

Written Evidence Submitted by PraxisAuril

(RFA0084)

A. Introduction to PraxisAuril

PraxisAuril is the UK's national association for Knowledge Exchange professionals working in universities and public sector research organisations to manage commercialisation, collaboration and other types of engagement between researchers and external organisations to deliver social and economic impact through innovation and enhanced productivity and skills.

We have welcomed the Industrial Strategy and the Government's significant funding commitments to science, research and innovation. Our input to this consultation is concerned with creating the best conditions for Knowledge Exchange and enabling our members to stimulate innovation, productivity and growth; locally, nationally and internationally. The UK's research base provides a pipeline for innovation and skills. It is also one of the UK's strongest attractors for overseas investors.

A number of aspects of this inquiry are consistent with previous inquiries around the dynamics of research and innovation: protecting basic research through dual-funding; avoiding 'one-size fits all' solutions for knowledge exchange; incentivising demand-side engagement and investment in the research base; providing opportunities regardless of geography.¹

We would like to draw attention in particular to our response to Question 5. Whilst there is opportunity to learn from other countries, it may be more valuable to consider what has happened in the UK over the past several months as R&D organisations have pivoted to tackle the COVID-19 pandemic. The pandemic has necessitated novel approaches to innovation in the current R&D system. The purpose provided by aligning around a challenge, the need to move at speed, to work across disciplines, and to quickly leverage industry partnerships has changed research innovation culture and – importantly – the perception of innovation and the value of research among the general public. We have yet to establish what changes could, and should, be retained as we return to more normal conditions but there will certainly be important learning for research funding, collaboration and translation that will benefit the overall R&D environment.

B. Questions

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

The Industrial Strategy has defined a number of sector and technology challenges with associated funding across and between research disciplines. Universities and their partners (including in industry) are

¹ We refer in particular to 'Managing intellectual property and technology transfer' HC755, March 2017 and 'Balance & effectiveness of research & innovation spending' HC143, September 2019

encouraged to collaborate more, to support economic growth through research-based innovation including by supporting the creation of new companies. There is a well-worn adage that the UK is ‘good at research but poor at commercialising the outcomes of research’. Features of the UK’s R&D landscape have been well explored and characterised as the ‘valley of death’ ; this has been the topic of many inquiries and reviews and is an obvious area for a new funding model to address.² There are a number of overlapping gaps here that could be addressed with a new approach:

a) The development / engagement gap

The research base is strong (‘punching above its weight’) but more could be pulled through by external users or supported to create new markets. Universities, research organisations, businesses and investors all have roles to play in doing this. We see universities reporting more innovation outputs in annual sector data, while national surveys report a decline in business-side innovation activity.³ We have a problem with customers for innovation in the UK: not enough private companies invest in our research base. This is particularly true of SMEs, where a minority are described as innovation active. This is a gap that a new funding agency could fill, moving at speed and with a high-risk appetite in order to crowd in more risk-averse investors and developers.

However, if the intention is to pursue ‘high risk’ research then outcomes may not be visible in the short-term. Commercial investors may be reluctant to support such breakthrough innovation and public funding will need to be in place to support outcomes until they are pulled through by the market or create a new market by scaling up. The difficulties in this space are well-known but new evidence is also needed. To this end, Research England has recently invested in a new centre dedicated to understanding the dynamics of innovation.⁴

Currently, the UK’s research base is an attractor for international R&D investment. Often, development is taken outside the UK which means that the economic and social impact of public investment is lost. If the new initiative is to fill this development gap – essentially further de-risking though public investment – then will there be incentives for customers to keep development in the UK e.g. through R&D tax credits? If not, then the UK may see more breakthrough ideas developed in China and the US.

b) The funding gap

² Please see our written response to HC755 (MIP0014) and oral evidence provided by Dr Phil Clare, Oxford University (02 November 2016).

³ Innovation outputs collected in the annual Higher Education Business Community Interaction survey <https://www.hesa.ac.uk/data-and-analysis/business-community>. Business-side innovation data as collected in the UK Innovation Survey <https://www.gov.uk/government/statistics/uk-innovation-survey-2019-headline-findings>.

⁴ University of Cambridge, Policy Evidence Unit for University Commercialisation and Innovation (June 2020)

In terms of new company creation, the gap is at Proof of Concept or Proof of Market stage – where novel ideas are tested and validated. Relatively small amounts of funding can have big impacts if they are available at the right time – well targeted funding available at point of need rather than in-line with the next funding deadline, are particularly scarce. Some universities have invested in their own funds to support spin-outs through vital early stage development, thanks in part to the former University Challenge Seed Fund which PraxisAuril has advocated in past inquiries as a solution in this space [ref]. This type of funding is not challenge specific but means that more diverse breakthroughs from the research base can be supported.

c) The diversity gap

There is a growing awareness of the need for diversity in innovation; projects such as Oxford Brookes 'Women and Spinouts' have raised awareness in this respect.⁵ But there is much more to be done on supporting diversity beyond gender. This is a gap that affects our R&D landscape because we need to support ideas from many different backgrounds and cultures. It is unclear how the ARPA style approach will address this but thought should be given to equal opportunities both in terms of recruiting programme managers and in awarding funding.

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

This approach is distinctly different from established funding bodies in a number of ways and not least because there is a focus on very light-touch administration and no peer-review of proposals. The proposed funding model aims to create less 'constrained' opportunities for researchers, working outside grant cycles, reducing 'bureaucracy' and with light-touch management. Bureaucracy is used as a pejorative but it is important to recognise the role of research governance and particularly research ethics to assess potential risks and benefits for research participants. This includes considerations on how data is used, for example.

An ARPA funding agency model is potentially exciting for UK knowledge exchange, providing a high-profile platform for innovation through collaboration and a new mode for public funding in that space. However, although new models of KE funding, such as Research England's Connecting Capability Fund (CCF) and UKRI's Strength in Places fund, are breaking new ground for KE there is, overall, a lack of incentives for knowledge exchange activities in current academic promotion and reward structures which are geared around publication. This needs to be addressed as part of research culture generally if researchers are to devote more time to KE regardless of where the funding originates.

Another of the main barriers to KE is time, which is often stretched between teaching, research and administration. This can curtail activity on the 'supply side'. New funding could offer time – essentially by

⁵ See <https://www.brookes.ac.uk/women-and-spinouts/>

offering fellowship-style funding – to researchers. The Natural Environment Research Council (NERC) KE fellowships are one good example in this respect.⁶

There are implications, therefore, for universities as well as for funding agencies. This may extend to how the new funding is administered, salary scales for collaborators, treatment of IP and so on.

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

If the intention is to deliver highly translatable research then the agency should ask ‘who is the customer’ right from the outset: having a clear customer was the main reason for DARPA’s success in the USA. It should also identify gaps in sector and/or disciplinary coverage and have a clear purpose. The model should be well-connected with basic and ‘challenge’ research programmes and be alert to opportunities where outcomes can be joined up. Its greatest contribution might be in supporting cross – or even novel – disciplinary investigations where existing funding is particularly hard to find because national research agencies are disciplinary focused, and charitable research funding tends to favour particular application areas. Given the importance that is being attached to the inclusion of arts, humanities and social sciences alongside STEM subjects, particularly as we recover and re-set from the COVID-19, this funding model could provide a unique way of bringing together new combinations of research areas and exploring potential applications.

On the other hand, is this model sufficiently different from what exists? What about co-production of research, more locally / civic focused initiatives rather than more ‘breakthrough’ science. Why are the Industrial Strategy Grand Challenges not sufficiently ambitious to accommodate longer-term and / or ‘risky’ research and innovation? If not, why not? Could they be given more freedom to take risks and drive collaboration?

The R&D funding landscape is crowded and often hard to navigate. This is particularly at the translational end where there is no single large funder but many new initiatives focused on incubation, engaging with investors, taking a sector-specific approach (e.g. LORCA in the cyber-security space⁷, ASPECT in the social sciences⁸) or rooted in place (such as the Northern Accelerator⁹). The new agency should acknowledge these new approaches and, potentially, learn from them to achieve additionality.

Similarly, the agency should work with the many intermediaries in universities and research organisations who have experience and understanding of translational issues: the PraxisAuril membership is well-placed to advise in this respect and can draw attention to known problems e.g. in growth capital, in engagement with SMEs, in scale for regional investment and skills.

⁶ See <https://nerc.ukri.org/funding/available/schemes/kefellows/>.

⁷ See <https://www.lorca.co.uk/>

⁸ See <https://aspect.ac.uk/>

⁹ See <https://www.northernaccelerator.org/>

What mechanisms will be put in place for engaging potential research users? This is not just about large, research intensive companies – the 400 or so companies that currently account for the majority of R&D investment in the UK – but also about the UK’s SME sector where research-business collaboration is challenging for a variety of reasons, widely explored in sector reports and inquiries. Will the new agency use existing networks, such as KTN-UK and the Catapults, to engage customers? The diffusion of new knowledge is an important factor to address at the outset and incorporate into the design of a new agency.

Finally, arrangements will need to be made for the identification, ownership and management of any intellectual property (IP) arising from funded projects. Treatment of IP arising from research will depend on discipline or sector addressed. Possibly, a dedicated tech-transfer office with deep expertise in a particular field (such as found at Cancer Research UK, for example) will be the right model. If projects address more diffuse or un-known markets then identifying translational expertise in existing infrastructure – including at universities – will be more efficient.

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

The proposal is to allocate roughly £200m per annum (£800m across remaining 4 years of Parliament) to the new agency. A number of questions come to mind:

- Should there be a cap on any single funded project?
- Is funding for projects only, or for staff and infrastructure too?
- Should there be a cap on the number of projects any one institution / person can receive?
- Will funding for IP-related costs be included in project budgets?

The fellowship model has been suggested as a way of giving academic researchers time to pursue research development outside university / grant funding structures and may work in this context.

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

Whilst we can look to other countries for ARPA-type models, it is important to recognise that what works in one national research system is unlikely to translate well to another for a variety of reasons (research culture, R&D culture, State Aid regulation). It may be more valuable to consider what has happened in the UK over the past four months as R&D organisations have pivoted to tackle the COVID-19 pandemic.

The COVID-19 crisis has changed the approach to innovation in the current R&D system. The purpose provided by aligning around a challenge, the need to move at speed, work across disciplines, and quickly leverage industry partnerships has changed research innovation culture and – importantly – the perception of innovation amongst the general public.

The intense challenges of COVID-19 have demonstrated how universities, research institutes, consultancies and industry can work together under pressure to address an acute need. The ability of universities to respond quickly to the challenge of identifying a vaccine is derived from long-term investment in the research base, which provides the basic research and knowledge to tackle the virus.

Established partnerships with medical charities and industry partners have been leveraged to translate research into application. This has been done with the support of Technology Transfer Offices who have also changed their modus operandi; prioritising new Covid-19 related IP disclosures in order to progress them as quickly as possible. Oxford University Innovation, for example, created a set of guidelines to cover the commercialisation of Covid-19 related innovations built on non-exclusive royalty-free licensing principles¹⁰. The aim was to reduce negotiation time around IP contracts and get knowledge out into the market as quickly as possible. Many lessons have been learnt from operating in 'crisis' mode and some will be incorporated into 'business as usual' when the crisis has subsided. Moving more quickly on negotiations – one way of reducing 'bureaucracy' – is reflection of intense need but also of the perceived risks that partners are willing to take in order to reach agreement.

This raises the question of whether a new funding model is needed at a time when COVID-19 has undoubtedly changed ways of working. If this is coupled with the large investment in R&D proposed by the government's R&D roadmap, then the current system could demonstrate a less 'risk averse' way of working without the need for a separate agency. As we come out of the crisis, we have to ask whether the proposed model is solving the most relevant and urgent problem that we face; it was conceived in different times. Our universities, research institutions and many industry partners need to reset and renew – R&D investment should provide security with ambition, not more uncertainty.

The challenge is to identify what changes that researchers and their collaborators have been forced to make during the pandemic, out of necessity, and which can be applied in non-crisis conditions. These have largely been focused on collaboration models and costs (ensuring that the latter is not a barrier to uptake for COVID-19 IP). But it is important to understand why IP, for example, is treated in certain ways, what gives rise to associated costs, and why collaboration agreements are structured in particular ways. Simply taking research funding outside established institutions does not eliminate the need for structure and costs when it comes to IP.

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

¹⁰ The guidelines are published here: <https://innovation.ox.ac.uk/technologies-available/technology-licensing/>. Dr Adam Stoten's blog on OUI's operations under COVID-19 can be read here <https://www.praxisauril.org.uk/news-policy/blogs/tech-transfer-crisis-%E2%80%93-reflections-front-line>.

Judging by information available to date, the proposal is for the new funder to have a distributed base rather than a single location. This immediate avoids geographic pull and hopefully support principles of rewarding excellence wherever it exists whilst also supporting diversity. But striking a balance between rewarding excellence and recognising diversity of place is not easy, especially if funding is to be distributed in a light-touch way. Furthermore, the benefits from a UK ARPA (or any research collaboration) are not just about the funding that the agency provides to collaborative teams for the term of the project, it is about the impact that that funding will have when outputs are developed by customers, meaning investment in jobs and infrastructure. This is much harder to direct and detect than the initial funding itself. We note that there is a significant amount of analysis available on the strengths of places and the benefits that might be gained from directing investment there. This includes Science and Innovation audits, Smart Specialisation mapping, Local Industrial Strategies, City Deals, and the work of the Civic University Network.

End.

(31 July 2020)