

Written Evidence Submitted by Coventry University (RFA0091)

This paper responds to the following inquiry questions:

- **What gaps in the current UK research and development system might be addressed by an ARPA style approach?**
- **What are the implications of the new funding agency for existing funding bodies and their approach?**
- **What should be the focus be of the new research funding agency and how should it be structured?**
- **What benefits might be gained from basing UK ARPA outside of the 'Golden Triangle' (London, Oxford and Cambridge)?**

Coventry University

1. Coventry University is one of the country's leading modern universities with a robust academic presence regionally, nationally and across the world. Our innovative and forward thinking approach is driven by the enthusiasm of over 30,000 students, 2,400 academic staff and 2,000 professional services staff.

2. The University has always been industry focused and continues to do so as it aligns with the Industrial Strategy and its initiatives for the benefit of the regional and national economy. Meanwhile, as an innovative, enterprising and entrepreneurial university group, Coventry University is business engaged - developing strategic level collaboration with businesses on a local, national and global scale.

3. Where the response refers to the Coventry University Group, this is an umbrella term for Coventry University and all of the locations owned and governed by Coventry University.

Inquiry response

4. Coventry University is grateful to the Science and Technology Select Committee for allowing us the opportunity to share our views on the nature and scope of a UK ARPA. As an ambitious and innovative university, our research makes a tangible difference to the way we live. Coventry University would be willing to give oral evidence to the Committee should that be helpful to the inquiry.

5. Coventry University is already known for delivering research that makes a significant contribution to a number of global challenges. Our research centres focus on a range of real-world issues including sustainability, disease prevention and innovative engineering; areas which we believe are key to addressing future challenges our world faces.

6. The University believes that the focus of a UK ARPA should be wide ranging. Whilst it should look to focus on gaps in the research and development system, it should also look to

see what research is already taking place globally and how it can utilise those opportunities to showcase British research and development. It should also be set up to respond to as yet unknown global challenges.

7. By focusing solely on gaps in research and development, there is a concern that the UK could miss out on opportunities to invest in and take a lead on, which may be to the detriment of work that is already taking place in the UK. The Coronavirus pandemic has illustrated that silo working, be it within an organisation or within a country, is not always the most efficient way of tackling unknown global challenges. The pandemic is something which has affected all countries has therefore required the global research and development community to come together. An agency such as a UK ARPA would be well placed to spearhead such projects when the need arises in the future. With that in mind, it is important for UK research to not only look for and fill the gaps in research knowledge, but to also build on and support existing research by providing British expertise when the need arises.

8. Furthermore, it will be important not to limit the scope of a new agency too narrowly so that opportunities to engage with projects and ideas which could create the chance for the UK to become a world leader are not missed, and so that the UK does not find that it is unable to engage with some of the already well established global challenges that the world faces. Putting in place project managers who also have the ability to horizon scan and seek out emerging opportunities would be one way of drawing all of these opportunities together.

9. If the scope of a UK ARPA was to include some focus on research of international significance, this would strengthen the view that the UK was a leader in that particular field, rather than creating a more insular view of research that takes place in Britain. In many cases, researchers already look to work collaboratively across borders. Coventry University has a wide network of colleagues across the globe who are working on many of the challenges that the UK is also looking to address. By taking into consideration what activity is taking place internationally, a UK ARPA will ensure that the UK is utilising all of its networks and is able to ensure any research and development is relevant, cutting edge, and at the forefront of its field.

10. Coventry University believes that the focus of the new UK ARPA should centre on the four grand challenges that have been identified by government: artificial intelligence and data, ageing society, clean growth, and the future of mobility. These areas have already been identified as being key areas for the UK, and across the globe, and are areas where the UK has the potential to lead.

11. Certainly, work is ongoing at Coventry University on projects which focus on all four of those research strands, including clean growth. These have the potential to support the UK in being a world leader on these challenges and innovative in its approach to finding solutions. One example of where work on this is already taking place is in Coventry University's Centre for Business in Society. The centre was set up with the ultimate goal of establishing mechanisms by which society can live within environmental limits and to attain social justice, through the delivery of responsible business and ethical consumption

practices. The Centre focuses upon areas such as waste reduction, resource and energy efficiency, sustainable community and consumer behaviours, corporate values and supply chain governance all of which are vital areas of research to invest in to support the government and the UN's goal of achieving clean growth. As illustrated by the work that Coventry University is doing in this area, this grand challenge is already a strand of research which the UK has the potential to be a world leader in.

12. With that in mind, a UK ARPA could be seen as a way of focusing attention on those grand challenges in a way that has not been established so far. By investing in areas of research where there is already expertise in the UK, such as clean growth projects taking place at Coventry University, efforts can be focused on where a UK ARPA can add value. In turn this will not only benefit worldwide projects looking to address the same challenges, but will also support the UK to establish itself as a world leader in this area and support the UK's reputation for facilitating cutting edge research.

13. Transparency will be key in the establishment of a UK ARPA. Regardless of what the focus of the research agency might be, it will be important that the decisions taken on which projects are given funding, which are taken forward, and which are closed down is carried out in a fair and transparent way. Being transparent about how projects are chosen and how success is measured will be vital to encourage academics and businesses to come forward and engage with the process.

14. Coventry University also believes that should a UK ARPA be established, there would need to be investment in state-of-the-art facilities, and that these should be developed using an 'open access' model so they can be utilised by academics and businesses who are being awarded funding by the agency. Those who are working on 'high risk, high reward' areas may be incentivised to take their work forward should they have access to the right technology, which may not be provided to them through their place of work. Knowing that facilities will be available for certain projects and that there is no need for capital investment may encourage more projects to fall into the high risk, high reward category.

15. A UK ARPA should ensure that it focuses on impact, and should also be able to analyse which projects look to be commercially viable. With that in mind, it should look to adopt technology readiness levels (TRLs) and adopt a process of smart investment which creates flexible and responsive funding mechanisms. Due to the nature of 'high risk, high reward' research and development, it will be important that the agency is able to assess the impact of a project as well as its commercial viability and this could be done through adopting an economic impact assessment approach to model how a project might work in the real world.

16. In the main, any UK ARPA approach should be flexible and responsive to a changing research and innovation landscape, allowing the redistribution of funding to address yet unknown global challenges. The agency should have the ability to move funding from one project and inject it into another which might have the potential to succeed. It will be important that the UK remains on the front foot in terms of new ideas and this will mean

that a UK ARPA will need to be aware and be willing to engage with global research and development patterns.

17. This has come to light most notably with the Coronavirus pandemic as previously mentioned and the important work that is being done in the UK to supplement medical advances elsewhere. For example, a Coventry University spin-out company, Inocardia, has been allocated funding to test the safety of new drugs being developed to combat COVID-19. This could have very meaningful implications for how the virus is treated both in the UK and around the globe. This example of academia, and business working together to address a global challenge highlights why it will be important for a UK ARPA to be flexible in its approach and attune to global challenges as they arise.

18. With regard to the implications of a new funding agency for existing funding bodies, Coventry University would welcome further clarity on how ARPA's role will differ from other funding bodies, and how it will relate in practice to organisations such as UKRI, the Research Councils, Innovate UK and other funding organisations.

19. Coventry University believes that given the numerous funding organisations that are already in place, it would make sense for the UK ARPA to adapt a framework and process that is similar to those used by UKRI and other existing organisations when looking at how funding should be distributed. It should also be mindful of what space those organisations already occupy in terms of research and development in order to avoid any duplication within the system, and ensure that there is alignment within the research and development space.

20. We would argue that funding from a UK ARPA should focus on both research and technology organisations as well as research active businesses and should be open and encouraging towards guiding and pulling together consortia to work on particular projects. Forming and working through consortia is a successful way for projects to come to fruition and is a common way in which academics and business groups work together. A UK ARPA should consider how it would support such consortia to form, and how it would work with them to maximise success, with universities as one of those consortium partners. It should also build in a mechanism which allows different partners to be swapped in and out of the projects where this would improve chances of success. This model would also allow the agency to have the widest pool of projects available to choose from and would not artificially narrow that choice.

21. As has been previously mentioned, it is important that there is clarity with regards to how a UK ARPA would interact with other funding bodies, and the nature of its relationship with any such organisations. There is also a need for transparency regarding how and why funding is allocated.

22. Furthermore, consideration should be given to the length that funding is allocated. Given the general lead time that is needed before research becomes commercially viable, Coventry University would recommend that funding should be allocated for a period of between five to ten years. This longer-term focus means that research and innovation can be robustly produced, tested and checked for commercial viability without the fear of

funding running out before completion, which may make groups and individuals unwilling to take risks on possible high reward research and innovation.

23. It is also important that funding can be moved easily should there need to be a sudden change in focus with all efforts needing to be directed elsewhere. This has certainly been the case with Coronavirus and having the ability for the agency to respond to a global challenge with such a significant impact on the UK would require some flexibility built into the system.

24. Coventry University believes that a UK ARPA would benefit from being situated outside of the 'Golden Triangle' and would recommend that any new agency is set up in the West Midlands. Whilst the geography of the agency may not be as important as some of the other factors being considered, there are some benefits to it being situated outside of London, Oxford, and Cambridge.

25. Setting up the agency in the West Midlands would mean setting up in the home of engineering and technology in this country, two of the research strands that a UK ARPA would no doubt look to invest in. Not only would a change in geography raise the profiles of voices that may not otherwise be heard by policy makers, but it would also create an opportunity to bring new players into the research and development space who may be more willing to enter into 'high risk, high reward' projects.

26. It may also encourage organisations who see themselves as disruptive, agile and innovative to come forward with truly different ideas. Coventry University works closely with organisations like that in the work that our research centres do. The Institute for Advanced Manufacturing (AME) is a collaboration between Coventry University and Unipart Manufacturing Group and through that partnership we have created the first 'Faculty on the Factory Floor'.

27. Our Centre for Advanced Low Carbon Propulsion Systems (C-ALPS) is a Coventry University research centre, established to partner with the propulsion system supply chain and accelerate the progression to carbon-zero transport. Working across the automotive, aerospace, and marine and rail industries, the centre supports these sectors create cleaner mobility and to help develop the supply chain so that it can deliver these rapidly developing 'enabling' technologies. Global engineering consultancy FEV is a founding partner, with its UK commercial operations co-located in the C-ALPS facility.

28. The University is also working closely with partners on projects that focus on Artificial Intelligence, Data Science, Manufacturing and Logistics, 5G campuses and Intelligent Healthcare, all of which are areas that have the potential to support the government's ambition for the UK to be a world leader.

29. The West Midlands is also home to many large employers, many of whom are proactively engaging with the research and development agenda. The region is also already heavily geared towards innovative research and development through the West Midlands Innovation Alliance. The alliance of organisations brings together organisations who are interested in science and technology based innovation across the West Midlands. It aims 'to

build and maintain a thriving innovation eco system, and to stimulate and catalyse a pipeline of innovation activity'. This hive of activity which is already taking place in the West Midlands means that any agency set up in the area would benefit from and enhance the research and development agenda in the region.

30. With that in mind, setting up the agency in the West Midlands would provide an opportunity to bring in new voices that may not have been heard by government to date, and may bring in partners who have the agility to be innovative and forward thinking in a way that would support the aims of a UK ARPA.

Conclusion

31. Setting up a UK ARPA has the potential to strengthen the UK's research and development output. We would encourage the government to set the agency up outside the 'Golden Triangle' and believe that the West Midlands would be an attractive location.

32. Coventry University believes that as well as addressing the gaps in R&D, a new agency should also look to focus on the grand challenges that have been set out by the government as these are crucial areas of research for the world. It should also have mechanisms in place to respond to as yet, unknown challenges such as the Coronavirus pandemic. The agency should be set up to be transparent and fair, and should establish a clear and defined relationship with the current funding bodies that already exist within the system to encourage academics and businesses to engage with its 'high risk, high reward' strategy.

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