Science and wealth creation

Mark Richmond

How can governments ensure that wealth is created from the scientific enterprise? In an abbreviated version of his talk at *Nature*'s recent meeting[1], Sir Mark Richmond assesses the probable British strategy.

WITHOUT an excellent basic research base, I do not believe Britain can ever produce a highly developed workforce for the needs of its industry in the next century. Research provides the essential background against which the specific programmes of industry and commerce can be pursued. But even though a strong basic research base is essential, it is folly, in my view, to expect miraculous benefits to flow simply from having one, however distinguished. One must have some overall strategy and the necessary mechanisms to facilitate its exploitation.

The development of a 'mission' for the science base in general and for basic research in particular[1,2] immediately raises issues of who is to shape and coordinate it. I would see the research councils (or analogous bodies), with their ability to fund research both proactively, in the context of a strategy, and responsively, responding to bids arising ultimately from the imagination of gifted scientists, as of crucial importance in this respect. Such a dual mode of proceeding allows a degree both of direction and of free thought to flow in science.

Of course, not all public money for research in Britain flows through the research councils. Departments of government have science budgets to pursue their objectives as set by parliament when they receive their parliamentary votes; any national strategy for wealth creation through research will need to integrate spending by these departments with that of the research councils.

Recent events have tended to work in the opposite direction. Up to the last general election, research in higher education institutions was supported very substantially by money flowing through a single department of government, the Department of Education and Science. Until then the two legs of the dual-support system for university research were the responsibility of one secretary of state. Now, with the setting up of the Office of Science and Technology (OST) and the demise of the University and Polytechnic funding councils to form regional funding councils, the dual-support system is in the hands of five government departments and five cabinet ministers. Some feel that this will give the consideration of science by the cabinet greater weight, others are not so sure. At all events, all the signs are that the integration of an overall wealth-creation policy will not be helped by these changes. The birth of OST has had the effect of constructing additional interfaces without reducing the number elsewhere.

Then there is the matter of the money the research councils/OST spend compared with government spending departments. This is an issue of absolutely central importance to any strategy for the science base and for wealth creation. In fact so important is it that one can only imagine that the critical decisions in this area must have already been taken by the government before the announcement of the forthcoming White Paper (policy document) on scientific research. In one important regard matters in this area are obscure, at least to outsiders. It relates to how government departments bid for science money and how overall priorities are set. Each government department certainly bids for money under the annual public spending procedure, but it is quite unclear to those outside "the ring fence" whether these bids contain specific lines for research. The whole area of public expenditure bidding is covered by low cloud. Consequently it is unclear whether the government has anything approaching an integrated research budget — even in concept — or whether there are merely a series of individual departmental bids against headings of 'research' over which the chief scientist at OST casts an eye.

Perhaps one example will illustrate the importance of this issue. The pursuit of wealth creation will require an effective interface between the government's science spending and that of industry and commerce. As far as physics-based industries are concerned, the Department of Trade and Industry has a central role. Other government departments are in the lead for other areas: for example the Ministry of Agriculture, Fisheries and Food for the food industry and the Department of Health for pharmaceuticals. So who is to coordinate these activities, let alone coordinate them with the relevant research councils, who themselves are supporting (and in some cases doing) research in cognate areas?

The setting up of OST and the announcement of the White Paper with OST central to its production suggests that it is that department which is to play the coordinating role. But can one expect OST, itself a vote holder from parliament for a part of the science base; to combine an executive role with respect to that money with an advisory/supervisory one for the spending of other government departments, particularly when they are likely to be bidding against one another? I do not believe OST, at least as operating at the moment, can be both executive and advisory/supervisory on the same topic.

So should all the spending departments' science money be transferred to OST? Probably. But unless things are already decided, there is not much time to arrange that, even in principle, before publication of the White Paper. Nor can one believe this is actually to happen — on a large scale at least. The alternative possibility — to transfer all OST's money to spending departments — would also have serious disadvantages. Apart from the politically difficult step of reversing the recent dual-support transfer, depriving OST of virtually all its funds would weaken it disastrously.

Because I believe the generation of advice should be clearly separated from executive control, OST may well have to be divided functionally to reflect two distinct roles. I don't feel scientists, or even those in industries concerned with wealth creation, should be too sanguine about this. The motivation for any decision in this area is likely to be almost exclusively one of raw politics, and the decision will have a profound effect on how science is managed in the future.

As well as influencing the structures and missions of the research councils, the White Paper may have a profound impact on the way they operate. Speaking personally, I am attracted to a 'mission-oriented' way of operating; but it would have important implications. In particular a research council would seek to fulfil its mission wherever the work could be done most effectively. For the Science and Engineering Research Council this would not necessarily be in higher education institutions, and so the White Paper could indirectly signal a sharp change in funding patterns. □

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1. Dickson, D. *Nature* **362**, 285–286 (1993).
2. Dickson, D. *Nature* **360**, 705–706 (1992).