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Introduction

I welcome the questions posed by the House of Commons Science and Technology Select Committee about the formation of a new funding agency (ARPA) focused on high risk, high reward projects.

I have more than 20 years experience of Research and Innovation funding development and delivery within and outside of the Research Councils. I have worked in partnership with the Wellcome Trust and Cancer Research UK to deliver funding for multidisciplinary and multisectoral partnerships. I am an expert in collaboration, partnership building and research funding.

I am submitting to the inquiry because I feel that very often the perspectives of those that have professional skills in developing funding streams and partnerships are very often not considered by committees. With senior positions in Research Councils and Funding Bodies most often drawn from academia, the perspectives of professional experts in research strategy and funding are rarely heard first-hand. A new funding agency is a very exciting opportunity and the inquiry needs to hear the perspective of such experts in delivering these activities as well as the service users (academics, businesses).

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

The gaps and weaknesses in the UK research and innovation system relate to its emphasis on funding research and innovation through competitive peer reviewed processes which has historically increased that quality of research funded in the UK; but is not in the region of diminishing returns. More competition will not result in even better or more transformational research; we need a new approach.

There has been a focus on delivering outcomes which are measurable (papers, predominantly) whereas hard to measure assets such as social capital, cross-sectoral knowledge flows and innovation which lead to transformation are poorly supported, short term. The competition for the opportunities that do exist often have the (unintended) consequence of eroding the very social capital and trust based relationships needed for cross-sectoral innovation and to bring in people from different parts of the innovation ecosystems with new perspectives and ideas.

ARPA needs not to increase competition but collaboration, to work differently to how things have been done before and to suit the UK context and culture, not the context and culture of another country.

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

This £800 million represents a relatively small proportion of the overall public spending on R&D funding but could be a critical part of the UK's investment portfolio alongside other funding bodies.

There needs to be routes into and out of ARPA from 'standard' funding streams whether that is UKRI, NIHR or third sector funding.

ARPA needs to be different from UKRI/NIHR to complement the way that they work, and to also have opportunities to collaborate with UKRI/NIHR so that the organisations are not competing with each other or duplicating effort- including within the research and innovation base. Sharing insights and intelligence between organisations will be important, particularly horizon scanning.

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

Professor Julia King put forward a number of bullets which summarised the potential role of ARPA, which seem like an excellent starting position:

"An ARPA scheme that addresses my six bullets: improving communication by acting as interpreter and matchmaker between new ideas and needs; risk taking - the ability to test, quickly, which ideas have real potential; acting as a customer where no market yet exists; and providing diverse and relevant packages of funding to accelerate development through high risk stages; would be an impactful addition to our innovation landscape."

In terms of delivery/structure, it seems clear that there are two possible and complementary models of operation:

- Technology push from blue skies research like Quantum Technologies to bring these to market more quickly. The application of Quantum Technologies to Medical Research appears to be an area which could usefully be accelerated more quickly
- Challenge driven approaches which start from societal and national strategic need e.g. Net Zero; reducing the cost of delivering healthcare.

ARPA should be delivered through Programme Leaders that are empowered, highly talented and experienced individuals- **not** those at the forefront of their fields/businesses but rather experienced, impartial partnership and honest brokers that can bring people around a **shared vision**, take a range of diverse perspectives, take a long term view and compile a portfolio of interventions/investments, and encourage cross-fertilisation between them.

ARPA needs to move away from the idea that the experts are the best people to lead these programmes- which is the current way research and innovation is delivered in the UK- and place authority and resource in the hands of professional partnership brokers with a track record of building community and horizon scanning.

Examples of these types of skills would be the Programme Managers in the Engineering and Physical Sciences Research Council in the early 2000s, under the leadership of Richard Brook and Dr David Clark, compared to the more committee led processes of the other Research Councils. Over time and with changes of leadership, the empowerment within EPSRC has been reduced and the processes are more similar to those of more academic directed research funding processes (which includes medical research charities and Wellcome).

To differentiate itself from the broader research ecosystem ARPA could usefully take a less competitive approach to addressing challenges where superstar groups and collaborations take all

towards a more collaborative way of working. This would be based in a research and innovation community with shared values which encourage supported risk taking, collaboration, building ideas up in the long term rather than intense competition for resources; combined with honest and rigorous assessment of potential for impact and breakthrough such that unproductive lines of inquiry can be closed down and skills redirected into more promising streams.

Experienced Programme Managers should be able to understand the pros and cons of different types of funding models having had many years of experience in delivering funding at pace and scale. They should be able to work within the Nolan Principles and be guided by principles rather than rules when determining how to use the resources at their disposal, to deliver the strategic goals of the nation not an institution or company. Being overtly impartial will enable them to build trust as an honest broker and to take decisions in the national interest. They will need to be supported by the governance structures within ARPA if the Programme Managers are to take risks. There is no place for 'feet to the fire' – type rhetoric which leads to fear and actually less transformative investments.

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

Some suggestions have been made about the use of Challenge prizes for reaching a wider pool of innovators. While superficially attractive, the NESTA Longitude Prize has not demonstrated the efficacy of this approach for Anti-Microbial Resistance.

ISCF has tried to take a challenge approach to research funding with the use of Programme Directors; it is not clear that this approach has been entirely successful to date- and so simply repeating this model in ARPA does not seem to be a sensible approach.

Distribution of funding should be flexible, guided by principles to maximise its effectiveness and return to the public purse. Programme Leads should be accountable for how they take decisions aligned to these principles but not for the outcomes of the research and innovation; these will not be within their control and such KPIs will inhibit the precise type of risk taking ARPA wants to encourage.

Drawing a wider range of innovators in to the ecosystem is very important for the success of an ARPA-style approach. Spaces for this to happen, for example through hackspaces which are open to a broad range of people across different industries and hold events to stimulate a large number of innovative ideas which can be developed might be one way forward- with Programme Leaders able to provide resources quickly to enable innovators to take the next steps forward. There also needs to be an exit pathway into different funding streams- as the total funding available for ARPA will not be huge.

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

Government must take active steps to fill the gap created by the lack of a single intelligent customer (a role filled by the US Department of Defense1 for DARPA) to ensure the technologies catalysed by ARPA are deployed for the lasting economic benefit of the UK.

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

It is unclear why ARPA needs a significant physical infrastructure. The overheads of the Research Councils are very low, around 2-3%; so the amount of funding that would be put into ARPA operations would be around £3.2M pa over 5 years. A substantial proportion of that would be allocated to salaries, likely of Programme Leaders that would most likely be field based, given the type of role that would be needed. The return to the local economy in terms of skilled jobs would be low, and given changes in working practices after Covid-19 the need for new physical office infrastructure could be questioned.

There are UKRI sites around the country, which might be obvious ways to leverage the investment already made in administration and back-office facilities while basing UK ARPA outside of the Golden Triangle. Sci-Tech Daresbury or Polaris House (Swindon) seem obvious candidates. Sci Tech Daresbury is located within the North of England in Liverpool City Region, has plenty of space available for building and also close to North Wales. Swindon is already home to the majority of UKRI, the UK Space Agency and UKSBS and has the infrastructure and expertise to manage a relatively small additional administrative overhead with local expertise to deliver quickly. With Honda closing UKRI is a major employer in the town which does not have a university – it is effectively an 'anchor institution' for Swindon.

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