



Council for Science and Technology

Dr Richard King
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Office of Science and Technology
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19 June 2001

Dear Dr King

**STAGE 2 OF THE QUINQUENNIAL REVIEW OF THE GRANT
AWARDING RESEARCH COUNCILS (THE QRC).**

On behalf of the independent members of the Prime Minister's (Advisory) Council for Science and Technology (CST), I am pleased to provide the attached response to your letter of last April about the second stage of this review.

As you will see, we have sought to assist the QRC Steering Group by concentrating on the top-level issues concerning the Councils' missions, roles and governance. We considered that this was the most appropriate and useful approach to take under the Council's strategic terms of reference.

You will also see that we are intending to provide the Group with a further contribution as soon as possible, following a visit to Stockholm to study the re-organisation of the Swedish Research Council system and the establishment of a new organisation with responsibilities for Sweden's national innovation systems. The arrangements for this visit are in hand but still to be settled.

As required by our terms of reference, we will be submitting and publishing a report to the Prime Minister about our work on this review. In the meanwhile, we trust that the attached response proves to be a helpful contribution to the Group's work.

I am copying this letter and the attachment for information to Lord Sainsbury, (Minister for Science), Professor David King (Chief Scientific Adviser) and my CST colleagues. A further copy will be placed on the Council's web site shortly.

Yours sincerely

Julia Higgins

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COUNCIL FOR SCIENCE & TECHNOLOGY

RESPONSE TO THE SECOND STAGE OF CONSULTATIONS ON THE QUINQUENNIAL REVIEW OF THE SIX GRANT FUNDING RESEARCH COUNCILS.

Introduction

This response contains our views on the further steps that the Government should take to ensure that the UK has outstanding Research Councils supporting outstanding research

2. In accordance with our remit as the Prime Minister's advisory body on the strategic aspects of the UK's science and technology (S&T) policy,¹ we have concentrated on the top level issues concerning the Councils' missions, role and governance. These mostly fall within the terms of reference of working group A, which has been established by the Quinquennial Review (QRC) Steering Group.

3. From the consultative letter of April 2001 from the Office of Science & Technology (OST), we were pleased to note that the review is being conducted along the lines of our initial response of 23 November. We were also pleased to note the emphasis that the Government placed on the Councils' strategic role in its announcement of the review last February.

4. This response has been prepared by a sub-group of members comprising Sir Paul Nurse and Professors Dame Julia Higgins, Kumar Bhattacharyya, Sir Alec Broers and David VandeLinde. It was approved by the full Council at its meeting on 4 June 2001 and follows the same order as the main lines of reference of review working group A, as requested by OST.

5. We have taken into account a number of other reviews and studies that are underway or impending, in particular:

- The Transparency Review, and its follow up (concerning the Dual Support arrangements).
- An OST/HMT/DFEE study of under investment in research infrastructure.
- The Quinquennial Review of the Council for the Central Laboratory of the Research Councils.
- A review of Foresight by OST.
- A review by OST of its Public Understanding of Science, Engineering and Technology (PUSET) activities.

¹ Published on the Council's web site at www.cst.gov.uk



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- A review by Sir Gareth Roberts of the SET postgraduate education.
- The Government's next (2002) Spending Review

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Summary

6. Overall, we consider that the six Research Councils have performed well individually since they were established in 1994, following the 1993 S&T White Paper, *Realising our Potential*.²

7. We can see no convincing reason for changing their number. Nor can we see any good reason for amending the top-level mission statement in their respective Royal Charters. From our own experiences and in the light of the review of the Research Council System which OST published in December 1998,³ the main challenge is to build on the strong foundations that have already been established by the Councils, the Director General of Research Councils (DGRC) and the OST.

8. One of the key issues to be addressed concerns the distinctive roles and missions of the Councils as a group on the one hand, and of the OST on the other. Both sides are pivotal actors in delivering the Government's goal for investing public funds in the science and engineering base,⁴ simply expressed the creation of a world beating science and technology platform that best underpins and serves the UK's societal and economic requirements.

9. For these essential purposes, the existing systems and structures must be strengthened to improve the Councils' joint working on cross cutting matters at both the strategic and operational levels, and especially in relation to the planning, use, monitoring and evaluation of Science Budget expenditure on research. As a group, the Councils should be held clearly and publicly to account for these joint responsibilities. Together they should develop their key position as the strategic leaders and managers of this investment portfolio.

10. In partnership with the Councils, the OST should focus more sharply and clearly on its overarching role as the Science Budget holder. The OST needs to develop its arrangements for assessing and reporting openly on the Councils' performance, the outputs and outcomes of the funded research, and the extent to which the science and engineering base is adequate and fit for the UK's present and future purposes.

11. There are two further key issues. First, there is the need to achieve a step change improvement in the performance of the business (ie demand) side of the nation's innovation systems through which wealth and value is created from S&T by

² *Realising our potential, a Strategy for Science, Engineering and Technology*, Cm 2250, April 1993.

³ *Review of the Research Council System: January 1994 to December 1998*, DTI/OST December 1998.

⁴ This was defined in the 1993 S&T White Paper, *Realising our Potential* (Cmn 225) as comprising the research and post graduate training capacity based in the universities and colleges of higher education and in the institutes, units and centres operated by the Research Councils, together with the central facilities (whether in the UK or abroad) supported by the Councils and available for use by UK scientists and engineers ”.

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companies. As we stressed in our March 2000 report, entitled *Technology Matters*,⁵ this is a massive challenge from all viewpoints.

12. Accordingly, we consider that Government should take the opportunity of this review and related work to examine the options for establishing a new organisation, which we have called *the Office for Innovation (the OfI)*. With the Research Councils and the OST concentrating on the science and engineering base supply side, this new organisation would focus on developing the business or demand side, thereby forming a cohesive and effective axis for securing full value from public investment in science and technology.

13. Second, there is the need to resolve the research funding "gap" in higher education. At present, this part of the science and engineering base is over-trading in the sense that the full costs of the research being conducted are not being recovered from the various funding parties involved in the public, private and voluntary sectors.

14. Consequently, this research is being cross-subsidised from other financial sources, and the balance between recurrent and capital research expenditure is insufficient for the purposes of maintaining the research infrastructure in a suitably stable way over the medium to longer term. This issue must be solved as quickly as possible.

15. Our views on these key issues are presented more fully below. But in brief, we consider that:

i) The Councils' mission statements should be reformulated to set out clearly and comprehensively their core functions, both joint and several (paras 16-20, 25 and 26).

ii) Following completion of the Transparency and related reviews, including the next (2002) Spending Review, the Research Council grants should cover fully their attributable share of the indirect costs of the projects and programmes that they support (paras 21-24).

iii) New guidelines should be established, setting out the governing principles and criteria that apply to the Council's own research institutes, units and centres. These guidelines would provide the basis for future reviews and decisions in relation to the status of the existing institutes etc, as well as decisions concerning the establishment of any new ones (paras 27-29).

iv) A new organisation, *the Office for Innovation*, should be established to improve and strengthen the business or demand side of the UK's national innovation systems, and especially the channels by which S&T created in the science base is diffused and exploited commercially (paras 30-36).

⁵ Report on the exploitation of science and technology by UK business, DTI URN 00/73. Also available on the Council's web site at www/cst.gov.uk



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v) To improve and strengthen top level strategic leadership and management across the Councils, especially in relation to the collective functions of planning, monitoring and evaluation, a new, overarching strategic structure should be established. This structure, which we have called *the Board of the Research Councils*, must add value to the roles and work of the Councils' existing boards. The new Board should complement, not usurp, the responsibilities of the Councils' individual Boards (paras 37-45).

vi) The Arts and Humanities Research Board (AHRB) should become a formal member of the Science and Engineering Base Co-ordinating Committee. Systematic arrangements should be made concerning the periodic attendance of the AHRB at meetings of the Research Council Chief Executives and Director General of Research Councils, as well as at meetings of the new overarching Board. OST should ensure that the agenda and papers for such meetings include matters of mutual interest that bridge the organisational S&T - A&H divide. Further OST, should convene and facilitate regular meetings of the main funding bodies for science, technology the arts and the humanities. We favour re-establishment of the AHRB as a UK-wide Arts and Humanities Research Council (AHRC) (paras 46-47).

vii) The Director General of Research Councils, supported by the OST, should:

a) publish regularly a report on the performance of these tasks by the Councils.

b) publish regularly a separate report on the present situation and prospects of the UK's science and engineering base (paras 48-56).

viii) For supporting future public investment and expenditure exercises, OST should adopt a further, longer term process, possibly with a five year frequency, to evaluate and report systematically on the outputs and final outcomes of science budget expenditure (para 56).

ix) A more integrated cross cutting process should be established, one that closely links the production of science and innovation strategies by Departments with the largest R&D budgets more closely with the one for setting and allocating the Science Budget (para 57).

x) In the light of the above, OST should keep under review its existing Forward Look and Science, Engineering and Technology (SET) Statistics publications to ensure that future versions serve useful and appropriate purposes at suitable points in the various planning and reporting cycles involved (paras 57-63).

Detail

The Councils' Missions as funders of research

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16. The Councils' individual missions are defined broadly in their existing Royal Charters, essentially in terms of supporting high quality basic, strategic and applied research⁶ and related post graduate training in certain scientific fields; and meeting the needs of their user communities for its research and training outputs.

17. Though not expressly stated in their Charters, the Councils' core tasks as non-departmental public funding bodies concern the planning, provision and monitoring of the funds that are allocated to them from the Science Budget for following purposes:

- (steady state) support for research projects and programmes including cross Council programmes;
- (transitional) support for changing research activity, for example by pump priming a new inter-disciplinary research centre or upgrading laboratories;
- research post graduate education and training;
- the provision of major research facilities eg high performance computers;
- bringing on new research talent or research activities that are not yet ready for traditional peer review; and
- supporting star researchers, for example through fellowships

17. They also perform ancillary tasks such as dealing with enquiries from the public or the media about their activities or research portfolios and providing advice to the Government on these matters.

18. We believe that these tasks should be defined in a new mission statement, using suitably clear and comprehensive terms. Rather than changing their existing Charters, this statement could be incorporated more easily into the combined management statement and financial memoranda between them and the OST.

19. As for the statement's terms, we consider that it should encompass all of the following, elements, which we have expressed generically for illustrative purposes. We attach particular importance to those aspects that are underlined:

In relation to basic, strategic and applied research in the UK's science and engineering base within the fields of [A,B,C..], [Council X] ⁷ shall:

- *Promote quality, relevance and innovation in research.*
- *Work to create a world class research environment, including buildings and equipment.*
- *Promote and facilitate structural and other changes within this base.*
- *Support researcher initiated research.*
- *Initiate and support cross disciplinary research initiatives.*
- *Collaborate nationally and internationally with other authorities and bodies which conduct of finance research.*

⁶ PPARC's mission statement is limited to basic research.

⁷ In the case of PPARC, strategic and applied research would not of course appear.

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- *Foster and instigate international research co-operation and the exchange of experience.*
- *Support post graduate research education and training.*
- *Promote mobility, gender and ethnic diversity within the research community, as well as the professional development of researchers throughout their careers.*
- *Pay particular attention to any ethical issues involved, and disseminate information about these issues.*
- *Provide its considered views and advice on these matters.*

The Council shall, in particular –

- *Maintain a comprehensive, forward looking oversight of these research fields, particularly new opportunities, threats and international developments*
- *Take account of user needs in reaching funding decisions*
- *Negotiate funding for research to ensure that the attributable indirect costs are normally met in full.*
- *Monitor and evaluate the costs and benefits of its expenditure on research systematically.*
- *Work to improve its effectiveness and efficiency continuously.*

The Council shall work on these matters in partnership, in particular with

- *The research and user communities including Government Departments.*
- *The other Research Councils, the Funding Councils, the Arts & Humanities Research Board, and other funding bodies in the public, private and voluntary sectors.*
- *The DGRC, the OST and the overarching Board of the Research Councils..*

20. Generally, we believe that such a statement would help the Councils to counter mission drift and avoid spreading their resources too thinly. It would also help secure further improvements in the Councils' performance by providing the basis for holding them firmly to individual and collective account, for instance on such key tasks as:

a) ensuring that their research communities are more fully aware of the opportunities for research that are relevant to the UK's future needs, e.g by greater use of research grant panels in thinking forward strategically and of exemplars provided by the US National Science Foundation and National Institutes of Health.

b) conducting landscaping and horizon scanning exercises, severally and jointly, eg for identifying and initiating support for new interdisciplinary areas;

c) initiating new approaches, taking into account international developments and opportunities; and

d) fostering the development of new research talent and new ideas for research.

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21. We have included in the above model an explicit reference to the Councils' responsibilities concerning the indirect costs of research in their project and programme grants. We attach considerable importance to this, not least for the purpose of helping the Councils in their tri-lateral relationships with Higher Education Institutions and the Funding Councils.

22. The most appropriate form of words for defining this particular responsibility depends upon the resolution of a number of complex questions concerning the attribution of these costs within the far more diverse higher education research funding system that exists now compared to when the dual support arrangements were first established. These questions include:

- Which of the various funders should benefit from the Funding Council block grants and the Research Infrastructure Fund, to what extent, and on what basis ?
- What should be done to tackle the low price culture that exists within research university research departments and elsewhere ?
- Do the existing arrangements unduly favour research volume ?
- What are the most appropriate funding mechanisms for ensuring the right balance between recurrent and capital expenditure ?
- Is the Councils' existing (formulaic) contribution to indirect costs at the right level ?

23. There is widespread belief that the Councils' existing contribution to these costs, calculated on the basis of 46% of eligible direct staff costs, is too low and, hence, one of the reasons why there is a "gap" in higher education research funding.

24. The QRC, the Transparency Review and the forthcoming 2002 Spending Review provide an opportunity for resolving this long-standing issue once and for all. While Science Budget funds should not subsidise the indirect costs of research supported by other funding parties, it is essential that the Councils meet their share of these costs, and that they are seen to be doing so.

25. As for the other tasks and activities that the Councils perform at present, the QRC Steering Group must examine them thoroughly to ensure that the Councils do indeed concentrate on the above core tasks. Their public understanding of science, engineering and technology (SET) activities for instance might be better conducted through new organisational arrangements involving OST and the numerous other bodies involved in SET communication work.

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26 Our views on the Council's technology transfer activities and the partnership aspects of this model statement are presented below under the relevant headings that follow.

The Councils' Missions as Research Providers

27. We accept that there are good reasons for the Councils to fulfil the additional role as providers of research in certain cases through their own institutes, units and centres, units. At present, some of these are owned or governed by the Councils, some involve Council staff on permanent or limited contracts, some are embedded in Higher Education Institutions and others are free standing. Each of them is subject to periodic review by their parent Council but this is done on a case by case basis without any underpinning criteria.

28. Nonetheless, we urge the QRC Steering Group to consider this particular aspect of the Councils' role because of its historical nature, distorting effects on research funding playing field, and its demands on the Council's management time and resources. We favour the establishment of some basic ground rules in the form of a set of guiding principles and criteria as to the circumstances in which the creation of any new such institute etc is justified. These rules would also provide the foundation for future (quinquennial) reviews of those in existence at the time.

29. Additionally, we consider that during the course of the next Spending Review, particular consideration should be given to the case for investing in structural changes sooner rather than later in order to secure future savings in the longer term.

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Technology Transfer, S&T Diffusion and Exploitation

30. Since their establishment in 1994, the Councils' work in this particular respect has been conducted during a period of considerable change in the related budgets and activities of the Department of Trade and Industry and other Departments. The QRC Steering Group should therefore examine carefully whether any mission drift has occurred that needs correcting.

31. In its recent Skills, Enterprise and Innovation White Paper, entitled *Opportunity for all in a world of change*,⁸ the Government confirmed its intention to establish cross-functional teams of people. These teams will be drawn from the public and private sectors and work to create the right conditions for growth industries of the future. The White Paper also referred to the simplification of the existing business support schemes. Some such as LINK, Faraday Partnerships and the Teaching Company Scheme involve the Councils.

32. As we see it, too much of the existing activity and focus lies on the science and engineering base or supply side of the innovation processes. This "push" approach has its limits and needs to be complemented by a fresh focus on the "pull" side from business. After so many years of comparatively low levels of private sector investment in R&D, we seriously doubt whether the existing, fragmented organisational arrangements and support schemes within Departments have sufficient focus and power to bring about real, lasting improvements in the demand side's performance in exploiting S&T.⁹

33. We believe that the time has now come for the Government to take more radical action by adopting a much more balanced, twin pronged approach, one that is spearheaded by:

- the OST and the Research Councils on the one side, supporting and encouraging innovation and S&T knowledge diffusion from the science and engineering base; and on the other
- a new organisation, which we have termed for convenience - *the Office for Innovation (OfI)*, working in a dedicated way as their counterpart and key partner on the demand side and focussing sharply on forging and strengthening businesses' linkages with this base.

34. Our starting point is that the Research Councils and the OST, with their supply side responsibilities and focus, are unnecessarily handicapped at present by the absence of such an organisation.

⁸ Cmn 2052, February 2001.

⁹ See for instance the second edition of *the Competitiveness Indicator*, DTI, February 2001.



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35. Plainly, the *OfT's* role and core functions would need to be established in parallel with a review and re-definition of the Councils' role and core tasks in technology transfer. Its creation from the organisational parts that presently exist would also need to be examined carefully in order to secure the fullest possible synergistic benefits, cost effectively and efficiently.

36. Provided the arrangements can be made in time, we are intending to provide the QRC Steering Group with our further views after undertaking a visit shortly to study the new organisations that are being established in Sweden along these same lines.

The Council's Top Level Governance and Cross Working

37. The Councils' existing charters make no reference to their collective responsibilities, and as far as we are aware these have not been defined so far in any other instrument governing their activities. And yet this set of joint responsibilities is crucially important, not least in view of the fact that the Councils are increasingly engaged in collaborative programmes such as those covering e-commerce, genomics and basic technology.¹⁰ Furthermore:

- Science is fast changing and no respecter of traditional discipline or subject boundaries. Indeed, leading edge science and technology lies increasingly between and across these boundaries.
- OST and the Government require the Councils' combined advice on such matters as the Science Budget, the priorities and balance of allocations in this Budget, the EU Research and Technology Development (RTD) Framework programmes, and on the provision of major research facilities, nationally and internationally.
- Regardless of their number, the Council's boundaries need to be kept under continuous overarching review for making suitable changes and adjustments, as and when necessary.

38. The present arrangements for dealing with such matters principally involve monthly meetings of the Councils' Chief Executives and the DGRC. There is a widespread view, one with which we agree that these arrangements are insufficient to deal with cross cutting matters, especially of strategy but also of operation. We also consider that the Councils' collective role and position in relation to OST needs to be clarified and strengthened.

39. Inevitably as funding bodies, financial considerations influence each Council considerably, if not predominantly - especially in terms of the allocation of funds for particular research fields, communities and activities. The same is true, just as inevitably, when it comes to their relations with one another and with OST.

¹⁰ *Science Budget 2001-02 to 2003-04*, DTI November 2000,



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40. Accordingly, we consider that the QRC Steering Group should give serious consideration to the establishment of a new overarching strategic management structure, which we have termed for convenience *the Board of the Research Councils*. As we envisage it, the new Board would be chaired by the DGRC, comprise the Councils' chief executives, and be supported by a small strategic unit. In considering this suggestion, the QRC Steering Group will need to examine the case for including a couple of non-executive directors as well.

41. The reformulation of the Councils' individual mission statements that we have proposed already would facilitate the development of a much more common culture and ethos throughout all the Councils, individually and collectively. This still needs to be established.

42. As for the Board's remit, it should be cast in inclusive terms that serve this same purpose by specifying the collective core tasks of the Councils. This particular set of tasks include the preparation and publication of their jointly agreed views and advice on:

- the strengths and weaknesses of the overall research portfolio that they fund,
- the future threats and opportunities including any developments internationally that are relevant to this; and consequently
- the changes which should be made to the existing balance of expenditure from the Science Budget.

43. Similarly, we consider that the remit should require the Board to report on the outputs and outcomes of the Councils' expenditure. At present, no single reference source exists with figures on the breakdown of expenditure across the Councils by discipline, subject or mode of funding.

44. We fully recognise that a suitable taxonomy would need to be established - another task that would improve joint working - and that monitoring and evaluation on science budget expenditure involves considerable complexities. Nonetheless, we believe that methodologies for these purposes are being developed¹¹ and that they do need to be strengthened. This essential function must become a mainstream activity of the Councils and the Board, alongside those involving Science Budget allocations and expenditure per se.

45. More generally, the Board's remit must be framed such that it adds value to the existing Boards of each Council, and does not usurp their individual responsibilities

46. To improve joint working with the arts and humanities research communities, we favour the Arts and Humanities Research Board (AHRB) becoming a formal

¹¹ See for instance the status report on implementing the US Government's Performance and Results Act for Research by the Committee on Science, Engineering and Public Policy of the National Academy of Sciences, the National Academy of Engineering and the Institute of Medicine. National Academy Press, Washington, May 2001.



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member of the Science and Engineering Base Co-ordinating Committee¹². Moreover, systematic arrangements should be made for the periodic attendance of the AHRB at meetings of the Research Council Chief Executives and the DGRC. OST should ensure that the agenda and papers for such meetings include matters of mutual interest that bridge the organisational S&T - A&H divide.

47. We also support the re-establishment of the AHRB as the UK wide Arts and Humanities Research Council (AHRC).

¹² This Committee, which deals principally with dual support issues, comprises at present the chief executives of the Funding and Research Councils, along with senior officials of the Education Departments and OST.

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OST's Role in relation to the Research Councils

48. As set out in the 1993 White Paper, OST's overall mission is to

" act as the mechanism for developing and co-ordinating Government policy on science and technology both nationally and internationally; to sustain, enhance and develop the United Kingdom's capacity and capability to help advance scientific knowledge; to stimulate the diffusion of knowledge, the transfer of technology and the movement of people between the science and engineering base and industry; to help ensure an adequate supply of well trained and skilled scientists and engineers for the science and engineering base and the wider economy; and to ensure that Government expenditure on science and technology is targeted to make the maximum contribution to our national economic performance and quality of life."

49 Along with the Councils, OST is a key actor in delivering the goals of the two most recent White Papers on Science and Innovation:¹³

- maintaining and enhancing the excellence of the science base, the bed rock of the UK's economy, through significant new investment in the research infrastructure, and in research, especially in the key areas of research: genomics, e-science and such basic technology as nano-technology, quantum computing and bioengineering;
- opening up opportunities for innovation and interaction between universities and business, for instance through the Higher Education Innovation Fund, Business Fellows, Faraday Partnerships, Science Enterprise Centres, the University Challenge Fund, a new Foresight fund, new Regional Innovation Funds, and the Small Business Research Initiative;
- ensuring that people have a confident relationship with science by creating a robust, transparent framework for the Government's role, as an investor, facilitator and regulator.

50. The Office supports the Secretary of State for Trade & Industry who is the Cabinet Minister with Trans-departmental responsibilities for S&T, the Minister for Science, the Chief Scientific Adviser (CSA), and the Director General of Research Councils (DGRC). Organisationally, it is headed by the CSA and comprises two groups. Reporting to the CSA, the Trans-departmental Directorate deals with LINK, Foresight, International S&T including the EU RTD programmes and Science in Government work including the production of the "Forward Look" publication on Departmental SET expenditure plans.

51. The other, the Science and Engineering Base Group (SEBG), is headed by the DGRC and deals with the Science Budget, the Research Councils and related work. This work includes the delivery of such recently introduced schemes as the Scientific

¹³ *Excellence and Opportunity: a science and innovation policy for the 21st century*, Cm 4814, July 2000; and *Opportunity for all in a world of change: A White Paper on Enterprise, Skills and Innovation*, Cm 5052, February 2001.

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Research Investment Fund, the University Challenge Fund, Science Enterprise Centres and the Higher Education Innovation (formerly Reach-Out) Fund.

52. The DGRC is responsible for advising Ministers on the exercise of their powers under the Science and Technology Act 1965 to direct the use and expenditure of that money by the Research Councils, including the provision of broad guidance to the Councils. As such, he is concerned with the strategic aspects of the Science Budget while the CSA is concerned with lateral science and technology issues across all Government Departments. He is also responsible for:

- helping to secure the successful and high quality operation of the Research Councils in pursuit of their new missions, and, in consultation with other Government Departments;
- devising suitable mechanisms for ensuring that the user communities are able to play a full and proper part in these processes;
- keeping under review the boundaries between Research Councils;
- ensuring that Councils work together to achieve a common approach and take advantage of the possibilities for improved efficiency through joint working;
- encouraging the Councils to keep under review the arrangements for managing, monitoring and funding their Institutes.
- supporting the Minister and the Departmental Accounting Officer of the Office of Public Service and Science in their responsibilities for making sure that the Councils are making effective and efficient use of the funds voted by Parliament.

53. We are convinced that the core tasks and focus of the DGRC and SEBG must continue to be the provision of top quality advice and assistance to Ministers about the Science Budget and the operation and performance of the Councils. In setting and allocating Science Budget, the Government should continue to adhere to the Haldane Principle, limiting its role to providing the Councils with broad, top level guidance. It should also continue to apply the related principles of the dual support arrangements for science and engineering base funding, simply put that:

a) second rate research is a poor buy; and that

b) "S&T advances depend on the ideas, inspiration and dedication of individual researchers not the machinations of councils, committees and Departments."¹⁴

54. Accordingly, in determining the Science Budget during the course of successive periodic public expenditure planning, the Government should continue to

¹⁴ *Sir Michael Atiyah in his 1992 Royal Society Presidential address.*



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act as an intelligent investor while stopping well short of directing the initiation and execution of research projects and programmes. It should restrict itself to establishing the high level priorities and balance of allocations across the Councils.

55. For these essential but limited purposes, a dynamic, well informed and adaptable approach is necessary, one which fully recognises that this exercise is an art not a science and driven mainly by public expenditure and cash limited departmental budget considerations over the 3-4 yearly planning cycles. Research intensive companies are adopting similar approaches and over similar cycles for managing their investment in underpinning research in view of the unpredictable nature of S&T over longer periods, the rapidity of S&T advances and the shortening periods between such research and its exploitation.

56 The approach also needs to take account of the performance of the Research Councils and, more generally, the overall situation and prospects of the science and engineering base. Accordingly, we consider that with the help and advice of the new Board of the Research Councils, OST should prepare and publish in a systematic way its assessment against a suitable set of performance indicators, which will need to be established. We favour the production of:

- a) a report on the Councils' performance over the previous five years in the lead up to each future quinquennial review: and
- b) a separate report on the present situation and prospects of the UK's science and engineering base in the lead up to each future spending review: and
- c) on a longer, no shorter than 5 year cycle, a report on the outputs and final outcomes of science budget expenditure in supporting the national research portfolio.

57. These further steps would build on the OST's work so far in developing suitable metrics and in publishing reports of this nature occasionally. Additionally, we consider that OST should now:

- a) seek to establish a more integrated cross cutting process, one that closely links the production of science and innovation strategies by Departments with the largest R&D budgets more closely with the one for setting and allocating the Science Budget; and
- b) keep under review its existing Forward Look and Science, Engineering and Technology Statistics (SET) publications and their respective cycles to ensure that future versions serve useful and appropriate purposes, and that they are produced consistently at suitable points in the various planning and reporting cycles involved.

58. As specified originally in the 1993 White Paper, Forward Look was intended to contain a longer term assessment of the portfolio of publicly funded SET best suited to the broader scientific and technological needs of the country; the extent to which individual departmental S&T plans and programmes are matched to that portfolio; and

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the prospects of bringing a closer alignment between the two. More particularly, Forward Look would set out strategic objectives over a 5 to 10 year perspective and consider:

- *any gaps or imbalances in the education, training and research effort when set against the changing economic, social and scientific environments and when considered alongside the activity of the private sector, including the research charities;*
- *how the UK's efforts compare with its principal competitors;*
- *the balance between civil and defence research, and between civil research commissioned by Departments and that undertaken by the science and engineering base;*
- *the balance between domestic and international research and the scope for co-operation with other countries, whether through the European Community or other international frameworks;*
- *opportunities for achieving synergy across programmes;*
- *the scope for greater concerted action and collaboration, both within the public sector (between Research Councils, universities and Government Departments) but also, as it becomes possible to draw upon the results of the Foresight Programme, between the public and private sectors.*

60. Since 1993 and especially since 1997, S&T policies, processes and practices have developed significantly, for instance concerning:

- the annual business planning cycles for the Councils; and
- the biennial comprehensive spending review exercises that result in budget allocations to Departments with public service agreement targets for a three-year period, starting some 9 months after the review's outcomes are first announced, so far in July.

61. The science and innovation strategies which Departments are preparing in response to our 1999 Report on *S&T activities across Government* add a further cross cutting dimension, specifically in relation to their expenditure on research for underpinning their individual responsibilities and objectives.

62. In our view, the SET Statistics should continue to be published annually and a new version of Forward Look should be published in the year following each Spending Review to provide top level information about planned SET expenditure by Departments over the period concerned. Any adjustments to this expenditure that occurs subsequently should be included in the historical record provided by SET

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Statistics, and further details would be provided by the science and innovation strategies of individual departments.

63. Additionally, we favour a more systematic approach to the important task of keeping under periodic review¹⁵ the inter-relationships between Department's SET expenditure in accordance with these strategies.

Conclusions

64. We trust that the QRC Steering Group will find this response helpful, and stand ready to provide any further advice or assistance that might be required.

65. Overall, our views are directed at strengthening the position and working relationships of the Research Councils and the OST, particularly with regard to their distinct but complementary roles as the guardians of the public's interest and investment in the Science Budget. By supporting the UK's science and engineering base with research project and programme grants within the dual support arrangements, the Councils play a much more direct role in determining the composition and direction of publicly funded research than the Funding Councils with their more general responsibilities. To achieve their joint purposes, the two sides must co-operate, with the Research Councils working effectively together.

66. The portfolio of research funded through the dual support arrangements, providing Higher Education Institutions with discretionary block grants on the one side and Research Council funding on the other, should continue to be formed through the existing, bottom up decision making processes. The condition, outputs and outputs of this base must be monitored and evaluated systematically. It is also vital that the "funding gap issue" is resolved satisfactorily through the Transparency Review and related work to ensure that these arrangements serve the present and future circumstances of the science and engineering base.

CST
June 2001

¹⁵ *Review of the Inter-Relationships between the Science, Engineering and Technology Expenditure of Government Departments*, OST, December 1996.