

## Written Evidence Submitted by the Adam Smith Institute (RFA0107)

Authored by Professor Terence Kealey.

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

The original ARPA was created in 1958, not in response to the USSR's launch of Sputnik in 1957 as such but, rather, in response to the perception that the linear model (or the pipeline model as it is sometimes known in the US) had failed to ensure the US's lead in space. The NSF had been launched in 1950, to fund pure science, and the linear model, as promoted by Vannevar Bush in his 1945 book *Science: The Endless Frontier*, had asserted that the federal government, by funding the NSF's pure science, would create a pool of knowledge that industry and the military could exploit to beat the Soviets militarily and economically. The launch of Sputnik put paid to that vision, so the Advanced Research Projects Agency was launched, to promote projects as defined goals.

The proposed ARPA-style approach does not appear to plug any existing gaps or serve any particularly useful purpose. It is built on the perennially false premise that it is necessary for the Government to fund research to support technological processes. However, it is clear now that government-funded research is a waste of money if economic growth is sought.

Science is not a "public good," it is a "contribution good," and therefore needs no public funding. The history of technological progress since the Industrial Revolution demonstrates that private businesses invest in beneficial innovations, including in pure science, without state assistance. State spending on research and development, in both the United States and Britain, does not contribute to innovation or economic growth.

The industrialised East Asian countries, such as South Korea, Taiwan and Japan, have achieved substantial economic growth through business-sector led research and development spending. It is a myth that ARPA created the modern world. It is also a myth that state research spending stimulates innovation or economic growth. The UK Government is making a mistake by creating British ARPA.

Before going any further, the Government should clearly state what they believe is not being met by current funding arrangements, what ARPA would fund, and how its success (or failure) will be measured. If they are unable to make clear a case for a British ARPA, the allocated £800 million should be spent elsewhere.

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

ARPA is a significantly different model of funding from the agencies of Research UK, which are wedded to the linear model. If the government identifies societal goals that the current agencies are failing to achieve, the implications are primarily for the linear model.

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

The first part of this question can be answered only by the government, who are yet to clearly state what this organisation would actually achieve. An organisation without a clear goal is destined to failure. The second part (structure) essentially answers itself: if you identify a goal, then you go for it. ARPA in the US fetishises the frequent turnover of managers within a bureaucracy that does no research itself (it's all contracted out) which is not unrelated to the for-profit company model. Why not stick with that?

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

None. Michael Piori of MIT wrote a chapter in Bonvillian's 2019 book on DARPA in which he revealed how DARPA has always rejected any form of cost benefit analysis, and until that's performed, we must assume DARPA has been a waste of money. D/ARPA has been brilliant at claiming the credit for the development by Baran (RAND Corporation) and Davies (National Physical Laboratory) of packet-switching technology, and it has been brilliant at claiming it spawned XeroxPARC (which actually arose only because the Mansfield amendment closed down ARPA's pure science) but ARPA has always resisted any attempt at analysing its usefulness in terms of money spent and in terms of crowding out. From its point of view, there's a very good reason for that reticence. Not so much from the taxpayers point of view.

- What can be learned from ARPA equivalents in other countries?

Impossible to tell, because (to the best of my knowledge) none has attempted to show a full ROI (return on investment) taking crowding out into account. Certainly, Moore's Law has shown no deflection since the various ARPAs arrived. We could perhaps learn from attempts to copy the ARPA model that the entire idea is fundamentally flawed and will return little benefit to British taxpayers. This is because even if one accepted that the original ARPA contributed to the development of certain technologies, crowding out would suggest that ARPA achieved nothing but the shifting of certain inevitable developments out of the private sector into the public sector, whence they had to be returned to the private sector.

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

Until ARPA's projects and goals are defined, this question cannot be answered. Realistically, other than funding a few lucky projects that deliver minimal benefit, it is unlikely to provide many benefits to 'Golden Triangle' or anywhere else in the country.

If the Government wishes to encourage the development of new ideas and technologies, they should focus on creating an appropriate institutional environment that enables scientific progress. This would mean, in practice, JUDICIOUSLY removing red tape that holds back certain technologies and developing a tax system that encourages investment.

### **About the author**

Terence Kealey is a Fellow at the Adam Smith Institute. He is also a professor of clinical biochemistry at the University of Buckingham in the United Kingdom, where he served as vice chancellor until 2014. He has written two books on how government money distorts science research: *The Economic Laws of Scientific Research* (1996) and *Sex, Science and Profits* (2008).

### **About the paper**

This response is based on the Adam Smith Institute's paper '[Drop ARPA and think smarter, government urged](#)'.

### **About the Adam Smith Institute**

The Adam Smith Institute is a free market, neoliberal think tank based in London. It advocates classically liberal public policies to create a richer, freer world.

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