Written Evidence Submitted by the School of Advanced Study, University of London
(RFA0063)

About the School of Advanced Study

The School of Advanced Study at the University of London brings together nine internationally renowned research institutes to form the UK's national centre for the support of researchers and the promotion of research in the humanities.

The School:

- Provides a research base for an international community of scholars
- Inspires, develops, and supports innovative research initiatives and networks
- Enhances the dissemination of the research of others, and related activities, beyond what they or their institutions could achieve alone
- Provides specialist research training at master's, doctoral, and postdoctoral levels - locally, nationally, and internationally
- Adds value to the work of researchers in the humanities and social sciences throughout the UK

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

Firstly, it is important to state that ARPA should complement existing bodies, with its own independent stream of funding, not taking funding away from UKRI. UKRI does good work. The UK is already one of the leading countries for academic research. Nothing should be done to undermine that (e.g. reducing UKRI funding) or destabilise that (changing existing structures to cover projects more suited for ARPA funding). Any attempt to mix the structures would probably lead ARPA to be overwhelmed by the very strong norms and habits of the existing system. Applications to ARPA should be those unlikely to secure funding through the UKRI councils.

Key gaps:

1. Gaps in funding 'blue skies' research

    Clearly, AI will need to play a significant role in a UK ARPA – in relation to medicine, social programmes, psychology, industrial development, defence, finance, the creative industries, in national collections, the climate economy, and in personal applications for health and education. Cross-department, -sector and - research council funding still hampers R&D. Research and development that smoothly crosses these boundaries would be welcome.

    The current UKRI grant assessment system means that investigators must generally have a clear idea of what they are going to discover before funding is awarded. The UK already does blue sky research, but only because researchers smuggle it in by other means. It is almost never funded as part of a UKRI grant proposal. It would be

preferable to invite applications that simply state an area of interest or fundamental idea without having to identify objectives.

2. Interdisciplinary Research

Many of the most exciting and transformative discoveries arise at the junctions between disciplines. There are still significant shortcomings in the existing infrastructure supporting interdisciplinarity. Interdisciplinary applications with large multidisciplinary teams must be reviewed by a panel whose members include those with experience of leading large multidisciplinary teams or projects, along with those from different sectors, including the creative arts and those addressing wider social benefits or consequences of the proposed projects. A wide range of expertise across disciplines and sectors, with attention to diversity and inclusion, is needed for assessment of applications.

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

The new funding agency could more easily solicit and review applications that would normally need to be handled as cross-Council bids, or academia-industry bids, which usually face extra administrative barriers and burdens.

The focus of bids to ARPA should be blue-sky research on deep issues that potentially have a transformative effect on science, technology and society. This kind of research and thinking can come from across the sector, from all disciplines and career stages: indeed, if it does not, there is every chance that transformative outcomes will not be realised. This transformation could be in how we understand the world (think: quantum mechanics,) as well as in our technological capabilities (e.g. computing machines, the internet). It should put interdisciplinarity and multidisciplinary teams at the heart of everything it does. Most big questions draw from more than one discipline, and many major advances depend upon thinking outside of the established norms.

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

ARPA should distribute most of its funding in response mode, through researcher-driven applications, looking for potentially transformative and translational research. After the first round, it should examine where there are lacunae: broad areas of potentially interesting research in which the UK has some relevant skills, but where there are few applications; it may need to issue calls to stimulate applications. A small portion of funding should then be set aside for applications in response to highlight notices for these areas. The balance between response mode and invited mode could be something like the mix seen with the ERC (i.e. mostly response mode, but with some targeted invited-mode calls). Occasional 'Moon Shot' calls can be issued with specifically targeted goals. These must not be narrowly disciplinary, and must consider societal, environmental and economic benefit and consequences, likely impact on future policy decisions and future generations, with considerations of inclusion and diversity addressed from the outset. It is critical that applications are turned around quickly, and that there is flexibility in the amounts available.

ARPA will need an enabling eco-system that builds better links between academia-industry-government; provides scope for synergies and partnerships; and allows thought to be given to economies of scale. Projects will need to be well-managed throughout their life-time, with an infrastructure to oversee them develop. A permanent directorate with a secondment structure for researchers is the only reasonable organization for an ARPA (that is how the US version has worked for many years). Projects of five to ten years are largely unpredictable, dependent upon the unknown outcomes of current research. So the personnel needed for future projects cannot be reasonably predicted now and will have to be refreshed.

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

APRPA should only fund projects that could not be funded through normal UKRI routes (this is why it is critical to keep ARPA separate from UKRI). It should have its own funding stream, and the sum indicated of £2.65M is appropriate, with funding only for priority projects. ARPA could proceed to fund in separate stages: proof of concept, further development etc.

What can be learned from ARPA equivalents in other countries?

On comparisons to other countries, DARPA has been very successful in the U.S., and the kinds of projects it has funded have by no means been restricted to technology. It has funded all kinds of blue-sky thinking, including in logic and philosophy, as well as mathematics. The link between these research projects and eventual technological advances has often been unclear or speculative at the outset. By framing the UK ARPA as about 'technology', the Government may find that they end up ruling out the kind of highly speculative blue-sky research that turns out to be so fortuitously beneficial in the long term. Digital technology and its impact on our daily lives will be of crucial importance and creativity needs to be stressed in thinking of the applications: immersive technologies, augmented reality and real-time use of sensed-information will require input from the gaming and creative industries.

DAPRA does not limit its scope. An Imperial College team together with Australian universities work on expert decision-making for US intelligence, drawing, for example, on philosophy and social psychology. Another notable example is the $7.5m grant that the Carnegie Mellon University Philosophy Dept received from the US Defense Department for Homotopy Type Theory in
Logic: https://www.cmu.edu/news/stories/archives/2014/april/april28_awodeygrant.html.

It is critical to build in a strong set of partners from different sectors and a full-time staff to manage projects; consider social context and consequences of projects; communicate the progress and results; and look for potential synergies between multidisciplinary teams to help set further goals.

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

Where ARPA is based should be less of an issue, since it should aim to do as much of its work as it can by video conference, to avoid the need to travel. Maintaining connections and dialogue across the whole research community is critical. The motivation to ensure that funding applications come from the whole UK, and projects involve teams and labs from around the UK, is important.

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