

QUINQUENNIAL REVIEW

OF THE

COUNCIL FOR SCIENCE AND TECHNOLOGY

FINAL REPORT

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SUMMARY

1. The Council for Science and Technology (CST) is a Non-Departmental Public Body with a remit to advise the Prime Minister on the strategic policies and framework for science and technology in the UK. It has been in existence in its present form for five years. During that time its overall impact has been disappointing, and the first stage of this review recommended that if the Government continued to want external advice it should retain CST but take steps to make it more effective. That recommendation was accepted.

2. So the second stage of the review has considered what steps are needed. This report sets out options for what sort of body the future CST should be; what its scope should be; what sort of work it should do; what members it needs; and how it should work. In order to answer these questions, the Government must decide what use it wants to make of CST in future.

3. The most important choice is whether to position CST as an advisory body within Government with the role of helping the Chief Scientific Adviser to develop strategy and policy, or as an independent body giving advice directly to the Prime Minister and through him to the Government as a whole. The decision on this fundamental issue will colour the answers to the other questions.

4. Nevertheless, there are some recommendations which hold good for both options. This report suggests that:

- CST's remit should be broadened to include the cultural, social, economic and ethical context of science and technology, and clarified in relation to the devolved administrations.
- The balance of CST's work should shift away from formal reports of studies on individual topics towards providing less formal advice on broader issues and giving assistance in other Government activities related to science and technology.
- CST will continue to need a well-balanced membership consisting of senior people drawn from a wide range of relevant backgrounds, but serving as individuals not as representatives of particular interests.
- CST should adopt more flexible working methods, delivering its advice in confidence if this enables it to be more useful. It should work more closely with the science and technology community, and it should be provided with the tools to do its job properly.

5. CST can only fulfil its potential if the Government decides what it needs to receive from CST. I hope that this report will help those decisions, and that the Government will then be prepared to commit itself to making full use of this valuable body.

PART 1 CONCLUSIONS AND RECOMMENDATIONS

6. This part of the report presents my own conclusions and recommendations. The second part presents the underlying arguments, analysing the views of those I have interviewed and those who have sent written responses. The Annexes provide background information and a glossary.

7. The conclusions of the review are mine alone. But I am grateful to all those who have participated in the consultation process, as well as to the steering group which has given guidance. My thanks also go to the CST secretariat for administrative support, and particularly to the late Sheila Lawrence for her cheerful stage-management of arrangements for interviews.

1.0 THE STARTING POINT

CST and this review

8. The Council for Science and Technology (CST) is an advisory Non-Departmental Public Body (NDPB). Its current remit is “to advise the Prime Minister on the strategic policies and framework for science and technology in the UK with the overarching aim of sustaining and developing UK science and technology and maximising their contribution to the nation’s sustainable wealth creation and quality of life”. CST is being reviewed now because it has been in existence for five years in its present form; this is the final report of that review.

9. My first stage report said:

“CST’s work since it was re-established has made some contribution to policy formulation. But its overall impact, like that of its predecessor bodies, has proved disappointing. If the Government continues to want external advice, the best way to obtain it is not to invent yet another body, but to ensure that CST’s advice is properly focussed and properly fed into decision-making mechanisms. Accordingly, this report recommends that CST should remain in being – but only if the Government and CST’s members are prepared to take steps to make it more effective. If this recommendation is accepted, the second stage of this review will consider what these steps might be.”

10. The Government accepted this recommendation. It must now consider why CST has not been as effective as it might have been, and decide for the future what sort of body CST should be, how wide its scope should be, what sort of work it should do, what members it needs, and how it should work.

What CST members think

11. In reaching decisions for the future, the Government will wish to take account of the views of current members on how CST operates at present¹.

12. When they accepted the invitation to join CST, members thought that the Government – even the Prime Minister personally – genuinely wanted to hear what they had to say. They had hopes of really making a difference. But they have found their experience of membership rather disappointing.

13. They are not clear that the Government really wants their advice, or – if it does – exactly what it wants from them. They do not necessarily expect all their advice to be accepted, but they are not sure whether anyone is interested in what they are saying, or whether it has any influence. They feel that they are operating in a vacuum, without feedback. They want to know where they have been useful – and, just as importantly, where their work is not seen to have contributed anything of value, which they feel that everyone is too polite to tell them.

14. They can only be useful if the Government is frank with them. They want to be involved in helping to formulate the Government's strategy, rather than being shown proposals when they are already cooked. They think that they might usefully identify problems and raise questions for others (and then test the answers), rather than suggesting answers themselves on the basis of topic studies. They want to be kept informed, but they do not want to be used as a rubber stamp.

15. The picture is not all black: members also have good things to say about their experience of CST. But these are serious concerns, and it is unfortunate that they have not emerged sooner. If the third incarnation of CST is to be more successful than the previous two, the Government must respond to them in its decisions on CST's future.

¹ Views here are those expressed by individual members, not specifically contradicted by others but not explicitly agreed by all.

1.1 WHAT SORT OF BODY SHOULD CST BE?

16. The intention of the present structure seems to be that CST should be an advisory body within Government, but some of the current difficulties arise from a lack of clarity in practice both about where CST fits into overall mechanisms, and about the extent to which it is independent.

17. CST's position is supposed to be that of a body "advisory to the Prime Minister". But this has been a purely formal concept: its reports are submitted to him, but he has never attended its meetings, where its informal advice emerges. The Secretary of State for Trade and Industry (as the Cabinet Minister for Science and Technology) is named as the chair of CST "on behalf of the Prime Minister", but the present Secretary of State has never chaired or attended a meeting. CST's main ministerial contact has been with the Minister for Science, to whom no role is formally attributed, but who has maintained a relationship with CST and has chaired more than half of its meetings. The Government's Chief Scientific Adviser (the CSA) is formally the Deputy Chairman; he has normally chaired meetings when the Minister for Science is not present, and has taken a role in considering the agenda and the papers submitted to CST. It is thus not clear where CST fits, and hence where it should look for support in getting its recommendations implemented, or at least seriously considered within Government.

18. At its re-launch in 1998 CST was described as an "independent" advisory body. That is how it is generally seen, and the recommendation of the first stage of this review was based on that perception. It therefore comes as something of a surprise to realise that independence is not enshrined in its present terms of reference. At present, its chair is not independent; all its members are²; the way in which its work programme is determined is not clear; and its secretariat is not independent. The question of whether CST should have an independent chair is crucial to its position; the other aspects are addressed separately in the course of this report.

19. The Government's objective should be to position CST so that has it has effective ways of making its views known to those whom it is supposed to be advising, and so that its advice is taken seriously by those who are to make the relevant decisions. There seem to be two options which could work:

Model A: CST as an advisory body within Government

20. In Model A, CST would become the CSA's Advisory Group, with the role of assisting him in developing strategy and policy on science and technology issues across Whitehall. The CSA should chair CST (though the independent members

² Unless the Minister for Science and the Government's Chief Scientific Adviser are to be regarded as members.

could meet informally without him). He would be responsible for ensuring that CST's views were conveyed to the Prime Minister (benefiting from the direct access which he enjoys), and that they were put as appropriate to the Ministerial Committee on Science Policy (SCI). He should be able to ensure through his own networks that CST's work was given weight throughout Whitehall. Within whatever remit was specified in the terms of reference, he would have a major influence over CST's work programme (though he should seek suggestions from other sources, including members). The secretariat would continue to operate within OST.

Model B: CST as an independent advisory body to Government

21. In Model B, CST would be a fully independent body, with a remit to advise the Prime Minister directly, and through him (or at least with his authority) the Government as a whole. It would submit both formal and informal advice directly to the Prime Minister, and through the Minister for Science to SCI. It would have an independent chair, preferably chosen by the members from among themselves. Within the remit specified in its terms of reference, it would determine its own work programme, though the remit would specify that this should be done in consultation with Government. The secretariat would continue to be provided by OST, but would be ring-fenced to give it independence.

22. *In both models*, CST would in future:

- have regular (though not necessarily frequent) meetings with the Prime Minister;
- sever the existing relationship with the Secretary of State for Trade and Industry, which is inappropriate because of its transdepartmental remit;
- continue to maintain a close link with the Minister for Science, which should be even more valuable because he would participate fully in appropriate meetings without being obliged to act as chair;
- continue to work closely with the Chief Scientific Adviser, though with the nature of the relationship depending on the model chosen;
- have its advice brought before the Ministerial Committee on Science Policy (SCI), though with the process depending on the model chosen;
- be able to invite other Government Ministers to attend meetings as appropriate in order for them to raise issues, to discuss advice previously formulated by CST members or to participate in open discussions;
- be kept closely in touch with Government thinking so that its work would be useful;
- be allocated the necessary resources to carry out its work effectively.

The choice

23. Model A (CST as an advisory body within Government) would leave the Prime Minister with a single clear channel of advice on science and technology matters, the Government's Chief Scientific Adviser. In giving his advice, the CSA would (as at present) distil views from a number of sources, including CST. He would be able to ensure that CST spent its time on topics where its views would be of benefit to the Government. But this model might restrict CST's ability to work on matters like the impact of public funding arrangements or the effective use and exploitation of science and technology, which should remain within its remit, but which may not fall directly within the CSA's responsibilities. And even though the individual members would remain independent, the body as a whole might not be perceived in that way.

24. Model B (CST as an independent body advising Government) would confirm what is ostensibly the present position, by providing a separate source of advice on science and technology going directly to the Prime Minister. There would be no doubt about CST's independent status. But this model is a higher risk option. It could mean that the Government would in effect end up with two Chief Scientific Advisers. And its success would depend on the Prime Minister (or his office) retaining an interest in CST: otherwise CST could easily become marginalised as just another pressure group, rather than fulfilling its function as "the Government's premier advisory body"³.

Recommendation

25. The Government should consider carefully which model is likely to provide what it needs from CST. It should then make a clear choice, to avoid falling back into the present confused situation.

³ Government statement to the House of Commons Science and Technology Committee, Minutes of Evidence Wednesday 1 June 1998, Session 1997-98, HC 796-i.

1.2 WHAT SHOULD THE SCOPE OF CST'S WORK BE?

26. CST's current remit requires it to advise on "the strategic policies and framework for Science & Technology (S&T) in the UK with the overarching aim of sustaining and developing UK S&T and maximising their contribution to the nation's wealth creation and quality of life", taking "a medium to longer term, strategic approach". It is noteworthy that there is no specific reference to innovation, though this seems to be implicitly covered by one of the core tasks, "keeping under review and making recommendations on ways of improving ... the effective use and exploitation of S&T by business, Government and the public services". It has been suggested that CST should now be specifically charged to take account of the cultural, social, economic and ethical context in which science and technology must be understood.

27. On CST's geographical remit, I have to admit defeat. The consultation letter asked whether CST had a role in relation to the devolved administrations: but I have not been able to discover how devolution works in the area of science and technology policy, and I have received views only from Scotland. It also asked whether CST had a role in relation to policy on the English regions: but I have received no information or views from regional bodies or from anyone speaking on their behalf.

Recommendations

28. CST's terms of reference could usefully make explicit reference to innovation. CST should be required to consider the cultural, social, economic and ethical context in which science and technology must be understood. Work should be undertaken urgently to clarify the present relevance of UK-wide science and technology policy to the devolved administrations, and to consider how it affects policy in the English regions, in order to determine what CST's role might be in both these respects.

1.3 WHAT WORK SHOULD CST DO?

29. CST's present remit leads it to focus almost exclusively on individual topics. But this is only one of a much wider range of functions which it could perform if the Government would find them useful. It could:

- (a) *Monitor the "big picture" in the science and technology world, and advise on the strategic direction of science policy and programmes across Government as a whole.* For this to be successful, CST would need to be kept informed of what was going on (probably on a regular basis, not just in preparation for individual meetings) without being drowned in paper, and the resulting discussion in plenary meetings would need to be carefully handled to avoid superficiality – both difficult, but not impossible, tasks. The aim would be to identify issues needing to be pursued, not normally through a study undertaken by CST itself, but through action elsewhere. CST would need to return regularly to these issues to ensure that they were indeed being followed up.
- (b) *Consider issues relating to the allocation of Government funding for research and development.* Following up departmental science and technology strategies (as suggested below) would enable CST to take an overview of their spending, but CST has not exercised a similar role in relation to the use of funds from the Science Budget. The current work on the implementation of the Quinquennial Review of the Research Councils provides a good opportunity to consider what that role might be.
- (c) *Play a part in other Government activities.* Even though it would not be appropriate to make CST the management board for OST, there are a number of specific activities in OST where CST could make a useful contribution. Examples are playing an advisory role for Foresight; considering the strategic agenda for the Link scheme; making an input to OST's task of following up departmental science and technology strategies; and advising on work on European and international matters. Even for OST, this is not an exhaustive list, and other Departments might wish to use CST in a similar way.
- (d) *Undertake studies of important topics.* The current CST members have enjoyed this aspect of their work, and CST has certainly made useful contributions in several areas. If this type of work is to continue, the choice of topic is crucial: it should rest with CST itself, but members will need to be sure that there is a reasonable prospect of the outcome of their work having a real effect.
- (e) *Respond to consultation documents, make inputs into reviews, comment on the work of other bodies, etc.* CST may sometimes have a real contribution to make to such exercises where its membership has the relevant knowledge and background. In those cases, its views must be fed in at the right level, to ensure that sufficient weight is attached to them. But it should not be tempted

to express unresearched views on topics where its members have no real expertise.

- (f) *Contribute on issues for immediate decision; troubleshoot.* It is not practicable for CST as a whole to reach quick views on urgent issues. But it needs to be kept aware of what is happening as part of the broader process suggested above.
- (g) *Engage in public communication on scientific issues.* It is tempting for CST to seek a role here, but there are others better equipped to do it – though of course it may wish to discuss its own work publicly as part of an attempt to raise its profile.

30. CST would obviously not be able to undertake all these functions. So the Government should make a broad decision now as to which types of work it would find most useful, and re-define CST's remit accordingly. Within that remit, how the priority to be given to individual activities is determined will depend on which model is adopted for the future CST. At both stages, the choices must take account of the fact that members will only continue to serve if they see the work they are doing as worthwhile.

Recommendations

31. If CST is to do its job properly, members need to be kept in touch with the big picture on science and technology, both outside Government and within (including the levels and distribution of Government funding). This will enable them to identify gaps and to raise questions. They can also contribute significantly to other government activities. The questions which CST raises should normally be for answer by others, which suggests that in-depth work on individual topics should assume less importance in CST's work. Lower priority should be given to the other possible activities identified (responses to consultation documents, contributions to reviews etc; contributions on immediate issues; and public communication on scientific issues in general).

1.4 WHAT MEMBERS DOES CST NEED?

32. Under the current arrangements CST can have up to sixteen independent members. The Government must decide whether this is the right number. At present there are two vacancies, and the terms of appointment of nine of the existing members will expire shortly (though all but two of them could be reappointed). So even within the existing maximum there will be scope for appointing up to eleven new members: the Government must decide what mix is needed.

33. In my view, the nature of CST's remit means that members should continue to be senior people, not only widely respected in their own fields but also able to see beyond their own patch. There is a need to involve younger people, but this can best be done (at least initially) by inviting them to be members of sub-groups. Efforts should be made to attract more women members, provided that they have a contribution to make.

34. CST members serve as individuals, rather than as representatives of particular interests. Nevertheless, they should continue to be drawn from a wide range of relevant backgrounds. This range may need to be increased depending on decisions about the scope of CST's work, and it could be useful to include more members with an international background.

35. Some degree of continuity in membership is desirable. Systematic induction procedures are important, to achieve a understanding about what CST is trying to do which is shared among members, their secretariat and those whom they are advising.

Recommendations

36. Members of CST should continue to be senior individuals, and may need to be drawn from an even wider range of backgrounds than at present. Despite the difficulty of achieving this within the present membership limit of sixteen, I recommend that this limit should not be raised, at least for the time being. Increasing the size of CST at this point would jeopardise the chances of cohesion and of productive discussion in plenary meetings, at a time when both will be needed to launch the body on its new track. To reduce problems of discontinuity in future, attention should be given to the length of appointments offered to new members, and to achieving a shared understanding about what CST is.

1.5 HOW SHOULD CST WORK?

37. CST's decisions about how best to work should depend both on what it is charged to do and on what its members find to be the most useful and productive way of interacting. Some formal plenary meetings will still be needed (though they should be held in a setting more conducive to proper discussion), but more will probably be achieved through a workshop approach. Brainstorming sessions on particular topics might include outside invitees. Working through sub-groups (possibly including non-members) will still be crucial, though the groups may be (for example) holding a watching brief over some aspect of Government activity rather than undertaking an in-depth study of an individual topic.

38. CST should obviously deliver its output in the way most likely to be useful to its client(s), and hence most likely to achieve maximum effect. So the Government should decide what it wants. On some matters it may be most helpful to proceed through discussions between members and the Prime Minister, other Ministers or the CSA; and short notes may often be more useful than formal written reports.

39. This raises an issue about openness. There should be no difficulty in continuing to publish any formal reports which CST may produce, as well as the type of meeting note which currently appears on the website. But the overall level of openness will be reduced if CST moves to giving advice earlier in the process (when Government ideas or proposals may still be confidential), and if it gives more of its advice in informal discussion.

40. CST's profile is so low that it is virtually invisible. Its work is unlikely ever to command great interest among the general public. But it is worrying that the existence of CST is so little known within the science and technology community. Taking on an explicit role of monitoring the big picture will require CST to keep more in touch with the work of outside bodies, but it should also publicise its own work where appropriate (for example by setting up an email contacts list for those interested to be kept informed about its work). All this implies a much more proactive role for CST and in particular for its secretariat. And it is shocking that CST is so little known within Government. Emphasis on its role as advising the Prime Minister and follow-up through SCI will of course help here, but so will a track record of useful advice given at the appropriate stage in policy making.

41. Links to CST's website from other Government sites are not as good as they should be, and although the site itself is generally judged to be adequate, it could be improved.

42. Last but not least, there is the issue of resources. My first stage report pointed out that "given the degree of distinction of its members and hence the opportunity cost of their input, CST has been remarkably cheap to run". But running CST on a shoestring represents a false economy. The members of CST are willingly making their time and intellectual capital available to the Government free of

charge: the least the Government can do is to offer them proper support. Failure to do so not only affects the functioning and output of CST, but also reduces the morale and hence the commitment both of members and of the secretariat.

Recommendations

43. CST should vary its style of meetings, including one-off workshops and brainstorming sessions as well as sub-group discussions and formal plenary meetings, and should hold them in settings conducive to a free exchange of views. It should also vary its style of output, with fewer formal reports and more short notes or face to face discussions with the Prime Minister or other Ministers. Although CST should continue to be as open as possible about its work, it should deliver its advice in confidence if and when this will enable it to be more useful. CST needs to raise its profile in the science and technology community, by promoting a two-way exchange of information and views. Links to CST's website should be improved, and the site itself could be redesigned to be more appealing. Once the Government has decided what it wants of CST, it should provide the tools to do the job, with an appropriate secretariat and appropriate funding for outside work.

PART 2 SUPPORTING ARGUMENTS

44. This part of the report supports the conclusions offered in Part 1, in the sense that it analyses the responses received in relation to the decisions which need to be made. All direct quotations are from written responses. Other points stem from interviews, from discussions among CST members, or from my own thoughts on the responses as a whole.

2.1 WHAT SORT OF BODY SHOULD CST BE?

45. Since the Government's objective is to make CST more effective, CST should be positioned where its advice can best be heard. CST is supposed to advise the Government as a whole. It needs a champion to ensure that the advice will be taken seriously by all players, even if it is not ultimately accepted. And it is important for the Government's credibility that both the science and technology community and industry are assured that CST's advice is given proper weight. So I have considered who might be the most appropriate "client" on behalf of Government as a whole, and to what extent it should be "independent".

Who is the most appropriate "client"?

46. *The Prime Minister* is currently the formal client for CST's work. He appoints the members, and the perception of reporting to him is important to them. He could not of course maintain a concern with CST's work at a detailed level, but instructions from him enforced by his office as to the weight to be given to CST's views should have an effect. It would be useful for CST to have regular meetings with the Prime Minister, and he might also wish to invite members to other occasions where matters within its purview are discussed.

47. *The Ministerial Committee on Science Policy (SCI)* is charged "to consider the Government's policies in relation to scientific advances and public acceptance of them". Its members⁴ represent the Departments with major interests in science and technology. This should make SCI a natural client for CST. But Ministerial Committees normally focus on issues where decisions are needed, and the decisions on many of the issues which CST considers will be made in other Cabinet Committees rather than SCI. And since SCI is chaired by the Secretary of State for Trade and Industry, there is a risk that it may be seen by other

⁴ The members are the Secretaries of State for Trade and Industry (chair), the Home Department, Environment, Food and Rural Affairs, Transport, Health, Defence, and Education and Skills; the Minister of State in the Office of the Deputy Prime Minister; the Economic Secretary to the Treasury; and the Minister for Science. The Government's Chief Scientific Adviser and the Chief Medical Officer are invited to attend; the Chief Veterinary Officer and the Chairman, Food Standards Agency are invited to attend as appropriate.

Ministers as a DTI fiefdom. However, if SCI were to take a sustained interest in CST it could apply collective pressure for the full consideration of all CST's recommendations, and implementation of those which were agreed.

48. Even though *the Secretary of State for Trade and Industry* is the Cabinet Minister for Science, it is hard to argue that she is the appropriate "client" for CST's advice. The Office of Science and Technology is within her department⁵; but in relation to its transdepartmental role (the aspect of its work most relevant to CST) it is an uneasy lodger. Of course, given CST's interests in technology transfer and innovation, it would expect to have a close working relationship with DTI, but that should parallel its relationship with other Government departments⁶.

49. It is generally acknowledged that, as the Association of the British Pharmaceutical Industry puts it, "the UK has an excellent *Minister for Science* in Lord Sainsbury of Turville". He has valued the advice which he receives from CST, and his esteem for CST is reciprocated: members believe that he is influential, and see this as an indication that science is being taken seriously within Government. But this does not necessarily make him the most satisfactory "client", simply because he is not a Cabinet Minister. Much of CST's work is clearly done *for* other Government departments (for example, its examination of departmental science and technology strategies); and some of it is done, so to speak, *at* other Government departments. In both cases it may suit the departments concerned to ignore CST's advice, and effectiveness may depend on the support of a higher authority.

50. The Government's *Chief Scientific Adviser* (currently Professor David King) is responsible for fostering science, engineering and technology throughout Whitehall. He is also the Head of the Office of Science and Technology, which (despite its formal location within the Department of Trade and Industry) has responsibility for developing strategy and policy on science and technology issues across Whitehall. The Royal Society suggests that the review should "investigate whether the Council might have more impact if it were more fully integrated into the activities of the Government's Chief Scientific Adviser, in an analogous way to the President's Council of Advisors on Science and Technology (PCAST) in the USA, where the joint chairs are the President's science adviser and an independent member". It sees this as potentially valuable because the CSA is "the prime source of advice to the Government on science matters". It recognises that "a standing committee [like CST] is not best placed to provide advice on day-to-day scientific issues where an immediate response is required, and [that] it is up to the CSA to decide how best to seek outside advice ... [but] a high level committee has much to offer on longer-term strategic advice on science and technology issues". With direct access to the Prime Minister, the CSA is obviously in a good position to feed in CST's views. But OST, which he

⁵ The fact that DTI's "branding" presents OST as part of the DTI family in the same way as, for example, the Patents Office and Companies House may not be helpful to promoting OST's transdepartmental role.

⁶ This has recently been recognised by DTI's appointment of its own departmental Chief Scientific Adviser.

heads, occupies an anomalous position in Whitehall; it has been described as having trans-Governmental programmes with no trans-Governmental guidance⁷. And there is a danger that CST's advice would be perceived as liable to be "filtered"; members value direct contact with Ministers and may wish to deliver messages to the Government with which the CSA would not agree, and outsiders value CST's perceived independence⁸.

Should CST have an independent chair?

51. At present⁹, the Cabinet Minister for Science and Technology (now the Secretary of State for Trade and Industry¹⁰) chairs the Council "on behalf of the Prime Minister". In practice, the Prime Minister has never chaired or attended a meeting of CST in its present incarnation. Of the 17 plenary meetings held:

- One has been chaired by the Secretary of State for Trade and Industry¹¹.
- Nine have been chaired by the Minister for Science¹², to whom no role is assigned in the terms of reference.
- Six have been chaired by the Government's Chief Scientific Adviser¹³, who is the formal Deputy Chair.
- One has been chaired by an independent member (Sir Richard Sykes).

Apart from the disadvantage of lack of continuity, the changes of chair have caused some members (themselves busy people with many demands on their time) to feel that CST is being given a low priority.

⁷ Although this issue falls outside the scope of this review, some respondents chose to address it. The Association of the British Pharmaceutical Industry argues that "there is an argument to move the Government's Chief Scientific Adviser, as head of the Trans-Departmental Science and Technology Group, to the Cabinet Office along with the CST. The Parliamentary Under-Secretary of State should retain his close connection with the group. However this central role will maximise the impact of both the CSA and the CST. Such a move would also back up the messages by the Prime Minister on the importance that his Government pays to science and technology". It is noteworthy that that Royal Society even now describes OST as "the science arm of the Cabinet Office". From the point of view of CST, a move of this kind would respond to the suggestion from Universities UK that "there is scope for re-emphasising the direct relationship between the CST and the Cabinet Office".

⁸ There are various aspects of "independence". Views on whether CST should have an independent chair are considered below. Views on the independence of CST's work programme, of its members, and of its secretariat are dealt with in later sections.

⁹ According to CST's terms of reference: see Annex A.

¹⁰ As the Royal Society points out, "This arrangement was introduced in the 1993 White Paper ... At that time, the Cabinet Minister was the Chancellor of the Duchy of Lancaster, who had a smaller portfolio than the Secretary of State for Trade and Industry."

¹¹ The present Secretary of State, Mrs Hewitt, has never chaired nor attended a CST meeting; the Secretary of State who chaired was Mr Byers (in June 1999). In addition, Mrs Beckett attended part of CST's first meeting in its new incarnation.

¹² All since the arrival of the present incumbent, Lord Sainsbury. His predecessor, Mr Battle, attended part of the first meeting.

¹³ Who has also attended all but three of the meetings which he was not chairing.

52. The Royal Society helpfully distinguishes the three functions of a committee chair as being:

- to chair the meetings
- to develop the work programme of the committee (which would include maintaining momentum and morale, and forging a link with the secretariat)
- to represent the committee and to champion the advice that it issues (vis-à-vis the client(s) in Government, but also vis-à-vis the outside world)¹⁴.

It elaborates: “With the heavy pressures on Ministerial time, a Ministerial chair can cause problems ... This is reflected in the difficulties the Secretary of State has had even to attend CST meetings, and so it seems unlikely that Ministers can give sufficient time to considering its future work. While it could be argued that it is the Civil Service’s job to advise the Minister on this, such a solution reduces the independence of the Council and blurs the distinction between it and, for example, the role of the CSA.” In the view of the CBI, “the chair of CST should be high profile, but should not be a Minister if the independence of the body is to be respected”.

53. Many respondents agree on the desirability of an independent chair, while at the same time recognising the need not to lose the crucial links with Government. The Royal Society says: “While it is usual for advisory committees to be chaired by a senior independent person, at this level there is a danger of the work becoming decoupled from the Government’s policy arrangements and it being seen as just another pressure group”. The Scottish Higher Education Funding Council says: “The independent nature of CST would be underlined if the Council was chaired by a respected scientist from outside the Government, rather than by the Minister. However, the presence of the Government’s Chief Scientific Adviser should ensure that the advice provided by the Council is linked effectively in to the policy making processes within the OST and that there is a bi-directional flow of information between CST and OST”. The Academy of Medical Sciences says: “For the purpose of *receiving* advice it must surely be useful for CST to be chaired by a minister and to have the Government’s Chief Scientific Adviser as a member. For the purpose of *generating* the advice it is doubtful whether the presence of either is desirable. If the advice is to be regarded as independent by the outside world, it must be generated by a body on which neither ministers nor their senior civil servants are represented”. The Engineering Employers Federation and the Engineering and Marine Training Authority agree that it is useful for Ministers and civil servants to hear the debate at first hand, but they are concerned that a Ministerial chair might restrict the range of debate to the Government’s agenda, “rather than sufficiently challenging Government thinking, which is the real value of committees such as this one”.

¹⁴ The expansions in brackets are mine.

2.2 WHAT SHOULD THE SCOPE OF CST'S WORK BE?

54. CST's current terms of reference¹⁵ require it "to advise the Prime Minister on the strategic policies and framework for Science & Technology (S&T) in the UK with the overarching aim of sustaining and developing UK S&T and maximising their contribution to the nation's wealth creation and quality of life". The context suggests that CST is intended to take the term "science" in its narrower, more modern sense¹⁶ (together with "technology", which the OED defines as "the scientific study of the practical or industrial arts"). Various issues have been raised about whether this is the correct interpretation. And in view of devolution and of the increasing responsibilities of the English regions, the UK-wide remit has been questioned.

Subject area

55. The Academy of Medical Sciences suggests that the Government should set a broad frame of reference for CST "to advise government, on its own initiative or at government's request, on all matters involving the strategic pursuit of science and technology". The CBI considers that CST's main focus should be expressed as developing an overall science and innovation strategy for the UK and providing advice on delivery (whereas the present terms of reference do not explicitly mention innovation). The Royal Academy of Engineering emphasises the requirement for CST to "take a medium to longer term, strategic approach", hoping that CST will "be visionary in its outlook, defining the future science and technology agenda, rather than functioning in a predominantly responsive mode".

56. For the purposes of the recent Quinquennial Review of the Research Councils, "science" was taken to include engineering and technology, social sciences and economics. Moreover, according to the Royal Society:

"Science and technology must increasingly be understood within its cultural, social, economic and political contexts. The public are less prepared than hitherto to accept the opinion of experts, including scientists. The strongly expressed reservations in many fields ... [are] partly due to the scientists and engineers disregarding this wider context and, in many cases, not addressing or being unable to address the

¹⁵ See Annex A.

¹⁶ The first OED definition of science is: "The state or fact of knowing; knowledge or cognisance of something specific or implied". Only later come the more specific definitions: "A recognised department of learning: often opposed to 'art'; a branch of study which is concerned either with a connected body of demonstrated truths or with observed facts systematically classified and more or less colligated [connected together by a general notion or hypothesis] by being brought under general laws, and which includes trustworthy methods for the discovery of new truth within its own domain". This would no doubt include engineering, in the sense in which it is used in speaking of "the science and engineering base" (a term of art used to mean the publicly funded research base) – ie "the science of engineering", which used to be called "engineery" (a term sadly now obsolete).

public's concerns. This calls for a much greater integration of knowledge not just across the whole of science and technology, but also with the social sciences and the humanities. The cultural barriers to this integration are arguably worse in the UK than elsewhere in Europe."

The British Association for the Advancement of Science suggests that the lack of a specific mention of the social context in the terms of reference might be "taken to imply a view that public ideas and attitudes are relatively unimportant and that science and technology policy can be developed without explicit attention to them".

57. Conversely, there have been suggestions that CST's scope should be more limited. Professor Sir Graham Hills argues that, unlike science, technology is not a knowledge-based entity, but "a bundle of intellectual and other skills, together usefully called the 'know-how' and which is invariably determined by its context". He claims that because "science and technology" are so frequently twinned, the difference in their needs gets overlooked. He therefore suggests that it might be better to have two separate councils, for science and for technology. Some members sympathise with the view that the agenda of CST has tended to concentrate on "science" at the expense of technology, but they do not support the proposal for two separate councils.

Geographical area

Devolved administrations?

58. CST's current terms of reference are drafted in terms of the UK¹⁷: this has some logic, since important elements of research funding are reserved matters. But to the extent that science policy is a devolved matter it may now be inappropriate. My first stage report said that when views were received from the devolved administrations it might be appropriate to return to this difficult area. There have been a number of responses from Scotland, but (despite reminders) no reaction from anyone speaking on behalf of Wales or of Northern Ireland (which may be an indication of the level of importance which they attach to CST's work).

59. Some respondents believe that CST should indeed be a voice for UK-wide science and technology. In the view of the CBI, "CST should bring together policy strands across the UK". The Institute of Physics considers that "the CST's remit must remain UK-wide ... as most issues affecting science and technology in the UK tend to be generic". The Scottish Executive supports the concept of CST, and appreciates the existence of an independent body taking a UK overview of science and technology. The Scottish Higher Education Funding Council similarly

¹⁷ They also specify that its membership shall "represent the entire UK". As pointed out in my first stage report, the importance of this provision may be more token than real, since CST members are appointed as individuals not as representatives.

sees the advantages of an independent body which is “able to provide objective, current and critical advice without being inhibited by departmental or territorial bodies”¹⁸.

60. But there are problems with the present position. The Engineering Employers Federation and the Engineering and Marine Training Authority suggest that “the fact that CST is chaired by a Minister, has the Government’s Chief Scientist as member and a secretariat within the OST stamps it very clearly as an English body and the devolved administrations may feel marginalised”. The Scottish Executive believes that CST’s present reporting lines should be re-considered because they do not take account of the extent of devolution of science and technology. And the University of Strathclyde believes that “as CST was set up to advise the Prime Minister its present remit does not provide for a role in devolved structures”.

61. Scotland now has an independent Scottish Science Advisory Committee (SSAC), described as having a similar strategic function to CST¹⁹. The Scottish Executive proposes that a link should be established between this body and CST by appointing the chair of SSAC to CST²⁰, and more generally that CST should take an interest in the arrangements developed by the devolved administrations. The Institute of Physics considers that CST “will need to devise a framework for receiving/providing advice to the devolved parliaments effectively, and appropriately”²¹.

62. No responses to the consultation for this review have been received from Wales, nor from Northern Ireland, where the Institute of Physics expresses concern that there is “no framework for managing science and technology ... no responsible minister and no department with specific responsibility”.

English regions?

63. My first stage report said: “Because of its UK-wide membership, it is questionable how far CST should be involved in work relating to English regions.” The consultation on this review has elicited no responses from regional bodies or from anyone speaking on their behalf.

¹⁸ It draws a parallel with the President’s Council of Advisors on Science and Technology (PCAST) in the USA, which it describes as “an important part of the advisory framework for *federal* science policy” (emphasis added).

¹⁹ SSAC is funded by the Scottish Executive under the auspices of the Royal Society of Edinburgh. It has 18 members, including an independent chair (currently Professor Wilson Sibbett, Wardlaw Professor of Physics, University of St Andrews), and with a wider spread of background than CST (including for example a theologian, a physics teacher, and the directors of a land use research institute and of a social and public health sciences unit). There is certainly room for improved communication here; while CST is described as having very low visibility within the Scottish Executive, the CST secretary and devolution contact in OST did not know of the existence of SSAC.

²⁰ The Scottish Higher Education Funding Council supports cross-membership between CST and the “science advisory arrangements” of the devolved administrations, and the Royal Society of Edinburgh and Universities Scotland agree on the need for close contact.

²¹ Members who are involved in policy development in the devolved administrations have already found CST reports useful.

64. Each Regional Development Agency has a strategy for its region, which should include science and technology issues, so they will obviously need to take national messages into account. There are also various financial initiatives which operate at regional level. It has been suggested that it is important for the membership of CST to be in touch with regional industrial development and employment issues. More specifically, Universities UK believes that CST “could have a role in mapping the distribution of funds, students and disciplines according to regions and review the principles on which, if any, these kind of decisions are made. It may also look at the overview of the distribution of other public services to see how they may impact on regional and country policy for example, the distribution of business support organisations. Universities UK believes that this type of work should be addressed by a body independent of the organisation that distributes the funds”.

2.3 WHAT WORK SHOULD CST DO?

65. CST's current terms of reference²² are very specific about the approach which it should take to its work: "The Council will be selective in its approach, concentrating each year on a small number of matters of strategic significance (say three or four) and dealing with them in depth". Lengthy "examples of strategic matters within the Council's core tasks" are then given, looking like a menu from which the choice of individual studies is expected to be made.

66. For the future, however, the Government may wish to consider charging CST with alternative or additional functions. It might wish CST to:

- (a) Monitor the "big picture" in the science and technology world, and advise on the strategic direction of science policy and programmes across Government as a whole
- (b) Consider issues relating to the allocation of Government funding for research and development
- (c) Play a part in other Government activities
- (d) Undertake studies of important topics
- (e) Respond to consultation documents, make inputs into reviews, comment on the work of other bodies, etc
- (f) Contribute on issues for immediate decision; troubleshoot
- (g) Engage in public communication on scientific issues.

These possible functions are considered in turn below.

(a) Monitor the big picture?

67. CST could be asked to take an overview of major science and technology issues and the Government's policy in relation to them, from the medium to long-term perspective, on a rolling basis.

68. This would involve keeping constantly in touch with developments in the science and technology world and with Government thinking, as well as with the activities of the other major Government advisory bodies. CST would need a regular overview report from the Government's Chief Scientific Adviser, and probably also from the Director General Research Councils. But in addition the secretariat would have to be proactive in finding out what was going on, using various channels, including information from those in OST charged to monitor individual Departments' strategies and (it was suggested) from special advisers in Departments.

²² See Annex A.

69. The CBI suggests that one way “to ensure that CST stays on top of the many inter-related issues in science and technology in the UK and can prepare effective advice” would be to interact more with outside bodies²³. This would include learned societies²⁴, professional associations and industry bodies. The interaction could not take the form not only of trawling for information and ideas, but also of involving them in discussion. It would help in identifying not only work elsewhere which could be useful to the Government, but also gaps which were not being covered anywhere. And for the bodies consulted it would provide a channel of access to Government.

70. Similarly, CST needs to build up links with top-level advisory bodies in other countries, as well as with the European Commission. Matters which are of interest to others may also be relevant for the UK Government.

71. All this material would need to be skilfully presented to members – possibly circulated in a regular newsletter (with headlines and web links), rather than only in preparation for individual meetings. And the resulting discussion in plenary meetings would need to be carefully handled to avoid superficiality. The outcome should be to identify issues needing to be pursued – not normally through a study undertaken by CST itself, but through action elsewhere. CST would need to return regularly to these issues to ensure that they were indeed being followed up.

(b) Consider issues relating to the allocation of Government funding for research and development?

72. CST’s current terms of reference include “keeping under review and making recommendations on ways of improving ... the overall impact of the funding arrangements for publicly supported S&T including those for research in higher education institutions”. As part of its oversight of the big picture, the Government might wish CST to look at Government spending on research and development, in relation both to the overall distribution and to the value for money being obtained.

73. According to *Investing in Innovation*²⁵, total Government spending in 1999-2000 in this area was nearly £4 billion. Of this, civil departments spent some £1.35 billion: continuing consideration of the science and technology strategies of those departments²⁶ would give CST an opportunity for an overview of their

²³ Many of CST’s members will already be involved with such bodies, of which there is a huge range – including, but by no means limited to, those which have responded to the consultation exercise for this review.

²⁴ As the Institute of Physics pointed out, “the House of Commons Science and Technology Committee’s recent inquiry into the Government funding of Scientific Learned Societies concluded that the learned societies have considerable expertise, which is at present under-used, and they recommended that Government should make greater use of a wider range of bodies for advice”.

²⁵ The Government’s strategy for science, engineering and technology published in July 2002.

²⁶ See below.

spending. But at present CST does not concern itself with the decisions on the “Science Budget”²⁷ which in 1999-2000 amounted to around £2.5 billion. This has surprised some CST members.

74. The Director General Research Councils (DGRC) is responsible for advising the Secretary of State for Trade and Industry on all aspects of the allocation of funds from the Science Budget. The recent Quinquennial Review of the Grant-Awarding Research Councils endorsed their continuing operation under the Haldane principle, “which allows day-to-day decisions on the scientific merits of different strategies, research programmes and projects to be taken by the Research Councils without Government involvement”²⁸. But it also recognised the need “to develop a clearer strategic framework for delivering science and for managing the Councils as a group [and] to ‘join up’ with key stakeholders so as to work with them in a more collegiate fashion”.

75. An RCUK strategy group was established in May 2002, chaired by the DGRC with the Chief Executives of the Research Councils as members; taking forward the recommendations of the Quinquennial Review is one of its chief responsibilities. The July 2002 implementation plan mentions that an RCUK “vision for science” is being developed to give “a 10-15 year road map of opportunities for science to underpin the consideration of future priorities, including the opportunities for international partnerships”. Work is in progress on proposals for consultation, to lead to a priorities document published in April 2003. Much other work is also in progress, including an exercise to improve the efficiency of OST’s interface with the Councils.

76. The Government may wish CST to have a role here. It would obviously not be appropriate for CST to involve itself in detailed allocations, and even the suggestion of one member that CST should have an audit role in relation to the missions and performance of Research Councils probably goes too far. CST’s role might include considering the overall balance of expenditure between different types of activity²⁹, as well as checking that sufficient funding was going to areas which it considered likely to be important in the medium to longer term.

(c) Make an input into other Government activities?

77. Unlike all other parts of DTI, CST does not have a “management board” with external members, acting as moderators in the relationship between Ministers and their civil servants. When this review was commissioned, I was asked to consider whether CST might fulfil that role. This does not seem a sensible option. Presentationally, it would link CST too closely with OST, whereas its role should relate to all Government departments (just as the Chief Scientific Adviser advises

²⁷ That is, the funding made available by Government for long term basic and strategic research.

²⁸ Stage 2 Report, November 2001, page 1.

²⁹ For example, the Royal Society of Edinburgh suggests that “an important role CST should perform is the strategic funding balance between science, engineering and technological ‘know-how’ ”.

the Government as a whole); and in practical terms, CST is not the right type of body for a management role.

78. Nevertheless, CST might play a useful part in a number of the tasks with which OST is currently charged, and perhaps in suggesting others which it should be doing. Below are some examples of areas of OST's work where CST might be able to bring new insights: the list is not exhaustive, and there may be areas in other Government departments where CST could similarly be of use.

Foresight

79. Foresight does not have an overall steering group or a committee structure. In view of its transdepartmental nature, it reports to the Government's Chief Scientific Adviser, and through him to the Minister for Science. In future, Foresight will be running a rolling programme, launching a new project every six months, each led by a stakeholder group chaired by the relevant Minister.

80. The chequered history of the Foresight programme has made many CST members wary of involvement with it. Some have doubts about the value of Foresight as an exercise, or consider that CST's remit relates to a shorter timescale than Foresight. Others accept that it would be appropriate for CST to contribute to Foresight by looking at the ideas for future work³⁰, and that interested members could act as a sounding board to thrash out individual issues.

81. It seems that there could be advantages for Foresight from having some involvement from an external group like CST, which might help to improve the focus and standard of the work, as well as increasing external contacts and credibility and bolstering Foresight's independence (both real and perceived) from Government constraints. It would not be appropriate for CST to assume a management or executive role. But a CST sub-group (possibly with flexible membership) could usefully play an advisory role in the choice of projects, considering each set of recommendations and adding advice which would go forward to Ministers together from other sources. In addition, individual members or sub-groups might wish to retain some involvement in particular projects.

The LINK scheme

82. The LINK scheme is "the Government's principal mechanism for promoting partnership in pre-competitive research between industry and the research base ... [It] offers an opportunity ... to tackle new scientific and technological challenges so that industry can go on to develop innovative and commercially successful products, processes and services"³¹. It comprises a number of

³⁰ On the basis of proper consideration, not a few minutes at the end of a plenary meeting.

³¹ See www.dti.gov.uk/ost/link.

programmes in defined technology or market sectors, sponsored jointly by Government departments and research councils. These programmes have been designed to address priorities identified in the Foresight programme, and each supports a number of collaborative projects involving partners from industry and the research base. OST is responsible for the co-ordination of the scheme.

83. Until recently, LINK was governed by an advisory board, but its future governance falls to be decided in the context of the Government's overall strategy for small business. There may be a need for a high level body, not to approve or supervise individual programmes, but to consider the strategic agenda of programme generation for LINK in the context of other Government mechanisms supporting knowledge transfer. CST could be of help here.

Following up departmental science and technology strategies

84. CST's past work on the science and technology strategies of other Government departments appears to have been useful. In endorsing the Government's implementation plan in response to its first report³², CST agreed to revisit the issues periodically "at suitable junctures in the future", and "to provide advice as and when most appropriate" to departments. It has already produced one further report³³ in this area. OST is now specifically charged to help other Government departments develop their strategies.

85. CST members could make a helpful input into a rolling review programme (possibly acting as individuals but comparing notes within a sub-group). This might lead to occasional reports on general lessons, but the most valuable contribution would be made in an informal way to individual departments. This exercise would also give CST the opportunity to follow up the extent to which recommendations from its other previous work had been implemented, meetings the concerns expressed by some members that implementation is either very slow or non-existent.

European and international matters

86. The Royal Society suggests that CST should take account of "developments in science policy and arrangements at the EU level and beyond ... With regard to international aspects of S&T, [CST's] current terms of reference are rather tightly drawn, concerned with synergies between the UK's domestic and international S&T activities. This needs to be expanded to consider wider policy implications of developments such as the European Research Area, and science policy and organisational developments elsewhere in the world".

³² *Government Implementation Plan*, July 2000, in response to CST, *Review of S&T activity across Government*, July 1999.

³³ *Review of Departmental Science and Innovation strategies*, March 2001.

87. OST's International Directorate works in this area, and CST is already giving thought to the merits of a European Research Council. There should certainly be other issues in this field on which its advice would be useful.

(d) Undertake studies of important topics?

88. Some respondents consider that undertaking specific studies is not an appropriate task for CST, on the grounds that there are others better equipped to undertake detailed studies of this kind. The CBI comments that CST appears to be acting as a third inquiry-based committee (the others being the Science and Technology Committees in the House of Commons and the House of Lords). It does seem that this may not be the area where CST has the most to contribute.

89. To say this should not be taken as a criticism of CST's past reports. They have been appreciated by the Minister for Science, and they receive high praise in responses to the consultation for this review. For example, the British Association for the Advancement of Science describes the report on science teaching as "a valuable piece of work, which asked key questions that many in the field of science education had not thought of asking, pointed out the lack of crucial management information and commissioned an independent study of the needs of teachers and the extent to which existing initiatives meet those needs". According to the Scottish Higher Education Funding Council, that report had "an impact beyond simply informing Government policies for science and technology". So did the report on arts and the humanities, which Universities UK particularly welcomes as "fundamental in raising awareness of the importance of arts and humanities to British society", and providing high profile support for the creation of an Arts and Humanities Research Council. *Technology matters* was singled out as providing valuable insight into industry's views on the sources of innovation. Moreover, members enjoy this type of work, and would no doubt be reluctant to abandon it.

90. If CST is to continue with work of this kind, there are questions as to how the topics for study should be suggested, and how the decision on whether to study a suggested topic should be made. The answers will depend partly on how CST is to be positioned in future.

Who suggests topics?

91. Some respondents have suggested that CST should consider only topics suggested by the Government, on the basis that it is providing a service for a client. These topics might be proposed by the Minister for Science or the Government's Chief Scientific Adviser. Alternatively or additionally, all Government departments could be invited to suggest topics either as part of a regular cycle (though cynics argue that this would lead to CST being steered away from the really important issues). However, explicitly limiting topics to those

suggested by the Government could give rise to serious doubts about CST's independence, and the more general view is that there should be no such restriction. The Save British Science Society considers it important that CST can advise on areas other than those chosen by the Government. Ideas could usefully be sought from outside bodies (including industry and the learned institutions), and looking at the topics being considered by equivalent bodies overseas could provide useful ideas. And members should be free to make their own suggestions.

Who selects topics from among those suggested, and on what criteria?

92. The secretariat should gather together a list of potential topics within which a choice should be made. Even those who consider that all topics should be generated by the Government do not generally argue that CST should be obliged to look at everything the Government suggests. Some respondents argue that this choice should be for CST itself, rather than the Government. For example, the Association of the British Pharmaceutical Industry says that although "requests from Government and other external bodies must be taken into consideration ... the priorities must primarily be driven by the independent members". But others look for the best of both worlds: for example Universities UK says that CST "should determine its own work programme, with a duty to respond to Government".

93. At its first meeting in its new incarnation CST adopted the following criteria to guide the choice of topics:

- Strategic importance: Is the issue sufficiently important to justify the Council's attention?
- Timeliness: Is this the most appropriate time to consider this issue? How and when does it fit within the schedule of Government business?
- Relevance: Is the issue of relevance to Government policy making?
- Value added: What value can the Council add? Is it the most appropriate body to address this issue?
- Coverage: Is the issue relevant to the whole of the UK³⁴?

It might be useful to add a further criterion: that the topic should be of interest to members³⁵.

94. The criteria of timeliness and relevance are particularly important if CST is to investigate topics of its own choice. It is crucial that CST's work should be in areas where the Government can be persuaded to focus, and on which it would welcome outside views. CST's work will not add value if it is a foregone

³⁴ The continued relevance of this criterion will depend on decisions about CST's future geographical scope.

³⁵ An aspect included in the questions which Lord Winston suggested that the House of Lords Science and Technology Committee should ask in deciding on inquiry topics, which were: is it timely? will a report on this subject now make any impact? is this Committee the appropriate body to do it? is it an interesting subject?

conclusion that Government will not listen to what it says. And CST would need to make its views known early while policy was still being formulated and there might still be a receptiveness to new ideas: as one member said, it is no good waiting until ideas are already cooked. This would normally mean acting before any formal consultation process had started.

(e) Respond to Government consultation documents, make inputs into reviews, comment on the work of other bodies, etc?

95. Respondents are doubtful about how far CST should involve itself in this type of work. The Institute of Physics “was concerned to note that the CST has been responding to consultation documents issued by the Government and its agencies”; it considers that “due to its remit and position of providing advice to Government, CST should not be responding to consultations, but should be providing advice to the Government on the issues that should form the basis of consultation exercises”. Similarly, the CBI suggests that CST “should have instigated the Roberts review, rather than just commenting on it”, and should not make inputs into the Quinquennial Reviews of other NDPBs.

96. Others argue that CST should not be too grand to participate in exercises initiated by others, provided that it has something uniquely worthwhile to contribute. This is likely to be the case in the innovation review which DTI has just started. CST has been invited to contribute to that review, but it does not appear to have been involved in a number of recent exercises where it might have had something useful to say, such as the streamlining of the business support programme, the work on women in science, the work by the Better Regulation Task Force work on regulation of scientific research³⁶, or the monitoring of whether Code Committees are properly implementing the Guidelines on Scientific Advice and Policy Making³⁷.

(f) Contribute on issues for immediate decision; troubleshoot

97. It has been suggested that the Government's Chief Scientific Adviser should consult CST when he is asked to comment on a Cabinet paper, so that CST could express a view in relation to the longer term implications of what was proposed. Even if this were desirable, it is not practicable. But this should not stop the CSA from keeping CST informed about the major issues (subject of course to confidentiality).

³⁶ Which is considering “the ways in which a balanced, proportionate regulatory framework can help scientific advancement without jeopardising public confidence”, aiming to strike a balance “between reaping the social and economic benefits of scientific advances and reassuring the public that sufficient controls are in place to prevent unwanted outcomes”.

³⁷ See *Scientific Advice and Policy Making: implementation of guidelines 2000*, Report by the Chief Scientific Adviser, Professor David King, DTI, December 2001, paragraph 12.

98. Similarly, although there might in theory be merit in involving CST in crisis management, as a body it is too unwieldy to be able to muster a collective view at short notice. Nevertheless, members as individuals or in a small group could be helpful, particularly if a problem arise in where CST has already worked.

(g) Engage in public communication on scientific issues

99. The consultation questionnaire asked whether CST provided a useful channel for communicating Government views and policy to the rest of science and technology community. The question provoked howls of outrage, suggesting that this role would compromise its independence. Some are not so sure. For example, the Royal Society says that communicating Government views and policy to the S&T community is an important issue that needs to be addressed by the CSA/OST³⁸, and the CBI considers that CST could be a powerful tool for communicating policy to the rest of the science and technology community.

100. According to the description of the role of members provided to potential applicants, they must be willing to serve “as the Council’s [rather than the Government’s] antennae and advocates within the circles in which they serve”. Some respondents agree that CST should be prepared to inform public debate by pronouncing and justifying its views. For example, Universities UK believes “that there is scope for raising CST’s profile to increase its effectiveness and gravitas in other areas of its remit, for example in terms of the public understanding of science”. And the Royal Society thinks that CST “should contribute to the public’s understanding of science and particularly to the understanding of the role of science advice in the Government process”.

101. But even an interviewee who explicitly considered communication of scientific issues to be part of the duty of every scientist still did not see this as a core task for CST, arguing that many other organisations were better equipped to carry out such work. The Government recently commissioned a study from the British Association for the Advancement of Science about “the relationship between the public at large, those directly engaged in science-related activities, and those taking wider policy decisions that relate to science”, to cover “what activities are taking place in this area, how effective they are at meeting public interests and needs, and to what extent those organisations providing science in society initiatives are working well together”. The report of this study³⁹ advocates greater co-operation and collaboration would be useful, but it does not give grounds for thinking that yet another body in the field would be useful.

³⁸ Which does not necessarily imply that CST should carry out the function itself.

³⁹ *Science in society*, advice to the Office of Science and Technology from the BA, 21 November 2002. It does not appear that either CST as a body or any of its members were involved in this study.

2.3 WHAT MEMBERS DOES CST NEED?

102. CST's current terms of reference⁴⁰ state that "the independent members will be drawn from very senior, widely respected people active in the worlds of academia, business, the City and from charitable sponsors. They will represent the entire UK and be appointed on the basis of personal merit and expertise following wide consultation." The term of office of all but five of the present members of CST will come to an end shortly, and there are many considerations which the Government will need to bear in mind when deciding on re-appointments and making new appointments.

103. Individual members of CST will be experts in particular areas, but by its very nature the body as a whole can never be expert on any single subject. So if its advice is to be worth having it must be because of the calibre, background and enthusiasm of individuals and because of the interaction between them. Interviewees wondered whether the Government wanted to tap members' knowledge or their intuition, and whether it wanted extra windows on the world or an articulate set of critics: the answer must be that it wants all that and more.

104. According to Save British Science, members should be people with independent minds, not afraid to give and to justify unpopular advice. But they must also be able to appreciate and present views with which they may not personally agree. The aim, according to one interviewee, should be a collection of Leonardos, with what another described as a "helicopter view" of the field, who can illuminate a range of themes without advocating vested interests. The membership must be such as to give CST's views credibility not only with Government, but also with the outside world (particularly, but not solely, the science and technology community).

105. It is also important that CST has – and is perceived to have – a membership balanced from various points of view. The Royal Academy of Engineering believes that "the membership should cover as broad an area of science, engineering and technology as is practicable, including representatives [from Government, industry, academia and education. The panel should encompass members with expertise in technical, financial and social issues relating to science, engineering and technology, as well as innovation and wealth creation. In addition, there should be a balance between male and female members and those from, in relative terms, older and younger age groups".

Perceptions about the present membership

106. CST at present has 14 independent members⁴¹. Most respondents speak highly of them as a group. The Institute of Physics refers to the "very senior, influential" membership, and the Royal Academy of Engineering reports that

⁴⁰ See Annex A.

⁴¹ Listed at Annex B.

“those Fellows who were familiar with the current members of CST mostly expressed favourable responses to the selection”. However, some well-placed interviewees had doubts; one did not recognise members as “movers and shakers” in industry, and another suggested that some individuals might not be respected because they were known to have definite agendas.

107. Respondents also express some doubts about whether the present membership is properly balanced.. The Academy of Medical Sciences comments: “It is ... noticeable that the number of working scientists on CST is very small. On the biological side there is probably only one. *We also notice that there is no medical scientist on CST at all*”⁴². The Association of the British Pharmaceutical Industry says: “It is interesting to note that under the present membership the pharmaceutical industry is not represented. As the largest private sector investor in UK R&D and the largest industrial funder of university research, this should be addressed”. Professor Sir Graham Hills considers that: “Although ... the membership of CST could hardly be more distinguished, it could be construed to represent yet one more facet of what is, for the want of a better description, the same scientific establishment”; he fears that it is dominated by the received wisdom of the current knowledge specialists, the body of which is in tune with present priorities, and so may be largely self-referencing.

108. Members’ own perceptions of the present membership vary. Some saw a bias towards academics, or at least towards people associated directly or indirectly with education, and hence towards science rather than engineering or technology; they complained that academics just wanted to talk. Conversely, others considered that more use could be made of academics, in particular echoing the view that hardly any members are “conventional scientific academics”. Most of them commented on the small number of women members.

Independence

109. There is no doubt that the present “independent” members are genuinely independent of Government. But there is also another aspect to independence. Despite the language sometimes used⁴³, members are not appointed to “represent” anyone. They are appointed as individuals, and (as the Royal Academy of Engineering says) it is essential that they should act impartially in their capacity as members.

110. In practice members’ views on issues under discussion will inevitably be coloured by their own personal interests and background⁴⁴. Similarly, a member

⁴² Emphasis in original.

⁴³ Even in the present terms of reference.

⁴⁴ Some CST members were concerned to note that colleagues came to meetings with briefing provided by their organisations; others welcomed this, on the basis that it made for better informed discussions. It might help if members who have been briefed were to inform their colleagues.

might propose a working topic for self-interested reasons. This should not normally present a problem. Formal declarations of members' interests are on the public record⁴⁵, members know each others' backgrounds, and balance will be achieved through the diversity of membership (this is not to say that the outcome need necessarily be a single agreed view, rather that "interested" views should be presented with the appropriate health warnings). However, if CST (as a whole or in sub-groups) holds discussions in the presence of Ministers there could be a risk that this balance might not be achieved: individual views could be expressed which other members might be too polite to challenge, and which would not therefore be "filtered" through CST as a body. In those circumstances, explicit declarations of interest could be appropriate.

111. The independence of CST as a whole could theoretically be compromised by the Minister for Science or the Government's Chief Scientific Adviser attending and participating in discussion at meetings, even if they are not chairing. Respondents were generally robust on this. The Save British Science Society sees no harm, and indeed potential benefit, in the Minister attending to hear CST commenting on and challenging Government views⁴⁶. And all the outside respondents who comment on this⁴⁷ consider that it is appropriate for the Government's Chief Scientific Adviser to attend.

Level of seniority

112. The Scottish Higher Education Funding Council says that the members should be "individuals who possess current and extensive knowledge of the science and engineering base in the UK and internationally, either because they are respected academic scientists or because they commission, perform or use science". Universities UK "believes that the current level of seniority of membership is appropriate as it reflects both subject knowledge and strategic experience". There is seen to be a need for mature judgement, and for management experience. On the other hand, it is important that, as the CBI puts it, CST "should not be populated with 'trophy' members". And members must not be too busy to participate fully. Recognising that the present members "must be heavily committed to other activities", the Institute of Physics wonders whether "there is a need for people who have credible expertise but perhaps a little more flexibility for action". Retired people, for example, would have more time to participate in CST's work, but they might be – or at least be perceived to be – out of touch.

113. On the other hand, the Government emphasises the need to involve younger people in public life in all contexts. Many consider that it could be useful

⁴⁵ It is crucial that members co-operate with the secretariat to update them regularly

⁴⁶ A parallel was suggested with the House of Commons Environment Audit Committee, where the relevant Minister may attend to participate in the discussion.

⁴⁷ Royal Academy of Engineering, Save British Science, University of Strathclyde, Universities UK.

for CST to have some relatively more junior members, who are on their way to the top in their fields but have not yet arrived. They would, interviewees said, be driving, thrusting, more controversial, more cutting edge; they would really debate science and technology, bringing new ideas and wanting to make things happen, rather than going over old ground. And they would benefit from the opportunity to come into contact with Government policy and machinery. But it might not be easy to attract the right people at that stage in their careers: those who are active and engaged will prefer to be doing what they do (working in their laboratories, or designing control systems, or inventing, or making money). And they might not be able to contribute fully; they would be less likely to see beyond their own patch, would not have managerial experience, and might be over-awed by more senior fellow-members.

Gender balance

114. The desirability of appointing more women members to CST is generally recognised⁴⁸ – as is the fact that suitable candidates are hard to find. The more senior women in the field are generally so heavily in demand that they are already over-burdened. Appointing younger women would be helpful in terms of the age balance of CST, but particular care would then be needed to ensure their contributions were not dominated by those of the more senior (male) members⁴⁹.

Range of backgrounds

115. The Government will wish to maintain the current variety of backgrounds from which the members with experience in science, engineering and technology are drawn. But, depending on decisions on the scope of CST's remit, it may also wish to continue to include social scientists, and to add people with a background in the arts and humanities (from academia or the creative industries). It may also need to add expertise in science communication and in consumer issues and perspectives. The Royal Society points out that the moral and ethical context are also important. There may need to be some representation from devolved administrations, and to cover the perspective of English regions. Finally, given that science and technology does not operate within national boundaries, it could

⁴⁸ This is underlined by *SET Fair* (the report from Baroness Greenfield to the Secretary of State for Trade and Industry on Women in Science, Engineering and Technology, November 2002) which points out that “the outcomes of scientific research are as important to women as they are to men”, concludes that women therefore “need to be equally represented in the science policy-making arena”, and suggests that to this end there should be “a science, engineering and technology advisory panel to the Chief Scientific Adviser to meet, discuss and be consulted on key scientific issues of the day: initially to be 75 per cent women, but at the end of three years [to] become a gender-balanced panel” (p 15). The fact that there CST already provides such a panel (albeit not gender-balanced) is not mentioned.

⁴⁹ A point made by a senior woman.

be useful to add members with an international background to bring a different perspective⁵⁰.

Number

116. In 2000, Ministers decided to increase the maximum number of independent members from 14 to 16, though only 14 places are currently filled. This increase was primarily intended to ensure sufficient attendance at meetings. In fact, this does not seem to be a problem. Given the other claims on members' time⁵¹, there has been a remarkably consistent attendance at the quarterly plenary meetings. At the 16 meetings between June 1998 and September 2002, on average 80% of independent members were present – with two meetings attracting all members, and only one falling as low as 50% attendance. Of the 14 current members, only 4 have attended less than around 80% of the meetings during their period of membership.

117. Some argue that even now the membership is too large for proper discussion in plenary meetings. On the other hand, the membership may be too small to cover the whole range of interests which should be involved – and indeed the same respondents who judge CST to be about the right size at present then produce ideas for adding different types of member. There is no right answer to this question, though to the extent that CST adopts different working methods in future the difficulty of large formal plenary meetings will be reduced.

Finding and appointing new members

118. Future appointments will be made in accordance with the normal NDBP procedures. The fact that the Institute of Physics questions whether these procedures are publicly visible suggests that the Government will need to take particular care to ensure that the net is spread wide. It will also have to ensure that decisions on this review result in a CST which appeals to people of the right calibre.

119. The Royal Academy of Engineering thinks that the appointment procedures themselves might deter potentially valuable members from applying. They certainly makes it administratively difficult to stagger the departure of members and the arrival of new ones, which would be useful to give some degree of continuity in membership.

120. The integration of new members could be helped by a full induction process, which according to some present members was not offered to them.

⁵⁰ This is envisaged in CST's current terms of reference. However, one member commented that those based overseas would have more difficulty in attending meetings, adding to the problem of lack of continuity,

⁵¹ And considering that members have also given large amounts of time to CST work in sub-groups.

This process should not only cover the procedures (formal and informal) of CST itself, but also the context within which CST works, with the aim of creating a shared understanding.

3.6 HOW SHOULD CST WORK?

Meetings

121. CST has hitherto worked to a rather rigid formula of quarterly plenary meetings, with separate sub-groups on individual topics meeting intermittently over various periods.

122. Some members enjoy the plenary meetings, seeing them as an exchange of views among a mixed group of people with different perspectives and insights, who listen to each other and actively seek consensus. Others suggest that discussion in these meetings is too formal and general to be useful, with members repeating their well-known positions and academic members tending to dominate the discussion⁵². Some detect factions developing around the table, and suggest that a common spirit does not emerge in such a way as to make the whole more than the sum of the parts. This is unfortunate, when one of the arguments for retaining a permanent advisory body is precisely that it should work well together. The problems may be partly due to the setting in which plenary meetings are held – an elegant formal room, round a table so large that members can barely hear each other speak.

123. One member suggested that CST might be the right group working in the wrong way. In the course of the review, members have expressed interest in making at least some of their plenary meetings less formal, so that issues can be kicked around in a workshop. This would also require careful preparation, but should certainly be tried.

124. CST's current terms of reference⁵³ provide that it "may work through sub-groups chaired by one of its members and possibly involving additional non Council members with appropriate expertise who are co-opted to help deal with particular, time limited pieces of work". Sub-groups hitherto have consisted of members who volunteer to join them (sometimes after a little persuasion), who tend to be those who already have some involvement in the subject. In the absence of specialist advice, the group must depend heavily on the knowledge of its members, which could give a risk of a biased result. It is therefore important that CST as a whole should run the rule over reports prepared by sub-groups.

125. Members have found it a real pleasure to work with colleagues in these small groups, gaining intellectual enjoyment from thinking through issues which are normally only on their peripheral vision. They would regret the loss of this experience. It is therefore important to note that sub-groups need not be confined to work on a particular topic or the preparation of a consultation response. Many of the potential tasks outlined above could probably be best undertaken in small groups of this kind.

⁵² Because, it is suggested, they find it easier to speculate on areas where they are not experts.

⁵³ See Annex A.

Output

126. CST could deliver its advice to Government in various ways, including:
- Publishing formal reports (together with evidence where appropriate)
 - Making published written contributions to Government reviews or consultations
 - Providing confidential written advice to Ministers (on occasion supplementing published advice)
 - Discussing with Ministers, officials or special advisers. CST might, for example, be asked to provide an oral science and technology update to the Prime Minister on a regular basis, not trying to give an overview of the field but raising one or two crucial points (which members would have agreed beforehand).

Confidentiality and openness

127. There is a general presumption that NDPBs should act as openly as possible. The re-launch press notice of 13 March 1998 said: “There was some criticism that the old CST was too secretive”, and CST’s present terms of reference provide that its advice will “normally” be published. Accordingly, at its first meeting, the re-formed CST “considered how it could best improve its openness and communications within and outside Government. It agreed to issue a press notice after each full meeting of the Council; establish a website containing up to date information about the Council, its work and its advice; adopt a distinctive logo; (and more generally) operate in as open and inclusive a manner as possible.” All this has been done⁵⁴. All CST’s reports, and its responses to reviews and consultation exercises, can be found on CST’s website⁵⁵.

128. Nevertheless, the Food Standards Agency considers that it would be helpful if CST operated more openly: “this would facilitate a better assessment of the wider benefits of the output of the Council from a public expenditure point of view”. The CBI suggests that “evidence and advice [should also be] placed in the public domain on a regular basis”, the British Association for the Advancement of Science seeks more transparency as to how CST comes to conclusions and the evidence on which they are based, and Scottish Higher Education Funding Council comments that “whilst the primary role of CST is to advise the Government, we believe that such advice should be made publicly available and

⁵⁴ Except that after the first few meetings press notices were issued only when there was a substantive announcement to make. A note (though not the full minutes) of each meeting is placed on the website.

⁵⁵ Reports have also been published in printed form: see the list at Annex E.

disseminated widely within the science community so that it can be considered, discussed and, where appropriate, challenged. With the exception of its topic-specific reports, we are not aware that CST has significantly engaged in publication and dissemination of its strategic advice". To suggest that "evidence" should be published may indicate a misunderstanding of the way in which CST currently works: unlike Parliamentary Select Committees it neither seeks nor receives formal evidence. And it has given virtually no unpublished written advice.

129. A move towards operating more in confidence would inevitably give rise to criticism – but some respondents recognise that it is necessary if CST is to fulfil its functions properly.

130. If CST is to be effective in assisting with policy making, it must make its contributions at an early stage in the process – probably long before issues have entered the public domain. So the Government must be able to make information available to CST in confidence. Similarly, CST must be able to give confidential advice to the Government, particularly if there is to be a change of emphasis from formal reports towards providing advice through brief letters or frank informal discussions. Even with formal reports, there are circumstances in which publishing could be counter-productive by destroying the Government's trust in CST⁵⁶. In the view of the Association of the British Pharmaceutical Industry, "arguably the most valuable advice that the members of CST can provide to Ministers and the CSA [is] confidential".

Profile

131. One of the objectives of the policy of openness announced at the re-launch was to increase CST's "public standing". This has not happened. The CBI says that "CST has been and remains almost invisible to the outside world ... It has had no impact on business or public understanding". Almost all respondents agree⁵⁷. And the view is shared in Parliament. The House of Commons Science

⁵⁶ It has been suggested that this may have happened in the case of ACOST, whose reports tended to be ignored by the Government.

⁵⁷ "It is very doubtful whether any appreciable number of the scientific or business community, and certainly of the general public, has ever heard of CST or is aware of what it does" (Academy of Medical Sciences). "We believe that the work of the Council is not widely known, even among those quite closely involved in science policy developments" (British Association for the Advancement of Science). "Many people to whom we have spoken and whom we would have expected to be aware of the CST had little or no knowledge [of it]" (Engineering Employers Federation and the Engineering and Marine Training Authority). "The profile of the Council is low" (Food Standards Agency). "The Institute [of Physics] was not entirely surprised to discover that many senior physicists had never heard of the CST, prior to the Quinquennial Review ... [its] work is not clearly visible to the science and technology community at large". More than 160 Fellows of the Royal Academy of Engineering, whose current President is a member of CST, contributed responses to its internal consultation: "Strikingly, over 50% of these respondents professed to have never heard of CST and a further 25% had, at best, only a vague awareness of CST. Several of those who were previously unaware of the existence of CST were heavily involved in other science, engineering and technology bodies and were

and Technology Committee considers that CST “continues to have too low a profile”. In its response to the consultation, the Committee drew attention to three reports in which it had underlined CST’s importance⁵⁸: in 1998 it noted that many witnesses knew little about CST’s functions or membership, and three years later it reiterated its previous recommendation that the Government should give more prominence to CST’s activities. The House of Lords Science and Technology Committee reportedly takes the same view. And it seems significant that although the Parliamentary Office of Science and Technology distributed the consultation letter to all members of both Houses on its circulation list, no individual replies were received.

132. Respondents made suggestions for ways of increasing CST’s public profile, such as holding meetings in public⁵⁹. But although the CBI would like to see this happen “where practical”, most respondents did not consider it to be appropriate. CST is an advisory not an executive body, and “the generation of scientific advice is not an activity which is necessarily best done at public meetings” (as the Academy of Medical Sciences puts it). However, in the view of the Royal Society, “while it would probably not be helpful for the Council to hold its business meetings in public, there may well be circumstances where it would be valuable for it to hold open meetings to hear views during its consideration of a topic ... This would be especially helpful when the CST is considering issues where there is particular public concern”.

133. It is also suggested that CST might do more to publicise its output. The Academy of Medical Sciences suggests that CST should launch its reports at a press conference and hold meetings “where public discussion of the report and possibly some public interrogation of the committee is encouraged”. The Institute of Physics supports this: “Perhaps the CST, with support from the OST, should make active use of the national media, and the science and technology specialist media, to publicise their work. They should also encourage feedback, which would reinforce (or otherwise) the advice to the Prime Minister and the Government”. The Royal Academy of Engineering suggests that this might mean producing short readable reports for publication in the press, perhaps tailored to different interest groups. If this is considered to be appropriate, CST would need to put effort into building up a relationship with the media: the press notices which

thus extremely surprised that they had never encountered CST. Many Fellows, including those who had some familiarity with CST, described it as ‘invisible’.

⁵⁸ *The Implications of the Dearing Report for the Structure and Funding of University Research*, First Report, Session 1997-98, HC 303-I, paragraphs 110-111; *The Scientific Advisory System*, Fourth Report, Session 2000-01, HC 257; and *Are We Realising Our Potential*, Sixth Report, Session 2000-01, HC 200-I, paragraphs 35-38 *et passim*, the terms of reference of which were to “examine the extent to which the measures and objectives outlined in the White Paper [*Realising our Potential: a strategy for science, engineering and technology*, May 1993, Cm 2250] have been successfully delivered, their impact on the management and performance of science and technology, and whether the structures it specified are still appropriate”.

⁵⁹ It is noteworthy that the House of Lords Science and Technology Committee rarely has a significant audience for its evidence sessions, which are open to the public.

have so far been issued about its activities and reports have not stimulated significant interest.

134. It is important to decide where to focus any effort to raise CST's profile. The public at large is never likely to have a great interest in CST, except if it happens to be working on a high profile subject⁶⁰. This probably does not matter, unless the Government decides that it should have a role in public communication of scientific issues.

135. But CST's invisibility among the science and technology community certainly does matter. The Royal Academy of Engineering finds its Fellows' lack of knowledge of CST "a source of considerable concern ..., given the importance of CST's role in science, engineering and technology policy decisions". More interaction with the science and technology community will be vital if CST is to develop a broader overview role. CST might take the trouble in future to keep those who express an interest directly informed about its work. It might also consider holding discussions with selected groups of relevant people on a regular basis⁶¹.

136. Arguably, CST's invisibility around Whitehall matters even more, if it is to be useful to the Government as a whole. The Save British Science Society says that although it might be better if CST's advice were more widely publicised, what really matters is that it is taken to heart within the Government. The Royal Society shares this view: its public profile "is probably secondary to the need to increase its profile within Government and Whitehall". Sadly, CST still has ahead of it the task of making other Ministers and their officials aware of its existence and responsive to what it is doing. Very few other Government departments have commented on the review. Those which did agreed that CST's profile was not as high as it should be, and some showed a remarkable lack of awareness of its functions and of the work which it has already done.

Website

137. The consultation exercise asked whether CST's website was easy to find and useful.

138. The Save British Science Society says that CST's website "is easy to find", whereas the Scottish Higher Education Funding Council says that it is not. It all depends on where one starts. There are some easy routes, for example:

- On UK online, the Government's central website, the Council for Science and Technology does appear (under its full name only) in the A to Z listing of

⁶⁰ It would of course be possible to add this to the criteria for choice of work; Parliamentary Select Committees, charged to inform Parliament, rightly take into account the degree of public interest when selecting topics for their inquiries.

⁶¹ Such discussions have been useful to CST in the past, during its work on science teaching on arts and humanities.

government and public service websites, with a link directly to CST's home page.

- On Google, searching for "CST" leads straight to the CST site, and the Royal Academy of Engineering comments that it is "readily located using common search engines".

But, as the Royal Academy of Engineering also points out, there are few links to the CST website from other related or relevant websites. Since CST's remit is "to advise the Prime Minister on the strategic policies and framework for science and technology in the UK", it is particularly surprising that the links on the Prime Minister's website under the heading "science and technology" do not include one to CST. From DTI's home page⁶² one has to travel via the OST home page, and unless one is familiar with the OST site it is not straightforward to get to the CST site.

139. As to usefulness, respondents generally consider that CST's website serves its purpose. It is described as "minimalist but effective" (CBI), reflecting CST's "current low-key mode of operation" (Royal Society). It is said to provide most information in a logical and useful way (Save British Science Society), and to be "easy to navigate" (Engineering Employers Federation and the Engineering and Marine Training Authority). Nevertheless, even with the present design detailed improvements are certainly possible; a number of these have already been discussed with the secretariat, and some are already being implemented. And the current presentation is "somewhat uninspiring" (Royal Academy of Engineering): if the Government decides to make a serious effort to raise CST's profile, the site would probably need to be redesigned.

Resources

The secretariat

140. The function of the CST secretariat could be described as "managing" the business and the members. Members (and others) paid tribute to the first secretary of CST in its new incarnation for the energy, liveliness and enthusiasm which he had brought to his work. They described him as being good at identifying topics, turning ideas into practicalities, and collecting and distilling views and maintaining momentum; he created an environment of making members feel useful. They believed that whatever the precise functions of CST in future its secretary would need to be a broad thinker and a dynamic entrepreneur, with the ability to gain the respect of members, of outsiders, and of

⁶² A recent study on Government websites awarded DTI's site a score of only 66.5 out of a possible 100 marks (Interactive Bureau, *A report on key Government websites*, November 2002). Although this mark earned the DTI site seventh place out of the 20 sites studied, some consideration will presumably be given to improvements – which could provide an opportunity for a clearer link to CST.

senior management and Ministers. An inadequate secretariat would sap the morale of members and limit the effectiveness of CST's work.

141. At its most basic level, the secretariat must carry out the administrative functions connected with CST accurately and promptly. Some members are content with this aspect of the secretariat's work, but others have commented that things do not run as smoothly as they should: for example, papers for meetings are not always circulated early enough, and records of members have not always been kept up to date⁶³. Moreover, OST's accounting system is not set up in such a way as to allow identification of the full costs of CST.

142. One of the most significant functions for the secretariat is helping CST to decide where its efforts can most usefully be directed (within its broad remit), in terms both of issues to be raised at plenary meetings and of topics to be chosen for further work. To do this properly, the secretariat needs to be proactive rather than reactive. It should seek to keep in touch with what is going on in the science and technology world – within OST, within Government as a whole, and outside. It is noteworthy that the House of Lords Science and Technology Committee has a scientific adviser post with this as its main function. For CST, the task requires input from OST colleagues (especially, but not only, senior management) and from members (who could usefully be invited as a matter of routine to suggest topics for meeting agendas). But it will fall mainly on the secretariat, and if CST is given a significant overview role it will assume much more importance in the future.

143. In the past, the most significant task for the secretariat has been organising and assisting work on the specific topics being investigated by sub-groups. In preparing its reports to date, CST has used various methods, including drawing on written material, collecting data through a questionnaire, analysing raw data⁶⁴, holding consultative meetings and individual interviews, and using focus groups – which all make varying demands on the secretariat⁶⁵. As for the actual report, in general once members have set the framework the secretariat has prepared drafts for comment and amendment by members. Once reports have been issued, the secretariat has followed up their implementation.

⁶³ It should in fairness be noted that both these tasks depend on timely input from others outside the secretariat, and that a small secretariat is particularly vulnerable to unexpected absences.

⁶⁴ Such as the work on university admission data carried out as part of CST's input to the Roberts review. The Academy of Medical Sciences considers that more work of this kind is needed: for advice to be authoritative "it is necessary that the available evidence is properly documented and this requires an advisory body with the staff and resources to provide such adequately sourced, authoritative advice ... It is a great difficulty for CST that they do not appear to have research staff to provide the backgrounds for their papers. This is a difficulty which can lead to undue reliance on individual opinions".

⁶⁵ The Academy of Medical Sciences suggests that the Government needs a major advisory body like the US National Research Council with very large numbers of staff. It says that the Chief Scientific Adviser has already rejected this suggestion in another context. To address it now would be outside the scope of the present report, which is dealing with how the existing arrangements can be made to function more effectively.

144. Depending on decisions about the desired future profile, the secretariat may also have an increased responsibility in future for seeking publicity for CST. The Royal Academy of Engineering considers that “at the very least, the CST secretariat should take direct action to inform the science and technology community of studies being undertaken and reports published, as already occurs for Select Committee activities”. Setting up an email contact list for this purpose should be a relatively simple one-off task, and mailing information to them at the same time as placing it on the website would require negligible effort. The Institute of Physics goes further, suggesting that CST “needs active people working alongside the senior decision-makers, generating greater publicity for their outputs”.

145. If CST is to be viewed as an independent body, or at least as a body giving independent advice, it can be argued that it needs an independent secretariat. Members of a body of this kind should see their secretariat as “belonging” to them, whereas at present some CST members view the secretariat as part of the bevy of civil servants who attend meetings.

146. The Royal Society argues that CST needs “a strong independent secretariat within OST, but well linked in with other components of the CSA’s office, as much of the background knowledge and statistics will be common to both”. It could be argued that “an independent secretariat within OST” is a contradiction in terms. However, there are encouraging parallels. For example, the secretariat of the Agriculture and the Environment Biotechnology Commission (AEBC), which operates from within OST, is ring-fenced from the rest of OST. The secretary is clear that he works for AEBC and not for Ministers or for the OST managers to whom he reports for pay and rations. In order to increase its independence, the CST secretariat could similarly be made responsible to CST (which would be more easily achieved, as well as more important, if CST had an independent chair).

147. Being within CST rather than completely outside the system (like, for example, the secretariat of a Royal Commission) should give the secretariat easier access to Government thinking, at the price of only a minor compromise of independence. It should also mean that there is senior management support available. But this may be only a theoretical advantage. Because of other pressures on time, the secretariat has not hitherto received priority attention from management. One interviewee suggested that this was apparent from the decline in CST’s performance, and it certainly affects the morale of the secretariat, which – as the Association of the British Pharmaceutical Industry commented – “seems to retain a low profile within the OST”.

148. Whether or not it is to be formally independent, it seems appropriate for the secretariat to be dedicated to CST work. In particular, it should not be called upon to draft the Government’s response to CST reports: its role is rather to push on behalf of CST for its recommendations to be adopted. It should not in general

be asked to carry out other work for OST⁶⁶. However, the general function of acting as the liaison point with Parliamentary Select Committees on science and technology matters, like that of acting as contact point on devolution, could actually be helpful to the task of keeping in touch on behalf of CST – provided that adequate staff were available.

Other resources

149. The Royal Society believes that CST “should be in a position to commission background papers, and should have a budget for this”. In the past, the secretary has gone round with a begging bowl to assemble funds to finance work of this kind: this is clearly not appropriate. If CST’s future role is to concentrate more on identifying the need for work than on actually carrying it out, this will reduce the need for outside input of this kind, but even so there may be occasions when the secretariat needs additional outside assistance (either because specialist knowledge or expertise is required, or because of peaks in work load). In some circumstances it might be appropriate to seek this from secondees⁶⁷ (who might come from industry, from academia, or from other Government departments or even within CST). In other circumstances, consultants may be needed. In either case, some funding will be needed.

150. The bottom line is that members who are giving freely of their own time and intellectual capital deserve decent support to enable them to produce what the Government wants from the body to which they have been appointed.

⁶⁶ It certainly seems inappropriate, for example, for a member of the secretariat to work on the co-ordination of budgeting and financial forecasting for the Science in Government Directorate, or to act as a bicycle courier to deliver to Parliament material unrelated to CST.

⁶⁷ ACOST used secondees in this way.

ANNEXES

ANNEX A

Current terms of reference and organisation of CST⁶⁸

Terms of reference

1. To advise the Prime Minister on the strategic policies and framework for Science & Technology (S&T) in the UK with the overarching aim of sustaining and developing UK S&T and maximising their contribution to the nation's wealth creation and quality of life.
2. The Council will take a medium to longer term, strategic approach to its core tasks of keeping under review and making recommendations on ways of improving:
 - (i) the performance of the UK (public and private sectors) in S&T, in relation to current and future national needs and opportunities;
 - (ii) the overall impact of the funding arrangements for publicly supported S&T including those for research in higher education institutions;
 - (iii) 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
 - (iv) the synergy between the UK's domestic and international S&T activities and the scope for the UK to get more benefit from S&T collaboration.
3. The Council will also deal with more specific strategic issues of national importance on which the Government seeks its advice.

Reporting lines

4. The Council is advisory to the Prime Minister and will submit its reports to him through the Cabinet Minister for Science and Technology (the Secretary of State for Trade and Industry) who chairs the Council on behalf of the Prime Minister. The Prime Minister is responsible for appointments to the Council and the Government's Chief Scientific Adviser is the Deputy Chairman.

⁶⁸ See CST website (www.CST.gov.uk).

Membership and mode of operation

5. The Council may work through sub-groups chaired by one of its members and possibly involving additional non Council members with appropriate expertise who are co-opted to help deal with particular, time limited pieces of work. Members and non members may include appropriate experts from overseas.

6. The independent members will be drawn from very senior, widely respected people active in the worlds of academia, business, the City and from charitable sponsors. They will represent the entire UK and be appointed on the basis of personal merit and expertise following wide consultation.

7. The Council and its sub-groups may commission studies as background to their work, and may invite and consider papers from Government Departments, Research Councils, Funding Councils and other relevant publicly funded bodies. The OST will provide the secretariat.

8. The Council will be selective in its approach, concentrating each year on a small number of matters of strategic significance (say three or four) and dealing with them in depth. One of the first tasks of the Council will be to agree a forward work programme. Examples of strategic matters within the Council's core tasks are provided below.

9. The Council will publish an annual report and information about its work programme. Its advice will normally be published.

Examples of relevant strategic matters

In relation to task (i)

- International benchmarking of inputs and outputs to UK S&T
- Assessment of strengths, weaknesses, opportunities and threats concerning the UK's national S&T portfolio, taking account of national and international trends and developments
- Consideration of the balance within this portfolio (eg between disciplines, between basic and applied, between directed and responsive modes etc) in relation to longer term national needs
- Consideration of industry's needs for highly qualified S&T personnel and the extent to which these are being met

In relation to task (ii)

- Monitoring of trends in public spending plans for S&T and consideration of their implications
- Strategic overview of the national dual support system for university research including consideration of the optimal degree of selectivity and concentration of funds for university research and of the operation of peer review
- review of synergy between public and private sector S&T investment in particular areas, and between S&T investment between Government Departments and Research Councils

In relation to task (iii)

- Review of indicators of exploitation/commercialisation of S&T in UK, with international benchmarking of UK performance
- Review of different models of transferring/diffusing S&T skills and know-how from the research base to industry/other users, and consideration of their policy implications including those for dual use
- Review of international evidence on the role that fiscal instruments can play in stimulating commercial exploitation of S&T

In relation to task (iv)

- Review of trends in patterns of UK's international S&T collaborations
- Review of returns to UK from participation in bilateral and multilateral overseas collaborations
- Consideration of scope for harnessing international S&T activities to the UK's wider export promotion and inward investment objectives
- Consideration of scope for UK to promote national interests by more systematic development and prioritisation of its bilateral S&T links overseas
- Consideration of UK's strategic aims for sixth European Framework Programme
- Consideration of the scope for encouraging international sharing of major scientific facilities and equipment.

ANNEX B

CURRENT MEMBERS OF CST⁶⁹

CHAIRPERSON

The Rt Hon Patricia Hewitt MP, Secretary of State for Trade and Industry;
Cabinet Minister responsible for Science and Technology

DEPUTY CHAIRPERSON

Professor David King Scd FRS FRSC FInstP, Chief Scientific Adviser to the UK
Government and Head of the Office of Science and Technology

INDEPENDENT MEMBERS

Dr Javaid Aziz, Chief Executive, Aspective

Mr Euan Baird, Chairman, Schlumberger Ltd

Professor S Kumar Bhattacharyya CBE FREng, Director, Warwick Manufacturing
Group, University of Warwick

Professor Sir Alec Broers FRS FREng, Vice Chancellor, University of Cambridge

Professor Vicki Bruce OBE, Head of College of Humanities and Social Science,
University of Edinburgh

Professor Sir Chris Evans OBE, founder and director of twelve biotechnology
companies

Dame Julia Higgins CBE FRS FREng, Professor of Polymer Science at Imperial
College of Science, Technology and Medicine

Dr Rob Margetts CBE FREng, Chairman, BOC Group PLC and Chairman, Legal
& General PLC

Sir Paul Nurse FRS, Chief Executive, Cancer Research UK

Dr David Potter CBE, founder, Chairman and Chief Executive, Psion plc

Professor Peter Schuddeboom, Director, Northern Ireland Science Park

Sir Richard Sykes DSc FRS, Rector of Imperial College of Science, Technology
and Medicine

Professor David VandeLinde, Vice Chancellor, University of Warwick

Mr John Weston CBE, non-executive Chairman, Spirent plc

⁶⁹ For biographies of members see CST website (www.CST.gov.uk).

ANNEX C

Consultation letter and questionnaire for review

19 August 2002

QUINQUENNIAL REVIEW OF THE COUNCIL FOR SCIENCE AND TECHNOLOGY

The Council for Science and Technology (CST) is due for review this year. I have been engaged to undertake this review, and I am writing to seek views from you – or from your organisation – on the issues which the review will consider.

The role of CST is to advise the Prime Minister about the United Kingdom's strategic policies and framework for supporting science and technology and maximising their key contribution to the nation's sustainable development (the full terms of reference of CST are at Annex A to this letter).

CST was re-established in 1998 as an advisory Non-Departmental Public Body (NDPB). All such bodies are subject to review at least every five years: regular reviews are a key component of the Government's commitment to improving the quality and effectiveness of public services.

The broad issues to be covered in the review now being launched are:

- whether CST's function of providing independent strategic advice to Government on science and technology continues to be necessary; and, if so, whether CST in its present form as an NDPB is the best way for the Government to obtain such advice;
- if CST is to continue, whether the way in which it performs its functions could be improved.

Annex B provides a list of questions designed to help address these issues. You are invited to submit written views on any or all of these questions or on associated issues, focusing on any problems which you perceive and suggesting practical solutions to them – but also commenting on where you think the present arrangements are satisfactory and should be left alone.

The issues to be covered are obviously sequential. I have been asked to produce an interim report during October on whether or not CST should continue to exist. So if you have strong views on that, I need to know as soon as possible. I may

need to approach you again with supplementary questions after the interim report has been considered by Ministers. The final report of the review is due by early December, so if I am to take your input into account I need it by the middle of November. The review will be conducted as openly as possible, so your response will be published unless it is marked "In Confidence".

If you would like to discuss the issues with me as well as submitting written views, do let us know. But in any case please send your written response to me, to arrive **by 15 November at the latest**:

- either by e-mail to cst.consultation@dti.gsi.gov.uk
- or by post, addressed to me c/o Maurice Potts at the address on this letterhead, if possible with a copy on disc in WORD 97.

If you have any queries, please telephone the Secretariat on 0207 215 0395, or send a e-mail to Maurice.Potts@dti.gsi.gov.uk.

I look forward to hearing from you.

Yours sincerely

DR ELIZABETH HOPKINS

Quinquennial Review of the Council for Science and Technology

Quinquennial Review of the Council for Science and Technology

Questions for consultation

Does the Council for Science and Technology (CST) perform a necessary function? If so, is CST the best way of performing that function?

1. Does the Government need high-level independent advice on the strategic policies and framework for science and technology in the UK, in addition to what it can get from its own civil servants?
2. How effectively has CST performed its function of helping in sustaining and developing UK science and technology and maximising their contribution to the nation's sustainable wealth creation and quality of life? For example, has it contributed to improving:
 - the health of the UK science and engineering base?
 - the use of this base by the Government, business and others?
 - public understanding?
3. Is the role of CST clear, within the overall advisory framework?
4. Does CST's work overlap with that of other bodies?
5. Does CST have a role in relation to the devolved administrations and/or in relation to policy in regions?
6. Does CST provide a useful channel for communicating Government views and policy to the rest of the science and technology community?
7. If the Government needs advice, are there better ways to get it? For example, should advice be sought through consultations on an *ad hoc* basis, or from a body led by the private or voluntary sector? Are there lessons to be learnt from the arrangements in other countries?
8. Is there a continuing need for CST, or should it be abolished?

If CST is to continue, could it perform its functions better?

9. Do CST's terms of reference enable it to play its part effectively?
10. Does CST provide its advice in the most useful way?

11. What sort of members does CST need? Is there the right mix of skills and experience among the present members? Do the present appointment and induction procedures operate effectively?
12. Is it helpful that CST is normally chaired by a Minister and has the Government Chief Scientist as a member?
13. Would it be helpful for CST to have a higher public profile? If so, how could this best be achieved?
14. Should CST improve its links with other bodies?
15. How should CST's work programme be developed? Should CST be responsible for determining its own work programme? Should it respond to requests from the Government? Should external views be invited, and if so how ?
16. Does CST operate in an open and transparent way? Could its annual report be improved? Should it hold open meetings? Are the minutes of its meetings clear and useful?
17. Does CST make the best use of new technology? Is its website easy to find and useful?

And finally ...

18. Are there any other comments you would like to make?

Elizabeth Hopkins

19 August 2002

ANNEX D

List of those from whom views have been received

Personal interviews

* indicates current independent member of CST⁷⁰

** indicates official of Office of Science and Technology

Dr Javaid Aziz*

Mr Euan Baird*

Professor S Kumar Bhattacharyya*

Ms Judy Britton, Director, Science in Government**

Professor Sir Alec Broers*

Professor Vicki Bruce*

Professor David Cope, Director, Parliamentary Office of Science and Technology

Dr Clare Craig, Director and Mr Karl Cunion, Assistant Director, Foresight**

Ms Jo Durning, then Group Director, Transdepartmental Science and Technology**

Ms Lynne Edwards, Secretary, CST**

Mr Steve Elton, formerly Secretary, CST**

Professor Sir Chris Evans*

Professor Roderick Floud, President, Universities UK

Dame Julia Higgins*

Mr Oliver Jones, Policy Adviser, Prime Minister's Policy Directorate

Dr Alistair Keddie, then Acting Director General, Innovation Group, Department of Trade and Industry

Professor David King, Chief Scientific Adviser to the UK Government and Head of OST **

Dr Jim McQuaid, former Chief Scientist, Health and Safety Executive

Dr Rob Margetts*

Lord May, President, Royal Society; former Government Chief Scientific Adviser

Sir Robin Nicholson, former Government Chief Scientific Adviser

Sir Paul Nurse FRS*

Dame Bridget Ogilvie

Dr David Potter*

Mr Maurice Potts, Deputy Secretary, CST**

Professor Sir Gareth Roberts, President, Wolfson College, Oxford; President, Science Council

⁷⁰ See Annex B.

Ms Mary Robertson, Clerk, House of Lords Science and Technology Committee
Dr Keith Root, Royal Society
Ms Emma Rothschild, Director, Centre for History and Economics, University of
Cambridge
Lord Sainsbury of Turville, Minister for Science
Professor Peter Schuddeboom*
Sir Richard Sykes*
Dr John Taylor, Director General Research Councils**
Professor David VandeLinde*
Mr John Weston*
Sir Peter Williams, Master, St Catherine's College, Oxford; Chair, Engineering
and Technology Board; President, British Association for the
Advancement of Science
Mr Alan Wootton, Director and Mr David Golding, Assistant Director, LINK**
Sir Robin Young, Permanent Secretary, Department of Trade and Industry

Written responses to consultation

Academy of Medical Sciences
Association of the British Pharmaceutical Industry (ABPI)
British Association for the Advancement of Science (BA)
CBI
Engineering Employers Federation (EEF) and Engineering and Marine Training
Authority (EMTA)
Food Standards Agency
Professor Sir Graham Hills
House of Commons Science and Technology Committee
Institute of Physics
Royal Academy of Engineering
Royal Society
Royal Society of Edinburgh
Save British Science Society
Scottish Higher Education Funding Council (SHEFC)
Universities Scotland
Universities UK
University of Strathclyde

ANNEX E

CST reports and papers in the public domain

Note: Most of these documents are available on CST's website; the reports shown in bold italics are also published in hard copy.

Annual Report for 1998/1999

Annual Report for 2000-2001

Annual Report for 2001-2002

- **Science and technology across Government**

Review of S&T activity across Government, July 1999

Government initial response, September 1999

Government Implementation Plan in response, July 2000

Review of Departmental Science and Innovation strategies, March 2001

- **Supporting science teaching**

Educating young people in science, engineering and technology, background paper by secretariat, September 1998

School science: fit for the future, initial report by CST sub-group, November 1998

Report for the Council on a survey of science teachers carried out by King's College, London, January 2000

Science Teachers: a report on supporting and developing the profession of science teaching in primary and secondary schools, February 2000

Initial response from the Department for Education and Employment, November 2000

- **Business exploitation of science and technology**

Exploiting the UK's scientific, engineering and technological capacities to competitive advantage, background paper by secretariat, August 1998

Technology Matters: a report on the exploitation of science and technology in UK business, February 2000

Government response to report, March 2001

- **The arts, humanities, science and technology**

Imagination and Understanding: a report on the Arts and Humanities in relation to science and technology, July 2001

Response from the Department of Education and Skills, November 2001

- **Quinquennial Review of the Research Councils**

Response to first stage of review, November 2000

Response to second stage of review, June 2001

Report on visit to Stockholm to study the re-organisation of Sweden's research and innovation agencies, July 2001

- **Review of the supply of people with science, engineering, technology and mathematics skills (Roberts review)**

Response to consultation paper, September 2001

- **Science and the service industries**

Science base-services links, Background paper, July 2001

Invitation to tender for a study into the links between knowledge intensive business services and the science base, draft, June 2002

- **Energy**

Response to Government consultation paper, Developing Energy Policy: key issues for consultation for the White Paper.

ANNEX F

GLOSSARY

Terms defined elsewhere in the Glossary are shown in italics.

| | |
|-----------------|--|
| ACARD | (Former) Advisory Council for Applied Research and Development, established in 1976 |
| ACOST | (Former) Advisory Council on Science and Technology: replaced <i>ACARD</i> in 1987 |
| AHRB | Arts and Humanities Research Board |
| BBSRC | Biotechnology and Biological Sciences Research Council |
| BTI | British Trade International |
| CCLRC | Council for the Central Laboratory of the Research Councils (providing facilities and technical expertise in support of basic, strategic and applied research programmes for the <i>Research Councils</i> and other users) |
| Code committees | Committees (of which there are over 80) set up to advise the Government on particular issues related to science and technology, following a code of practices promulgated by the <i>CSA</i> |
| CSA | Chief Scientific Adviser to the UK Government (currently Professor David King) |
| CSAC | Chief Scientific Advisers Committee, bringing together departmental Chief Scientific Advisers under the chairmanship of the <i>CSA</i> |
| CSAIC | Chief Scientific Adviser's International Committee on Science and Technology, with members from <i>OST</i> , <i>BTI</i> , <i>FCO</i> , <i>DTI</i> , the Royal Society, the British Council, and the <i>Research Councils</i> |
| CST | Council for Science and Technology, first established in November 1993 (replacing <i>ACOST</i>), and re-established after a review in March 1998 |
| DELNI | Department for Employment and Learning, Northern Ireland |
| DfEE | [Former] Department for Education and Employment |
| DfES | Department for Education and Skills |
| DGRC | Director General Research Councils (currently Dr John Taylor) |
| DTI | Department of Trade and Industry |
| EPSRC | Engineering and Physical Sciences Research Council |
| ERA | European Research Area |
| ESRC | Economic and Social Research Council |
| FCO | Foreign and Commonwealth Office |

| | |
|------------------------------|---|
| Foresight programme | Programme managed by <i>OST</i> , bringing together key people, knowledge and ideas to look beyond normal commercial time horizons to identify potential opportunities from new science and technologies and actions to help realise those opportunities |
| Funding Councils | The channel for <i>QR funding</i> , consisting of <i>HEFCE</i> , <i>SHEFC</i> , <i>HEFCW</i> , <i>DELNI</i> |
| HEFCE | Higher Education Funding Council for England |
| HEFCW | Higher Education Funding Council for Wales |
| Minister for Science | The Parliamentary Under Secretary of State (Science and Innovation) in <i>DTI</i> with responsibility for <i>OST</i> , the British National Space Centre, the <i>Research Councils</i> and the national Weights and Measures Laboratory, and chemicals and biotechnology (currently Lord Sainsbury of Turville) |
| MRC | Medical Research Council |
| NDPB | Non-Departmental Public Body |
| NERC | Natural Environment Research Council |
| OMC | Operational Managers' Committee (supporting <i>CSAIC</i>) |
| OST | Office of Science and Technology, part of <i>DTI</i> |
| PCAST | President's Council of Advisors on Science and Technology (in the USA) |
| POST | Parliamentary Office of Science and Technology: office of the two Houses of Parliament charged with providing balanced and objective analysis of science and technology based issues of relevance to Parliament |
| PPARC | Particle Physics and Astronomy Research Council |
| QR funding | Quality Related funding to provide underpinning research capability for universities, provided through <i>Funding Councils</i> , based on excellence as measured by the Research Assessment Exercise |
| RCUK | Research Councils UK, bringing together the <i>Research Councils</i> and <i>AHRB</i> |
| RDA's | Regional Development Agencies |
| Research Councils | Bodies funded by <i>OST</i> to provide money for specific peer-reviewed purposes: <i>MRC</i> , <i>BBSRC</i> , <i>NERC</i> , <i>EPSRC</i> , <i>PPARC</i> , <i>ESRC</i> and <i>CCLRD</i> |
| Roberts Report | Report of review by Sir Gareth Roberts: "SET for success: the supply of people with science, technology, engineering and mathematics skills", April 2002 |
| S&T | Science and technology |
| SCI | The Ministerial Committee on Science Policy |
| Science and Engineering Base | The publicly funded research base |

| | |
|----------------|---|
| Science budget | The funding made available by Government for long term basic and strategic research |
| SEB | <i>Science and engineering base</i> |
| SEBCC | <i>Science and Engineering Base</i> Co-ordinating Committee, which considers transdepartmental issues; members are representatives of the four education departments in the UK, the <i>DGRC</i> , the Chief Executives of <i>Research Councils</i> , and the Chief Executives of the <i>Higher Education Funding Councils</i> |
| SET | Science, engineering and technology |
| SHEFC | Scottish Higher Education Funding Council |
| SSAC | Scottish Science Advisory Committee |
| TCS | (Formerly "Teaching Company Scheme") Scheme providing support to businesses for employing high quality graduates on two year projects |
| UCAS | Universities and Colleges Admissions Service |