

Written Evidence Submitted by The University of Sheffield

(RFA0077)

Introduction

The University of Sheffield is one of the 24 leading universities that make up the Russell Group. In the most recent Research Excellence Framework, 99 per cent of our research was assessed as world-leading, internationally excellent or internationally recognised and we are top 10 in the Russell Group for research outputs. As a leading, research-intensive university we welcome the opportunity to contribute to the Science and Technology Committee's inquiry.

The University of Sheffield has also contributed to the joint submission from the Russell Group on behalf of its members.

1. What gaps in the current UK research and development system might be addressed by an ARPA style approach?

Over recent years there have been clear moves towards more challenge led, interdisciplinary funding within UKRI but such initiatives have not realised their full potential. There has been insufficient strategic thinking in the development of calls to address societal challenges and applicants have observed a degree of territoriality between individual research councils that has hampered implementation of cross-council research. There has also been a sense that programmes that were intended to be radical have actually been defined by the same sets of people as previously, and grants have tended to go to the same sets of PIs as before. As a result, initiatives that were intended to be bold have actually been incremental.

ARPA offers a real opportunity to move away from the approach of individual councils combining remits and overcome the limitations of the traditional three year grant. Truly, innovative research will often occur at the disciplinary interfaces of research council remits. Accordingly, ARPA should focus on large-scale, longer-term, challenge-led and mission-orientated programmes that do not fit neatly into current research council funding models. ARPA needs to be able to address and support high risk research concepts that could deliver big rewards, but which UKRI are currently wary of supporting as they may not deliver within the standard funding timeframe.

The current intention with ARPA seems to be a focus on applied research. This does require national attention but may well have unintended effects on fundamental research, introducing consequences in terms of potential additional funding gaps for fundamental science and exasperating disciplinary disparities (see question 2 below).

2. What are the implications of the new funding agency for existing funding bodies and their approach?

The relationship between ARPA and UKRI will need to be clearly defined. If ARPA is more focussed on challenge-led technological innovation and funding large-scale, long-term, high

risk projects, it is distinct from the current UKRI focus. That said, existing funding bodies may be encouraged to apply those ARPA principles to the fundamental end of the research and innovation continuum and become more willing to fund longer term, higher-risk, interdisciplinary projects and accomplish this transition in a truly collaborative manner. There is evidence that some funders (for example Wellcome) are already moving in this direction.

A risk from ARPA is that existing funders suffer a proportionate decrease in funding if Government regards ARPA as a more effective, higher profile delivery vehicle. It may be difficult for Government to maintain funding for fundamental science if ARPA is focused on applied research and innovation, and at the same time, post-Brexit, the loss of European Research Council (ERC) funding is not mitigated.

The creation of ARPA deepens the uncertainty in the role and scale of Innovate UK. The problems faced by this vitally important research agency have been well-documented; we see no clear way in which these will be resolved. The creation of ARPA potentially removes a part of the Innovate UK role. Innovate UK is important and should be protected, and indeed expanded. We hope that the role of both ARPA and Innovate UK will be clearly defined, and that efforts will be made to ensure that they are symbiotic. There is also a real disciplinary threat to the current funding landscape. With ARPA focussed on the application of science and technology, questions arise as to future levels of funding available for the arts and humanities and social sciences. The danger here is not only that of funding reduction but also that the impact of ARPA is ultimately lessened due to a reduction in the contribution that these disciplines are able to make towards technology development and uptake.

3. What should be the focus be of the new research funding agency and how should it be structured?

Whether delivering solutions to grand challenges or developing and applying new technology, a high risk focus is the key. UKRI currently fund fundamental, blue-skies research but budgets and timescales force a focus to be on lower risk research and projects that can demonstrate they can hit the ground running. ARPA needs to take on the high risk, high reward, “moonshot” projects that other funders are unwilling or unable to support but are the ones that will ultimately deliver real step change innovation.

ARPA’s structure should be as lean as possible. The US DARPA example has demonstrated the key role of the Programme Leaders in supporting this model. They clearly need to be talented, well networked and at the forefront of their mission areas and must be empowered in order that they are able to maintain regular and robust oversight of projects and ensure effective external peer review of funded activities. We must avoid a situation in which individuals exert too much power though – decisions must be transparent.

4. What funding should ARPA receive, and how should it distribute this funding to maximise effectiveness?

To deliver the types of objectives proposed for ARPA requires funding of programmes that are much longer than current norms, potentially greater than ten years in duration. These will require regular reviews and break points. In the US DARPA example, funding is quickly withdrawn where project milestones are not met, but the need for such ultimate sanction

(and the adverse consequences for research staff) can be mitigated by regular and rigorous peer review through project advisory boards and similar structures.

A balance will also need to be struck between allowing long term strategic programmes themselves to identify research missions and select the recipients of funding and that of maintaining the confidence of the research community, which is used to the standard peer review processes in place currently.

Industrial partnerships will be a key component but should not always require or be measured in terms of up-front cash or investment. Essential to success will be genuine engagement with the Programme Leaders. Challenge-driven research opportunities, whether having societal, industrial or healthcare impacts, should be identified via strong engagement with the relevant sectors.

5. What can be learned from ARPA equivalents in other countries?

The US DARPA equivalent is the most obvious reference point but it must be remembered that it exists in a very different funding resource environment to that of the UK and was driven by a single office of Government, the US Department of Defense. The UK can learn from the lean structure and Programme Leader model of DARPA, which has the potential to produce a more nimble and dynamic funding response, although obviously care needs to be taken to ensure that the research supported is of the highest quality.

There is a real danger that ARPA becomes politicised, used to fulfil commitments made to regions without due regard for excellence or strategic alignment.

One important issue obvious from ARPA equivalents is the impact of this type of funding on research culture: ARPA needs to attract the very best talent but those opportunities need to be open to all, and the equality, diversity and inclusion implications of the ARPA structure and its potential for sudden withdrawal of funding need to be understood and mitigated.

6. What benefits might be gained from basing UK ARPA outside of the 'Golden Triangle' (London, Oxford and Cambridge)?

Locating outside the Golden Triangle would help meet the aims of the Government's levelling up agenda and avoid reinforcing perceptions of regional disparity and the London centric focus of research. Placing ARPA in the North of England would also help meet some of the UK Government R&D Roadmap intentions around engaging the public and emphasising science is for the benefit of everyone.

If the mission of ARPA is to support long term, large scale, high-risk programmes that deliver significant returns to the UK economy, a regional location of ARPA and its Programme Leaders would support that mission through far more effective engagement with a wider range of research centres, businesses and industrial partners.

It is likely that locating ARPA away from Southern or Eastern England would save cost, allowing a greater proportion of the research and development budget to be spent on frontline activities.

(July 2020)