities for commercialisation and economic benefit.

4. UK scientific excellence, and our reputation as a global hub for talent, knowledge and ideas, is often the key to unlock wider economic and diplomatic benefits that accrue from international scientific collaborations. It attracts international businesses to invest and locate in the UK. Our innovative businesses become aware of new market opportunities, gain competitive advantage, and leverage investment. Scientific collaboration can help to facilitate diplomatic efforts on politically sensitive issues, or in politically difficult regions.

5. An international strategy should have the pursuit of scientific excellence as a guiding principle, and it should also reflect the broader considerations which inform decisions on international collaborations, including the benefits for economy and society from the research and innovation activity and the value of the skills and relationships developed through the partnership. Aligning the international research and innovation strategy with the UK's industrial, trade, diplomatic, security and aid strategies would create maximum economic and social value. Strong coordination across government will help achieve this.

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[1] *Science and Engineering Indicators 2016 (Chapter 5)* National Science Foundation https://www.nsf.gov/statistics/2016/nsb20161/#/report

[2] *Science and Engineering Indicators 2016 (Chapter 4)* National Science Foundation https://www.nsf.gov/statistics/2016/nsb20161/#/report

6. For example, the UK's international research and innovation strategy can play a significant role in building our understanding of every area of the world, supporting the industrial strategy, building a pipeline of talent for an innovative economy, increasing inward investment, supporting firms to scale up and export, and supporting research and innovation collaborations in areas of strategic importance for the UK, including the Industrial Strategy Grand Challenges, as well as maintaining the UK as an open, inclusive and outward-facing global research leader. An increase in R&D foreign direct investment will be crucial to achieving the Government's ambition of 2.4% of GDP investment in R&D by 2027.The international research and innovation strategy should be central to achieving this ambition.

7. Research and innovation thrive when there is sustained engagement between research institutions, business and other organisations. Physical and digital infrastructure, and availability of skills, including languages, are essential enabling conditions for research and innovation collaborations and investment decisions. The UK has several successful regional science and technology clusters of expertise which offer the potential for competitive advantage, and the Council's has previously provided advice on how the most can be made of our science and technology assets for economic benefit across the UK. These are also valuable assets to attract international partners and investment.

Recommendation 2: Communicate and deliver a clear offer to international partners.

To support the message that the UK is forward-looking and an active and welcoming partner for global international research and innovation, we need to identify and articulate the UK's excellence, capabilities and strengths in research and innovation and the benefits of doing research and innovation in or with the UK. This could include the relative attractiveness of the UK's business and regulatory environment and the talent and skills available.

8. We are in a global competition to attract talent and investment: messaging, policies and frameworks are critical. A clear statement of national priorities and a sense of long-term strategy can help build confidence in international partners and investors and raise the profile of the UK's research and innovation proposition to international audiences. This is particularly important as a relatively high proportion of the UK's R&D investment is from overseas sources[3].

9. Developing a simple set of communication products for use in international discussions would help stakeholders champion the UK research and innovation system, highlight the advantages of partnering with the UK, and deliver a clear message on the UK's priorities and opportunities for collaboration. A core script should promote the UK's strengths and make explicit the relationship between promoting research, innovation and wider government objectives, including priorities for trade and industrial strategy. This should be tailored for different countries and different sectors to ensure maximum impact. The UK Government's Science and Innovation Network can play an important role in amplifying these messages to potential partners.

[3] OECD figures estimate that 18% of UK R&D investment came from overseas, compared to 6% in Germany, 5% in the USA and 1% in China see: *Percentage of GERD financed by the rest of the world* (2015 figures) OECD Main Science and Technology Indicators http://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB

Recommendation 3: Develop a suite of mechanisms to support collaboration.

The UK needs an international research and innovation strategy underpinned by clear, flexible, well-structured mechanisms to support collaboration. There is an opportunity to review existing mechanisms for international collaborations with different partners and develop new approaches. This would include mechanisms for funding research collaborations and to support the transition of technologies from the research to development phases.

10. The UK needs to create opportunities in areas where we have less obvious natural strengths that need to be developed, whilst continuing to support and build on our research excellence in order to maintain the UK's role as a global research leader. The development of an international strategy for research and innovation provides an opportunity for a step-change in the UK's approach to international scientific collaboration.

11. It will be important to ensure effective funding mechanisms are in place to support collaborative activities in priority areas. Schemes such as the Newton Fund and Global Challenges Research Fund have been significant drivers of international collaboration with developing countries, but there has been comparatively less funding available for collaborations with partners in developed countries. We welcome the industrial strategy commitment to a fund for international collaborations that will help the UK remain a leading participant in the international community of discovery and development.

12. We welcome your message at Jodrell Bank in May that the UK would like the option to fully associate ourselves with the excellence-based European science and innovation programmes. Examination of other countries' models for funding international collaboration could provide insights into other mechanisms which facilitate effective partnerships, both bilateral and multilateral. We encourage immediate consideration of such schemes.

13. It will also be important to consider the relative attractiveness of the UK's business and regulatory environment and to review mechanisms in place to support the transition of technologies from the research to development phases. For example, while continued alignment with EU regulation will be important for research collaboration and trade with European partners, Britain's exit from the EU also presents an opportunity for the UK to consider new regulatory systems to attract and retain new and disruptive technologies on a large scale and unleash innovation in existing fields of research. A faster, more flexible regulatory system could form part of a distinctive UK offer to international collaborators and investors. Straightforward arrangements for sharing intellectual property rights from collaboratively developed technologies is another area to examine.

Recommendation 4: Ensure that messages to highlight that the UK will always welcome global research and innovation talent are backed up by an immigration policy that supports this.

This would include Home Office working with BEIS, DfE, UKRI, Foreign Office and HM Treasury as well as business, universities, national academies and research institutes to remove barriers to inward and outward flow of talent that can deliver economic benefits across the research and innovation landscape, including the optimal visa arrangements for different skill sectors and occupations.

14. UK research and innovation, in both academia and industry, thrives on the ability for people to move in and out of the UK, both on a short-term basis and for long-term employment. Those coming to the UK provide additional skills and expertise, including to address national skills gaps, often then returning to their home countries while retaining valuable links to the UK. UK-based researchers and innovators moving overseas can access a wider range of facilities, partners and markets. The relationships fostered through these exchanges are often the foundation of future partnerships that benefit the UK.

15. The UK is an attractive destination for people at all stages of their careers. Nearly one third of academic staff in UK universities are non-UK nationals (17% EU and 12% non-EU6), as are half of PhD students. One in five directors of UK tech start-ups are foreign citizens, and a significant proportion of these are EU nationals7. Nearly one quarter of start-up employees come from non-UK EU countries8 while the UK is the most popular destination for EU tech talent - 38% of all job searches for technology jobs outside home country were for the UK; Germany is second with just 21%.

16. For the UK to retain its place at the forefront of research and innovation, we need to continue to attract the best scientists, engineers and scholars to carry out ground-breaking research, as well as enable businesses to recruit the people they need. However, there is a worldwide race for top talent and attracting the right people is difficult. For example, the current shortage in digital skills is a key bottleneck for productivity and growth in both the tech sector and the wider economy. The UK Commission for Employment and Skills estimated we need an additional 1.2 million new technical and digitally skilled people by 2022. Upskilling the UK workforce for more 'homegrown talent' cannot solve the immediate skills shortages. In a recent survey[4], 70% of technology companies reported hiring being harder year on year, with engineering hires considered the hardest to fill. The UK is already an expensive place to hire and retain technical talent. We have the fourth most expensive software developer salaries in Europe with only Denmark, Norway and Switzerland being more expensive.

17. In order that we don't lose the race for talent, the UK should redouble efforts to present itself as an open and friendly place, with a policy on short- and long-term immigration to match. The Council strongly welcomes your commitment that the UK will always be open to the brightest and the best scientists, researchers and innovators. We believe that this points to the need for a visa system for skilled migrants and their families that is fast, flexible and low-cost, giving the UK access to the research and innovation talent from both inside and outside the EU, at all career stages and in all types or role whether in academia and industry - not only exceptional leaders, but also early-career researchers, technologists, technicians, students and teaching assistants with specialist expertise.

18. The recent Migration Advisory Committee (MAC) reports on EEA migration in the UK and on the impact of international students provide a helpful starting point for the design of an optimal immigration system for skilled people. They must nevertheless be considered in the context of the outcome of EU exit negotiations and the strain that increased visa requirements will place on the system. We recommend a more detailed consideration of the following areas.

Reviewing Tier 2 (general) Visa Conditions

[4] https://talent.balderton.com/

19. We support the MAC's aim of making it easier to hire individuals from overseas into high- and medium-skilled jobs. In particular, we strongly support the MAC's recommendation to remove the cap on the number of Tier 2 visas[5] as it creates uncertainty for employers and restricts the inflow of people that offer the greatest economic benefits to the UK. In order to streamline the existing system and ensure it does not prevent employers finding the people they need, we also recommend abolition of the Resident Labour Market Test (RLMT)[6]; the opening of the Tier 2 (general) visa to include all roles at RQF Level 3 and above[7]; and that current Tier 2 and Tier 5 conditions regarding dependents rights to work are maintained. Further, we recommend that PhD-level occupations be exempt from any remaining restrictions on numbers, salary and recruitment process.

Reviewing the Tier 2 (general) Salary Threshold

20. We note that the MAC supports the retention of the £30,000 salary threshold for Tier 2 visa eligibility but are concerned that in some specific but important cases this a poor proxy for skill levels. For example, in academia, where salary scales are typically below those found in the private sector, many technicians, early career researchers and teaching assistants, have considerable skills and specialist expertise but fall significantly below the threshold. Similarly, highly skilled roles in start-up businesses (which often have to manage cash flow very carefully) will frequently offer salaries lower than the threshold but with some form of equity as a part of the compensation package that cannot currently be counted towards the cap. We therefore urge further analysis to be carried out to examine salary levels (and non-cash compensation) in such cases, with a view either to lowering the £30,000 cap or offering appropriate exemptions. We recommend, as a starting point, that any researcher appointed or given project funding as part of a publicly-funded research programme (either UK or overseas in origin) and offered a long-term post in a UK university or research institute, should qualify for an exemption.

Reducing Administrative and Financial Burden

21. Many stakeholders view the UK immigration system as expensive and bureaucratic – much more so than in the countries with which we compete for talent. In virtually all EU exit scenarios, more incoming workers and more UK employers will need to use the visa system. Visa costs are a significant financial burden on Tier 2 applicants, especially for those with dependents or on salaries close to the minimum level. The system should therefore be easy to understand, simple to navigate, fast and impose lower cost and administrative burdens than is currently the case. We support the MAC recommendations to review how the current sponsor licensing system works for small and medium-sized businesses[8], to consult more systematically with users of the visa system to ensure it works as smoothly as possible[9], and to review the Skills Immigration Charge[10].

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[5]Referring to recommendation 3 of the 'Summary of recommendations for work migration post Brexit' from report on impact of EEA workers, p127 of ', 2018

[6]Referring to recommendation 7 of the 'Summary of recommendations for work migration post Brexit' from report on impact of EEA workers, p127 of 'EEA migration in the UK: Final report', 2018

[7] Referring to recommendation 4 of the 'Summary of recommendations for work migration post Brexit' from report on impact of EEA workers, p127 of 'EEA migration in the UK: Final report', 2018

[8] Referring to recommendation 8 of the 'Summary of recommendations for work migration post Brexit' from report on impact of EEA workers, p127 of 'EEA migration in the UK: Final report', 2018

[9] Referring to recommendation 9 of the 'Summary of recommendations for work migration post Brexit' from report on impact of EEA workers, p127 of 'EEA migration in the UK: Final report', 2018

[10] Referring to recommendation 6 of the 'Summary of recommendations for work migration post Brexit' from report on impact of EEA workers, p127 of 'EEA migration in the UK: Final report', 2018

International Students and Talent Pipeline

22. For students, the option to remain in the UK and work is an important factor in attracting the best candidates to study in the UK in the first place, as well as allowing the UK to benefit from the highly skilled people that we have trained. We therefore support the MAC recommendations regarding international students: there should be no cap on the number of international students and it should be more straightforward for both for students and graduates to take up employment in the UK.

Council for Science and Technology

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