

House of Lords Science and Technology Committee Inquiry: Setting science and technology research priorities

Submission from the UK Deans of Science

SUMMARY

- The Government's recognition of the importance of science and its commitment to the science base has led to an improved infrastructure that underpins the UK's research capacity. It is essential that these gains are not lost by random reductions in revenue or capital spending. (Please see paragraphs 3, 4, and 10).
- Scientific research knows no national boundaries and its outcomes must be shared. The overall objective of publicly funded research should therefore be primarily to support the UK research base and the extension of fundamental scientific knowledge and understanding. (Paragraphs 5 and 6).
- With the exception of research contracted by the Government to deliver highly specific solutions, the original concepts enshrined in what has become known as the Haldane Principle should continue to dictate how funding is allocated. (Paragraphs 7, 8 and 9).
- The objectives and mechanisms for allocation of research funds that have been applied in recent years have been broadly appropriate (paragraphs 10 and 14). However, the balance between targeted and response mode is now beginning to tip too far in favour of targeted research. Any requirement for more targeted research should be met by new money or by savings that do not impinge on the current breadth of the research base (Paragraphs 16 and 17).
- The processes for considering policy-directed research, defining research priorities, coordinating funding and identifying research gaps have been strengthened by the increase in the number of Departmental Scientific Advisory Councils and Departmental Chief Scientific Advisers. However, a rationalisation of the many Science Advisory Councils might lead to enhanced recognition of common problems, research gaps and potential synergies. (Paragraphs 11 to 15).
- There is a need for a strategic approach to regional development. (Paragraphs 15 and 23).
- The current extent of alignment between public, industrial and charitable funding of research does not achieve maximum social benefit. (Paragraphs 18 to 20).
- The concept of what is of economic importance needs careful consideration. (Paragraphs 22 and 23).
- The Government should not attempt to direct research "pick winners", though it is appropriate for it to define, using independent advice from the scientific community, within very broad parameters, the main societal challenges that need an input from science and technology. (Paragraphs 21 to 23).
- While a simplistic comparison may be misleading, more attention needs to be given to ensuring that the UK's investment in scientific research and development is at least comparable with those of our main international competitors. (Paragraph 24).

BACKGROUND

1. The UK Deans of Science welcome this very timely inquiry by the House of Lords Science and Technology Committee and wish to make some brief comments on some of the issues it raises.
2. The UK Deans of Science (UKDS) is an independent group with members from around 70 of the UK's higher education institutions that have significant science portfolios. Our primary aim is to ensure the health of the science base of the UK through the promotion and support of science and scientists and of science research and science teaching in the UK's HEIs.
3. Our comments are given at a point when the science community can look back on a decade when the Government has recognised the importance of science and technology to the future of the UK economy. This has been manifested in a significant increase in public funding and a much greater attention to science within the machinery of Government. Amongst the positive developments have been the increasing numbers of Departmental Chief Scientific Advisers and Departmental Scientific Advisory Committees and a much higher and positive profile for science in the speeches and actions of Ministers, culminating in the recent decision that the Minister for Science and Innovation should attend the Cabinet. We are extremely grateful for all of these actions.

THE CONTEXT

4. We are concerned about the interpretation that may be given to the inquiry's contextual statement that introduces this call for evidence. The expectation of overall cuts in public spending must not be a trigger for any reduction in the budget available for research in science and technology. This statement may be seen as the special pleading of the community that would suffer most if any reduction in funding were to occur. However, this is not the case. The countries that bite the bullet and decide to invest in scientific research during a period of economic downturn will prosper most in the inevitable economic upturn.

THE OVERALL OBJECTIVE OF PUBLICLY FUNDED SCIENCE AND TECHNOLOGY RESEARCH

5. Science and technology, by their very nature and practice, know no national boundaries. Except where national security or commercial sensitivity demand a different approach, the outcomes of all scientific research must be shared through readily accessible, peer-reviewed publication. Any other approach will prevent the essential progress that can be made by "standing on the shoulders of giants". Thus the overarching objective of publicly funded research must be that it will contribute to the sum total of the world's knowledge and understanding of science and its actual and potential applications. However, within such an intent it is accepted that support for science and technology by Government will be made through channels in universities, government research establishments, departmental research expenditure, etc, that will and should support curiosity-driven work, research that has broad and defined outcomes and applied work intended to solve very precise problems.

6. Within overall government supported research the objectives to support applied work must be built on the recognition of the need to develop fundamental scientific knowledge and understanding. Only with such knowledge can we be sure that we have the tools necessary to find solutions to society's needs. Within this the funding must make it possible for discover and address challenges that are yet to be recognised and to generate science whose application is as yet unknown.

THE HALDANE PRINCIPLE

7. In our approach to a definition of the Haldane Principle it is first necessary to distinguish between publicly funded research paid for by government departments (which occasionally requires direct answers to specific problems) and other research funded by the research councils and the university funding councils. Much of the former will fall outside a principle that government should never define or direct what research should be done. Thus we would argue that the Haldane Principle means that, outside very specific areas of defined need for applied research to answer specific and often immediate issues (eg swine flu), the Government must not expect to define and direct the research that it funds. This is a position that we would defend in the strongest possible terms. Again this is not a case of a special pleading from a special interest lobbying group that wishes to maintain a privileged position even when society is under extreme financial stress. We argue this case because we know of no evidence that medium to long term success is likely to follow such decisions made by governments. Notwithstanding this, those in receipt of public funding should be expected to account for its proper use.
8. It will be clear that freedom in research and a definition of a modern Haldane Principle are complex issues. However, it can be summarised in the following terms:
 - the Government has a right to specify fairly directly areas of applied research that it may, through its departments, commission from time to time for the solution of very clearly identified problems. In these cases the scientific method that is used should be decided by the scientists who will carry out the work and not the Government.
 - in some other cases of public funding of research the Government may wish, using to its fullest extent the advice of independent scientists and others, to indicate in the broadest possible terms the areas within which it, on behalf of the tax payer, wishes to see research carried out. These should be expected to relate to the perceived current and future challenges facing national and international society. But even in this there must be room for new areas outside the broad objectives
 - in all other public funding there should be freedom to carry out the research, with funding decisions based on peer review of the quality of the research proposals and of the research team's ability to deliver.
9. It is only by adherence to the principles in the latter two bullet points, allowing scientists to choose what projects to propose for funding, that the best and most productive research will be done in UK universities and the UK will continue to be a world leader in science and will attract and retain the very best scientists.

APPROPRIATENESS OF EXISTING OBJECTIVES AND MECHANISMS FOR THE ALLOCATION OF PUBLIC FUNDS FOR RESEARCH

10. Here we restrict our response to the funding of university research through the so-called dual funding mechanism, ie support provided by the research councils and the funding councils (through the Research Assessment Exercise (RAE)/Research Excellence Framework (REF)). Together with the significant investment that has been possible in the last ten years through the generosity of the Wellcome Trust and various Government capital funding initiatives the dual funding mechanism has successfully underpinned research capacity. UK science undoubtedly punches well above its weight, helped by the absolute dedication of the university science community. The success has been hard won. A major perturbation in the dual support mechanism, either in the balance of funding or an increase in the directing of research that should be done would be a major risk to this success and to the ability of the research community to follow up a wide variety of potentially fruitful ideas. This issue is considered further in paragraphs 13, 14 and 16.

ALLOCATION OF FUNDS FOR POLICY-DIRECTED RESEARCH, ROLE OF DEPARTMENTAL CHIEF SCIENTIFIC ADVISERS

11. As a group that is not in day to day contact with the Whitehall machine we confess to having an unclear “organisational” view of how policy-directed funding decisions are made, and the funding allocated. There is a maze of Science Advisory Councils (SACs) focussed on specific topics, with some departments, but unfortunately not all, having Departmental Scientific Advisory Councils (DSACs) . It is also regrettable that not all departments yet have a Departmental Chief Scientific Adviser (DCSA). Nevertheless the existence of this infrastructure is a clear indication of the Government’s commitment to science and its intention to obtain a wide range of independent scientific advice. Although the current need to reduce the overall rate of public spending may lead to some timely rationalisation or reduction in the numbers and complexity of SACs it is essential that, where they currently exist, Departmental Science Advisory Councils and Chief Scientific Advisers remain intact and are extended to the departments that currently lack them. It is also imperative that the advice they give to Government is made public.

RESEARCH PRIORITIES, COORDINATION OF FUNDING AND IDENTIFICATION OF RESEARCH GAPS

12. Notwithstanding the need to maintain, through difficult economic times, appropriate independent scientific advice, we have concerns as to how the disparate advice of all the advisory groups and individuals is collated and combined. While a Chief Scientific Advisers Committee exists we wonder whether each member brings to it such a high level summary of the advice of the many SACs (over 70 in total) that much useful detail may be missed – for example, common scientific problems, the need for development of similar fundamental research, scientific methodologies, etc. It is unclear where such diverse but important issues may be picked up given the apparently much higher level priorities of the Council for Science and Technology. In short it seems, from the outside that there is a major silo effect across the

Science Advisory Councils and we are unconvinced that this complex system successfully identifies all research gaps or potential research synergies.

13. In principle there is little wrong with the current process for agreeing priorities and coordinating funding through the Technology Strategy Board and the Research Councils. However, the very low rate of success of funding applications and the recent increasingly directional approach being taken by the Research Councils to the research that will be funded are both of concern. We believe that the balance is now being moved too far away from responsive mode funding. We also have some concern about the lack of transparency of Government “advice” to the research councils.
14. The second major Government research funding stream to universities through the university funding bodies is delivered through a robust and rigorous procedure (RAE/REF) that involves appropriate peer review, including in the last exercise (RAE 2008), the use of international panel members. In spite of minor concerns about the results of the last exercise, they were broadly fair, though, as always, there was some disappointment over the resultant financial allocations. However, on balance the distribution and relative concentration of RAE funding resulting from the 2008 RAE is generally about right.
15. There is also a question as to whether in this and the coordination of research priorities discussed sufficient consideration is given to strategies for distribution of research funds to the regions and the effect that this may have on some of our regional universities. This issue is further addressed in paragraph 23.

BALANCE OF FUNDING BETWEEN TARGETED AND RESPONSE-MODE RESEARCH

16. As indicated earlier we believe that the balance of funding is now shifting too far in the direction of targeted research activity. Unfortunately, as a comparison of the funding streams illustrates, there is a similar issue over the funding available to universities within the EU’s Seventh Framework Programme. Of course, it is quite reasonable to expect scientific research paid for by Government to show impact, but success in this regard needs to be evaluated over timescales of up to at least 10 to 15 years.
17. One issue which is paramount in any discussion of Government support for scientific research is the need, in the coming period of financial constraint, for the sum total of Government research funding to be ring-fenced. Any additional needs for investment in targeted research should be additional new money.

ALIGNMENT BETWEEN PUBLIC, INDUSTRIAL AND CHARITABLE FUNDING

18. In one respect we would take issue with the suggestion which is implicit in the question posed by the Committee – we believe that the science-based industries in the UK do, very often, take full cognisance of societal needs when drawing up their strategies and research plans. However, there is always the need for industry to consider the bottom line so that the highest priority will be given to solutions where there is likely to be a good, and relatively rapid, rate of return. This might be less of a problem to industry were it not for the commercial environment in the UK

which allows the predatory takeover of a company, often based on very short term views of its balance sheet.

19. An issue that seems to be increasingly difficult for many universities is trying to pass on the effect of full economic costs for research. Industry argues that this makes the cost of the research too high, imagining that they are paying in part “for the Vice-Chancellor’s yacht” while they only want to pay the direct cost of the research. Charities often take the view that they should pay for the salaries of a project’s researchers, expecting the infrastructure to be available free of cost to them. There would seem to be a place for Government to consider this issue further, helping to act as a broker, in recognition of the fact that much very useful researching into societal needs is carried out in universities with such funding.
20. We believe that the Technology Strategy Board should take as part of its brief the need to find ways of ensuring that industry, charities and universities can work more fruitfully together, with consideration of how tax incentives could be given to companies, perhaps encouraging a commitment from them that a certain small percentage of their research and development budget might be dedicated to such activity.

21. FOCUSING ON AND IDENTIFYING AREAS OF ECONOMIC IMPORTANCE

We do not believe that it is possible to predict the economic future so any attempts to identify and focus on “winners” is likely to be unsuccessful unless only very predictable, short-term gains are being sought. What is more important is whether there should be any attempt to do this at all and we believe there should not – it is not the role of Government.

22. The question is not even a simple one of financial profit or loss. Much of what is of economic importance is not instantly recognised as such – for example the health of the nation can have a positive effect on economic performance, as could such events as England winning the 2010 World Cup.
23. An aspect of economic performance which must not be neglected is the spread of success across the UK. Just giving money to the Regional Development Agencies insufficient. There is a need to ensure that proper and appropriate strategies are in place for regional development in science research and development. This would appear to be a role for the Technology Strategy Board, one which it should be encouraged to take up with some vigour as soon as possible. However, regional issues also need to be in the brief of Departmental Science Advisory Councils, Chief Scientific Advisors and the Council for Science and Technology. In this way we can ensure that the UK uses fully the talents of all its scientists.

24. COMPARISONS WITH OTHER COUNTRIES

It is interesting that the Committee has made this particular issue the last point in its call for evidence because it is quite obviously the most important of all and one which is most worrying to the science community across all public, commercial and not-for-profit sectors). In spite of the very welcome increased investment by the Government over the past ten years, the

percentage of GDP that the UK spent on research and development at only 1.8% lags significantly behind most of our competitors. The current UK target is for a rise to 2.4% by 2014. Even if this is achieved, the UK will still be below most of our international competitors, almost all of whom have plans to increase their investment in the next few years. A few examples, of many that could be quoted, may suffice to sound a serious warning about the UK's investment: President Obama's commitment to science and to devote more than 3% of US GDP to research and development¹, while Germany and France also intend to move to 3%. India intends doubling its research and development expenditure, while China's research output has rapidly outstripped the UK's in the past ten years and will soon rival the US.

25. UKDS would be very pleased to supply further comment if required

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¹ Remarks by the President at the National Academy of Sciences Annual Meeting, Washington, 27 April 2009.
http://www.whitehouse.gov/the_press_office/Remarks-by-the-President-at-the-National-Academy-of-Sciences-Annual-Meeting/