

COUNCIL FOR SCIENCE AND TECHNOLOGY

ANNUAL REPORT FOR 2001-2002

Introduction

1. This is the third annual report of the Council for Science and Technology, covering its work over the period from 1 April 2001 to 31 March 2002
2. Following its re-establishment in March 1998 with new terms of reference, the Council serves as the Prime Minister's top level, independent advisory body on strategic issues concerning Science and Technology (S&T) in the U.K. It is charged with taking a medium to longer term, proactive approach to its core task of keeping under review and making recommendations on ways of improving:
 - (a) the performance of the U.K (Public and Private) in S&T, in relation to current and future national needs and opportunities;
 - (b) the overall impact of the funding arrangements for publicly supported S&T including those for research in higher education institutions;
 - (c) the effective use and exploitation of S&T by business, Government and the public services to create wealth and improve our quality of life, and;
 - (d) the synergy between the U.K's domestic and international S&T activities and the scope for the U.K to get more benefit from S&T collaboration.

Additionally, the Council provides advice on particular strategic issues of national importance whenever sought by the Government.

3. The Council presently comprises 14 independent members:

Mr Javid Aziz (Chief Executive, Aspective Limited);
Mr Euan Baird (Chairman, Schlumberger Ltd);
Professor S Kumar Bhattacharyya CBE FEng (Professor of Manufacturing Systems, University of Warwick);
Professor Sir Alec Broers FRS FEng (Vice Chancellor, University of Cambridge);
Professor Vicki Bruce OBE (Deputy Principal Research and Professor of Psychology, University of Stirling);
Professor Sir Christopher Evans OBE (Chairman, Merlin Ventures);
Professor Dame Julia Higgins CBE FRS FREng (Professor of Polymer Sciences, Imperial College of Science, Technology & Medicine);
Dr Rob Margetts CBE FEng (Chairman, BOC plc, Chairman, Legal & General Goup plc, and Chairman (Europe) Huntsman Corporation);
Sir Paul Nurse FRS (Director, Imperial Cancer Research Fund);
Dr David Potter CBE (Chairman, Psion plc);

Professor Peter Schuddeboom (Non-Executive Director, Industrial Research and Technology Unit, Northern Ireland).

Sir Richard Sykes DSc FRS (Chairman, GlaxoSmithKline plc and Rector of Imperial College of Science, Technology & Medicine);

Professor David VandeLinde (Vice Chancellor, University of Bath); and

Mr John Weston CBE (Chief Executive, BAe Systems plc).

4. As an “Advisory, Non-Departmental Public Body”, the Council operates in accordance with the framework for “Opening Up Quangos” which the Government established in 1998. In accordance with this framework, it publishes its advice, details of its meetings, work and membership¹. It has also adopted a code of practice based on the seven principles of public life, the “Nolan” standards of selflessness, integrity, objectivity, accountability openness, honesty, and leadership.

Summary

5. During 2001-2002, the Council met quarterly on 5 March, 4 June 2001, 24 September 2001 and 4 March 2002 to:

- Provide advice on the links between the Arts and Humanities and Science and Technology, in the form of a report called ‘Imagination and Understanding’.
- Provide an input to the quinquennial review of the six grant funding Research Councils.
- Publish an input into the Roberts Review of the supply of scientists and engineers.
- Provide advice on the review of Foresight by OST.
- Put in hand specific proposals for the commencement of a study into the science base’s links with the service industries.

6. In addition to the publication of the CST report *Imagination and Understanding* and the Government’s response to this, the Council continued to keep a watching brief on progress following publication of its earlier ‘*Science Teachers*’ report . In September 2001, within the White paper ‘Schools – Achieving Success’, the Department for Education and Skills expressed its’ commitment to a Centre of Excellence to support Science Teaching and provide science teachers with a central point through which to source CPD related products and advice. Further, following an initial consultation stage, in February 2002, DFES announced a further consultation process, to conclude at the end of May. The report by the Roberts’ Review Team ‘*SET for success*’, supports and further underlines the importance of this commitment.

7. The year also saw changes in the Council's membership and staff:

- Ms. Emma Rothschild stood down as a member in December 2001, after more than three years service as a member.

¹ The Council's web site contains this and other information, including the register of interests declared by member at the address www.cst.gov.uk.

- Mr. Steve Elton announced his departure as CST Secretary at the 4 march meeting of CST. His replacement (Lynne Edwards) was to commence post in April 2002.

Work during 2001-2002

(a) The Arts and Humanities links with Science and Technology

8. Following initial work and a scoping study on this subject conducted by a sub-group of members established at the Council's June 2000 meeting, the Council agreed a final draft of a report entitled '*Imagination and Understanding*' which was published in July 2001.

9. The sub-group was led by Ms. Emma Rothschild and comprised Mr. Javaid Aziz, Vicki Bruce and David Potter. Work commenced with a scoping study that considered the links between the 'creative industries' the arts and humanities and the science base. The scoping study elicited contributions from over 50 individuals and organisations in Government, Business, Academia. A dinner was also held in May 2001 involving many original respondents and key stakeholders.

10. Following their initial report, the sub-group was invited to provide a further report concentrating on three broad clusters of issues to include the education system, research funding structures and communications. During this stage, the sub-group sought further information on these themes from both DFEE and FCO.

11. The final report '*Imagination and Understanding*' was submitted to the Prime Minister in July 2001. The focus of the report was upon:

- **Education:** looking principally at the degree of specialisation and breadth or otherwise of students subject portfolios.
- **Research funding:** The present structure of funding streams for the Arts and Humanities, and the argument for greater parity with the science funding system in terms of both status and accessibility
- **Communications:** The growing importance of the communication, both of image and idea, and the increasing economic importance of the 'creative industries'.

12. The main themes of the recommendations made within the report are that:

- The Government should develop the Arts and Humanities research Board into a Research Council.
- Universities and the Government should give serious consideration to encouraging broader programmes of undergraduate study.

- The Government should continue with its efforts to facilitate a less specialised curriculum, including the consideration of additional elements of a Baccalaureat system.
- The government should encourage the provision of ICT training for Arts and Humanities students.
- The Government should ensure that Arts and Humanities research has access to the infrastructure required to participate outstanding scholarship and innovation.

13. In its reply, the Government welcomed the report as a distinctive and timely contribution to the Government's work on these issues, and that following publication of the report,

- DFES had announced a review of Arts and Humanities funding.
- Infrastructure funding would be considered as part of spending review 2002.
- Through its white paper '*Schools – Achieving Success*' the Government has initiated a debate about what more should be done to improve the education of our 14-19 year olds, and achieve necessary changes to long-established structures.

14. The AHRB chief executive has been invited by the Chief Scientific Advisor to attend future meetings of the Science and Engineering Base Co-ordinating Committee, and the quinquennial review of the research councils further endorses the view that the AHRB should be developed into a research council.

(b) Input to the quinquennial review of the research councils.

15. The focus of the council's work on this topic was overarching issues concerning the distinctive roles and missions of the councils and the OST. This review, announced on 14 February 2001, followed a consultative letter from OST of October 2000 to which CST had also provided a response. Work on this issue was undertaken by a sub-group of members led by Professor Dame Julia Higgins and comprising Professor Sir Alec Broers, Professor Kumar Bhattacharyya, Sir Paul Nurse and Professor David VandeLinde.

16. At its 4 June meeting 2001, Council members approved a working draft as a basis for the Council's input to the review, which was provided on June 19 2001, the main features of which were:

- To build on the strong foundations already established by stakeholders.
- Addressing the distinctive roles and missions of the Councils as a group on the one hand, and of the OST on the other.
- The strengthening of existing systems and structures to improve the Councils' joint working on cross cutting matters at both the strategic and operational levels.
- The focusing of OST more sharply and clearly on its overarching role as the Science Budget holder.

- 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 companies, with an examination of the options for establishing a new organisation, which we have called *the Office for Innovation (the OfI)*.
- Consideration of the research funding "gap" in higher education.

17. In addition to the CST input to the second stage of the review, further advice was provided in July 2001 following a sub-group visit to Sweden to look at the new Research Council structure there, and the establishment of a new organisation with responsibilities for the Swedish national innovation systems.

18. The final report of the quinquennial review was broadly in line with the advice given during the first and second stages. Specifically, the QRC report of December 2001 contained the following recommendations about monitoring and evaluating science budget expenditure:

- *A systematic monitoring exercise should be carried out every five to six years to identify traceable outcomes arising from earlier Science Budget expenditure - whether from the immediately preceding five year period or from earlier periods. It also recommended that*
- *The Councils should continue to monitor and more systematically report the outputs of programmes and projects shortly after they have been completed, drawing on the present requirement for post completion project reports, in order to provide early feed back of the effectiveness of expenditure involved against appropriate criteria.*
- *OST and the Councils should devise a new performance measurement system that integrates output and performance indicators and benchmarking and facilitates the development of set of critical management tools.*

19. These recommendations follow CST's advice at stage two of the review in summer 2001:

" 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....

..... with the help and advice of the new Board of the Research Council (now RCUK), OST should prepare and publish in a systematic way its assessment against a suitable set of performance indicators, which will need to be established.....

..... a report on the outputs and final outcomes of science budget expenditure in supporting the national research portfolio (should be produced on a cycle of at least five years)..."

(c) an input into the Roberts Review of the supply of scientists and engineers.

20. At the CST meeting of 4 June 2001, members agreed to provide a contribution to this review which was announced by the Chancellor in his March 2001 budget. The Council's work on this issue was carried forward by a sub-group of members comprising David Vandelinde, Kumar Battacharyya and Alec Broers. The team's report '*SET For Success*' was scheduled for publication in April 2002.

21. Members agreed that the CST's response to the consultation paper (released in September 2001), should draw attention in particular to the pivotal question of what more could be done to attract students into SET studies and career pathways, and that the response should also highlight issues concerning:

- The need for better quality more relevant, educational statistics;
- The ability of universities and other stakeholders to respond to changes in the student market;
- Engineering and technology education specifically;
- The standing and status of Doctoral Research Education; and the generational changes ahead as the cadre of existing researchers reach retirement age.

22. The Council's work was informed by an analysis of subject choice by A'level entrants to full time undergraduate courses, using data from the Universities and Colleges Admissions Service (UCAS) for the years 1996, 1998 and 2000, The CST's response to the consultation paper was provided in September 2001, and the study paper on student flows was published on the Council's web-site in March 2002.

23. At the Council's meeting of 3 December, members welcomed Sr. Gareth Roberts and the contents of the recently published interim report, much of which reflected the issues raised by the CST's input, including the need to consider issues concerning PhD quality and post doctoral research and ways of improving the attractiveness of science and engineering, as students seemed to be turning away from subjects requiring particular rigour.

(d) Review of Foresight.

24. Following on from the Council's 4 June meeting, where members were presented with a paper outlining the ongoing review of Foresight which was planned to be submitted to Ministers by autumn, with implementation in April 2002, members provided advice on this review at its 24 September meeting.

25. The Council welcomed the refocusing of Foresight where it could add most value, namely by concentrating on the application and exploitation aspects of S&T

advances that were likely to have a major impact on society or the commercial world the future. The starting point for Foresight projects could be either a new area of S&T, or a future problem/issue where science might hold solutions or opportunities.

26. Members considered that any future Foresight programme should be sufficiently flexible to accommodate emerging issues, and should have the resources to undertake in-depth reviews of existing knowledge and detailed analysis.. With regard to the sponsorship activities of departments, they stressed the importance of creating new networks and relationships, as well as nurturing those already established through the first and second rounds of Foresight.

27. CST will be further consulted, and will provide further advice and input regarding the direction of Foresight into 2002-2003.

Other Work

14-19 Curriculum

28. At the Council's 4 March meeting, members were apprised of the new DFES Green Paper on the 14-19 Curriculum and the vision, rationale and new structure that it proposes, including a new route into a second GCSE science, leading to either an AS/A2 qualification, or into technical science qualifications. Subsequent to a discussion, members agreed to provide a collective response this Green paper based upon the minutes of this meeting.

Future Work

(i) A study into the links between knowledge intensive business services and the science base.

29. In 2001, at Lord Sainsbury's instigation, the Council agreed to undertake work on this important topic, and to prepare advice on what more the Government should do to strengthen the links between the UK's science base and companies that are engaged in *service innovation*.

30. The existing pool of research and other evidence is insufficient for these purposes. It suggests however that measures for supporting service innovation need to be developed and strengthened, particularly in relation to science base-business links. This has been confirmed so far by the DTI/HMT work on the Chancellor's ECOFIN initiative.

31. To build on and take this work forward in the most appropriate way, it is intended that the terms of the study will be settled with the Treasury, and possibly other Departments, so that it will provide a clear, factual picture of:

- how companies in a representative sample of significant sectors, in particular knowledge intensive businesses, are interacting at present with the science base to create value and growth through innovating services;
- how and the extent to which, individually and jointly, they are identifying generic research requirements and opportunities, and how these are addressed and met at present;
- how, if at all, they are informing or drawing on research work within the science base;
- their views and use of the existing Governmental measures for supporting science base - company links; and
- any significant barriers or difficulties that they are experiencing in drawing on the science base for their business purposes.

32. Representatives of HMT, DTI and OST agreed that CST should proceed on this basis with a view to completing the study and providing consequent advice during the next 2002/03 programme of work. Previously CST approved a draft for the invitation to tender document at its most recent meeting on 3 December 2001. This draft reflected the results of the ECOFIN work so far.

33. The UK services sectors presently account for some 70% of the nation's GDP and 75% of employment. Their contribution to the output, employment, trade and direct investment of the UK and other OECD countries has grown appreciably in the past two decades, providing some two thirds of the GDP growth in the whole OECD business sector. The services sectors' share of the total expenditure by business on research and development (BERD) is running at around 30% of total BERD in Australia, Denmark, Norway and Canada, 20% in the UK, 11% in France, and around 4% in Germany and Japan.

34. This ECOFIN initiative, aimed at improving the EU's innovation and R&D performance, is a key party of the Lisbon agenda. The Economic Policy Committee approved an initial report earlier this month, containing nine broad recommendations for action at both the EU and national levels. The report highlighted the need to strengthen science base-business links, particularly in relation to services.

35. Following an ECOFIN meeting on 22 January, the report was considered further at an informal ministerial seminar on 1-2 February 2002 under the Spanish Presidency, ahead of the Barcelona summit in June 2002.

36. The work will commence with a tendering process, scheduled to last until late summer of 2002, with the subsequent study taking a further 9 months. CST consider the progress and outcomes of the study at various stages, and will publish the results of this study in the form of a report, envisaged for the autumn of 2003.

(ii) A quinquennial review of CST and appointments round

37. Like all other Executive and Advisory Non-Departmental Public Bodies (NDPB's), CST is subject to a review every five years at least, as part of, and in accordance with, the Government's *Modernising Government* agenda. The last review of CST was undertaken as part of the preparatory work on re-establishing the Council in March 1998. The next one will be conducted during 2002/2003.

38. At the 4 March 2002 meeting of CST, members were given the opportunity to raise any particular points or considerations which they wish to see taken into account when the review is being set up or underway. The secretariat will be holding discussions with individual members to learn of these considerations, and to discuss potential topics for study by the Council.

39. In addition to the quinquennial review, CST will undergo an appointments round during the year 2002-2003. This appointments process is required in order to replace the vacancies left by 2 ex Council members, and replace or re-appoint 9 others members who will either have to be replaced or re-appointed by the end of 2003. It is intended to run the quinquennial review and the appointments process concurrently during 2002

(iii) Emerging topics.

40. At the Council's March 2002 meeting members were invited to provide suggestions regarding appropriate topics for consideration during the forthcoming year. Possible areas for consideration include further input to the shape and reporting lines of Foresight, and also:

(a) Measuring the Outputs and Outcomes of Public Expenditure on the Science Base.

41. Consideration will be given to a CST study on this topic in accordance with the advice provided to the QRC team by the CST in summer 2001, and the concordant recommendations made by the quinquennial review of the six grant funding research councils. The impact of the S&T funding arrangements, including those for higher education institutions, and the performance of UK S&T, including international benchmarking of its inputs and outputs, are core tasks of CST.

42. Various working groups involving the Research and Funding Councils have addressed the need for such measures and indicators, and a number of reports have been prepared. Moreover, various exercises have been conducted for value for money and accountability purposes, including bibliometric analyses by the RCs and OST, and the Funding Councils' Research Assessment Exercise. Departments' public service agreements reflect some of this work, which so far has not produced an integrated, comprehensive set of top-level measures that cover the transdepartmental funding flows into the science base.

43. With the agreement of members, a position paper on this topic could be provided at the Council's meeting in December 2002.

(b) Towards the European Research and Innovation Area (ERA)

44. One of CST's core tasks is to keep under review and make recommendations on ways of improving over the medium to longer term the synergy between the UK's domestic and international S&T activities and the scope for getting more benefit from S&T collaboration. This task includes consideration of the UK's strategic aims for the 6TH European RTD Programme (FP6), and the scope for encouraging international sharing of major scientific facilities and equipment.

45. During 2002/03 - possibly next June or later in the autumn. It is intended that CST will be provided with a further opportunity to advise on FP6 and its implementation from 2003 through a paper presented by the OST - International Directorate.

46. It was agreed at the Councils 4 March 2002 meeting that a position paper on this topic would be presented to members at the Council's next meeting on 10 June 2002.

CST
June 2002