

Strategic choices and research funding: supplementary submission to IUSS committee enquiry on Science and Engineering at the Heart of Government Policy

Britain has a great tradition in science, research and engineering. We must continue to build on this. We cannot predict the 21st century counterparts of quantum theory, the double helix or the computer, or where the great thinkers, innovators and entrepreneurs of the future will get their formative training and inspiration. But one thing seems certain: unless we as a nation continue to get smarter, we will get poorer. The UK's relative standing will fall unless more technologies and innovations originate and are exploited here in the UK.

We don't always know where the benefits of research will come from, or how long it will take for them to manifest. Even in medicine, where research is often highly-targeted, the lag between scientific research and health benefit can be anywhere from 10-25 yearsⁱ. In other areas of science, it can be decades before direct benefits are realisedⁱⁱ.

To maximise the breadth and depth of our scientific potential, we therefore need to support research capacity across the full range of disciplines. We must balance the need to invest in world-class individualsⁱⁱⁱ, with the need to invest in world-class research infrastructure and established centres of excellence. We must also ensure that the UK continues to attract and retain the best researchers from around the world to support value-added partnerships.

In the clusters that our best universities have built around them, talent attracts talent (and big and small companies too). There is a symbiosis between applied and pure science – or as former Royal Society President, George Porter, averred, that there were two kinds of science: applied and not yet applied.

The scale of the challenges we face as a society and economy call for closer alignment of research with objectives and better processes for creating products and services from ideas. In general, there is a funding gap from the point where research ideas move out of universities through to their becoming commercially ready technologies that industry sees as sufficiently risk free to take on. Translational research bridges the gap between pure research and applied research and much has been achieved, particularly in the biomedical fields, to improve this transition. However, the bridge between applied research and commercially exploitable products and services is still weak.

A prerequisite for potential investors in all sectors is clarity, stability and certainty to allow a proper assessment of risk and potential return on investment. Government must set a clear, well-communicated policy and regulatory framework that promotes investment. There should be a cross-departmental focus on identifying and addressing barriers and perceptions that could deter investment, especially in new and emerging markets. Government procurement has an important role to play in speeding the adoption of new technological solutions. The tendency is for Government and public sector procurement to specify lowest-cost solutions; however, there is an opportunity for public expenditure to be used to stimulate innovation research and innovation, increase the flow of opportunity for leading-edge SMEs, and help promote emerging technologies.

It is essential that innovation is understood broadly, in line with last year's *Innovation Nation* White Paper, which stressed the importance of taking a holistic view of innovation, and highlighted how the UK excels at 'hidden innovation' in its leading services sectors and creative industries. The UK will have to compete by developing new products and services, discovering new ways of doing business, encouraging innovation in its public sector and public services, and drawing more effectively on the whole of the research base: natural sciences, engineering, the humanities and social sciences.

The Royal Society believes it is desirable to focus investment on specific sectors or technologies relevant to major challenges we face in the UK and globally. Indeed we believe that, for example, the needs of a low-carbon economy are worth of such targeted investment – areas such as plastics electronics, high performance batteries, green chemistry etc. However, we would be concerned if the balance within the ring-fenced science budget were to shift away from the responsive mode of funding the most excellent research from across all areas. In assessing our position on these subjects, we have considered implemented policies rather than the content of Ministerial speeches.

ⁱ *Medical Research: What's it worth? Estimating the economic benefits from medical research in the UK*, report for the Wellcome Trust, the Medical Research Council and the Academy of Medical Sciences, November 2008

ⁱⁱ Ben R. Martin & Puay Tang, "The benefits from publicly funded research", SPRU working paper 161, June 2007

ⁱⁱⁱ K. Pavitt, 'What makes basic research economically useful?', *Research Policy* 20 (1991), pp. 109–119.