

**A REVIEW OF THE LINKS BETWEEN
RESEARCH AND POLICY**

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Please contact the author before quoting from this report

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A REVIEW OF THE LINKS BETWEEN RESEARCH AND POLICY

‘Policy debates should be informed by research’. Although this statement would seem to be a truism, there is more to it than meets the eye; the relationship between research and policy-making is far from simple. This briefing explores the connections between research and policy, the work being done in the UK to improve the connections, and some on-going challenges. It is based on a wide-ranging review of policy initiatives, inquiries and reports in the UK and elsewhere, and interviews with around 60 UK policy decision-makers and researchers in various sectors.

This paper was written by Alister Scott¹ while he was a Visiting Fellow at the UK Parliamentary Office of Science and Technology during April 2002 – March 2003. The paper can be downloaded from the POST web site at www.parliament.uk/POST. A shorter four-page POSTnote for UK Parliamentarians linked to this report is also available.

Despite a growing recent emphasis on ‘evidence-based policy’, the mechanisms for using research to inform policy-making appear to vary widely across government. Senior officials publicly question the capabilities within government to be ‘intelligent customers’ for research. At the same time, incentives for researchers to become involved in policy advice appear at best to be mixed.

These problems exist at the same time as a growing general awareness of the need to build public confidence in policy processes; it is thought that the use of research-based knowledge can enhance the credibility of policy proposals. There is also a growing awareness of some of the tensions around the use of scientific information, ideas and advice in policy-making, and the various factors that affect such use.

Research-based evidence comes from a variety of sources; organisations involved in policy carry out their own research, they also commission research by consultants, academics and other groups, and much other research that is relevant to policy is also conducted independently by public sector research establishments, universities and other groups. The amount of research-based knowledge is growing all the time, not simply as a result of an accumulation over time but also because in many areas the amount of research being conducted is growing. Combine this with the globalisation of information-and-people exchange, and policy-makers are often faced with problems of information overload.

How can decision-makers make sense of this sea of information? Which research has the highest credibility? Is it possible and helpful to summarise the results of many studies, to arrive at a consensus view, or does this simply reinforce the status quo and undermine the search for policy ‘surprises’? How can horizon scanning be effectively organised? These are some of the many challenges that decision-makers face in using knowledge-based contributions.

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Report outline

An executive summary is to be found on pages 4-7.

Then the main body of this report starts by outlining the background to the development of evidence-based policy in the UK, including a range of policy initiatives that have emphasised its importance and have sought to develop it. A central plank of recent attempts to 'modernise' government has been to try to improve processes of analysis and evidence gathering. Driven by various crises in science-based policy, strategic initiatives now place much greater significance on the need to look ahead, and to integrate evidence into policy in a more consistent fashion.

The report continues with an analysis of the various different ways of seeing the links between research and policy. This relationship is more complex than may initially appear, and the briefing gives a short summary of the insights from research into these matters.

Next, the report moves on to a closer look at two of the crucial parts of the partnership between research and policy: first, the way in which government departments are organised to gather and use evidence; and second, the role of research outside government.

Readers should note that the UK National Audit Office has coincidentally and separately produced a similar review at the same time as this report, and reflects many of the same findings²

Health warning

This report is the author's work and does not represent a reflection of the opinions or official policy of the Parliamentary Office of Science and Technology, or SPRU at the University of Sussex.

² National Audit Office 2003: *Getting the evidence: Using research in policy making*, 42 pages and *An international review on Governments' research procurement strategies. A paper in support of Getting the evidence: Using research in policy making* 44 pages.

EXECUTIVE SUMMARY

This report reviews the complex topic of the links between research and policy. It is built on a wide-ranging review of policy initiatives, inquiries and reports in the UK and elsewhere, and interviews with around 60 UK policy decision-makers and researchers in various sectors.

Origins The report starts by reviewing more than a dozen recent initiatives on the theme of enhancing the provision and use of scientific advice. BSE was the event that triggered the development of a set of Guidelines and a Code of Practice for scientific advice, and these initiatives and related developments are summarised.

More to do There is widespread agreement – for example in the Treasury’s 2002 Cross-Cutting Review of Science and Research (CCR) and in reports by the UK top-level scientific advisory committee, the Council for Science and Technology – that while the Chief Scientific Advisor’s Guidelines and Code of Practice on scientific advice in policy-making are a step forward, there is a long way to go in seeing them implemented. However, there is still evidence of some hubris in some government statements on this topic, for example the statement in the CCR itself that implied that there is nothing to worry about with respect to social and economic research in government. There also remain concerns about secrecy; for example, ironically, the Transparency Review was only made available at the prompting of a House of Commons Select Committee.

How does research influence policy? A range of different ways of seeing the links between research and policy are outlined, including a rational-linear model, a power-based/political/muddling-through model and a network model. Commentators now see policy being influenced by a combination of precedent, information, ideas and interests. Open approaches to policy allow a greater role for information and ideas. Consultation processes similarly offer potential avenues of influence, although big questions remain about how the results of consultation are then taken forward by those making decisions.

What is ‘best advice’? Government says it is looking for the ‘best advice’, but this is precisely part of the problem – identifying what is the best advice. Connected to this, departments need to be brave to commission risky research on high-stakes problems, particularly when it comes to backing unfashionable theories and research perspectives. The strength of incumbent paradigms can even foreclose the investigation of alternatives, so that if current approaches fail, policy-makers can find that they face a dearth of other routes to follow. In this context, the commissioning of diverse research perspectives represents the creation of ‘options value’ for future. Such perspectives also warn against ‘one-size-fits-all’ approaches to policy.

Evidence-based policy The report outlines some initiatives on evidence-based policy, and some of its limitations. These are that evidence can be asymmetric – simply because evidence about certain effects of policies may be easier to collect than evidence on others – leading certain options to appear ‘better’ than others. The implication is that there is still a central place for judgement in designing policies and appraising what is likely to be their complete set of impacts. Some senior officials even suggest that what is needed is ‘anecdote-based policy’, which brings the power of case studies and ‘stories’ to bear; these can provide more joined-up assessments of the factors that have led to policy success and failure in the context of complex mixes of economic, social and environmental aims.

Intelligent customers: Government itself has identified the need to enhance the ability of departments to be ‘intelligent customers’ for research. This is partly about how generalist civil servants use and commission scientific advice, and ask the right questions, and is also partly about having more trained specialists within government. It could also be complemented by encouraging a larger number of secondments from, for example, universities, into government. Currently, the Treasury runs a scheme for 10 such placements each year; it would seem that this number could usefully be greatly increased, with benefits to all parties concerned. Secondments the other way – of officials taking a sabbatical in a university, for example – might also help develop expertise and networks.

Do heads count? The 1971 Rothschild Report led to the privatisation of many government research establishments, which in turn led not only to a substantial fall in the number of specialists employed directly by government – something favoured by the Treasury, with its emphasis on minimising the ‘head count’ in the civil service – but also to a shrinkage in the potential recruitment pool for central government departments. There is a feeling that the emphasis on head count is now counter-productive in relation to departmental research, analytical and research-commissioning skills.

Contracting out knowledge There is little analysis of whether the emphasis on ‘head count’ has actually led to cost savings, given that much analysis for government is now undertaken by private consultants at high cost. Officials also report wider costs, such as the de-skilling of research staff who now mainly manage contracts, and also the fact that while the codified knowledge gained through such contracts is reported in traditional form and is therefore theoretically available to officials, the tacit knowledge that is often a crucial part of the outcome of the activity is gained by the consultants rather than civil servants.

Departmental research budgets As a relatively small proportion of departmental budgets, and because its contributions to policy are often invisible, uncertain or long term, research can be vulnerable in budgetary planning exercises. For all the rhetoric about increasing reliance on research-based information in designing and implementing government policy, departmental research budgets have consistently fallen in recent years.

Organising research in government Departments need to be able to combine a central overview of their research, while at the same time linking the research directly to areas of policy development or service delivery, so that it can make its optimal contribution in a timely way. There is much variety across government in how research is organised. Most Departments now have a chief scientific advisor who, as a senior official, is in a position to argue the case for research and scientific advice, although various inquiries have found this arrangement to be far from stable and well-organised across government. The introduction of departmental science and innovation strategies may be a mechanism for addressing some of the concerns outlined in the above two paragraphs.

Integrating research into policy-making There is relatively little analysis of *how* research and the work of specialists can be integrated more closely into the development and delivery of policy. The ‘Bill Team’ could be a useful model for bringing together different specialists and generalists, driven by the need to deliver a complex result around a short-term ‘problem’. Such a model is rarely applied to other tasks, but could be used to enhance ‘organisational memory’ and the mutual understanding of the role of different officials.

Identifying sources

Officials can find it difficult to identify suitable sources of advice, and few have the time or inclination to read academic journals or books. Research infrastructure such as e-mail groups can help, but officials commonly rely on personal contacts or web searches to find sources of advice. The Learned Societies have a role to play here, although a) inquiries have found them to be an under-valued and under-used source of advice and b) many have traditionally had few resources to devote – or have chosen to devote few resources – to advisory functions, particularly in comparison to a body like the US National Academy of Sciences, which has had this as one of its functions from the outset.

Objectivity or diversity?

Certain individuals can come to dominate advisory positions, becoming the ‘default expert’ on an issue, and this can have the effect of artificially narrowing the range of policy options examined. Many officials recognise that although research is ideally about the impartial assessment of evidence, researchers themselves cannot be completely objective, particularly where there are competing explanations of events. In this context, it is vital to consult a range of opinion. Officials also acknowledge that campaign groups, despite their partial commitments, can be a useful source of information where more conservative organisations are less willing to lead debates.

Challenges in using advisory committees

Advisory committees are widely used across government, and their roles have been clarified by the Guidelines and the Code. However, various problems remain. First, remuneration varies across committees, from no pay to the equivalent of low-level consulting fees. Such fees in themselves are a poor incentive to attract the best advice, and can ironically themselves encourage the ‘low-price culture’ within universities of which the CCR was so critical. Second, researchers face difficult decisions about serving on such committees as pressures on them grow with more students, pressure to do high-quality research, and growing expectations with respect to ‘third-stream’ funding.

Conflicts of interest

Partly as a result of the encouragement to university researchers to work more closely with industry, departments are finding it increasingly difficult to recruit members to advisory committees who do not have such affiliations; the latter are seen by some to reduce or eliminate the ability of researchers to provide objective or balanced advice.

Eminence, or evidence?

To what extent are advisors chosen on the basis of their direct knowledge of a topic, or on the basis of their scientific eminence? Officials acknowledge that the more strategic an issue, the more likely it is that advisors are chosen on the basis of their eminence rather than their research-based knowledge of an area. The question then becomes whether this amounts to advice, or as one commentator has put it ‘good old boys sitting around talking turkey’. Does the winning of a Nobel prize immediately confer on that researcher wisdom about, for example, science policy? Eminence clearly has its role to play, but it would seem advisable to ensure that eminence is complemented with advice based on evidence, which will often come from younger researchers active in the field.

Aims of science policy

While many science policy initiatives emphasise the relevance of science to wealth creation, few have paid attention to the question of how research can contribute to public policy, and what incentives can be given to researchers to encourage them to develop their activities in this way. Certainly, research organisations can probably do much more to ensure that commercial benefits flow from research investments, but should wealth creation become their dominant aim? Such an emphasis may be harming

the potential of research to bring benefits to quality of life and the effectiveness of public policy, the two other aims outlined in the 1993 White Paper *Realising Our Potential*.

Incentives and rewards Although many researchers clearly regard involvement in policy as rewarding, and some regard it as a public duty in return for public funding for their work, it is by no means clear that the current patchwork of incentives and rewards is sufficient to ensure an optimum outcome for those developing policy. This report identifies many barriers that researchers currently face either in conducting policy-relevant or inter-disciplinary, problem-focused research, or in finding the resources (mostly time) to get involved in policy processes.

Dual funding system The quinquennial review of the Research Councils found that the dual support research funding system ‘is widely considered to be out of balance’, finding problems with: research assessment and how it affects the balance of incentives between research, teaching and knowledge transfer; the exploitation of research; incentives for multi-disciplinarity, and; research trajectories – the contrast between tenured university employment and the growth in short-term, project-based funding.

Research Councils There are clearly, on occasions, tensions between the desire of Research Councils to maintain an ‘arms length’ relationship with Government in order to ensure the independence of the research they fund, and on the other hand the wish to ensure relevance by becoming involved in public debate. This tension becomes acute when research calls current policy into question. This is especially the case with the Economic and Social Research Council (ESRC), which by its nature tends to fund research that is more closely involved in scrutinising policy. The pressure applied to the ESRC’s forebear in the 1980s provides a reminder of the difficulties in ensuring that researchers and their funding bodies be allowed an ‘independent space’ in which to conduct their work.

Funding Councils The Funding Councils such as the Higher Education Funding Council for England provide the other main stream of funding for universities under the dual support system. Although HEFCE states that one of its strategic aims is to encourage effective interaction between academics and those in industry and other sectors, there is a widespread feeling that the incentive signals it sends are overwhelmingly biased in favour of encouraging academic outputs rather than improved economic or social outcomes. Its Research Assessment Exercise (RAE) is currently under review.

Outputs or outcomes? The Minister for Science and Innovation has publicly stated that not only does he understand the power of the signals sent by the RAE, but also that the ‘culture of the knowledge base’ needs to change to reward academic ‘reach-out’ activities. Again the emphasis is on wealth creation, and the level of funding is modest, but the emphasis seems to be shifting towards encouraging researchers to consider not just the *outputs* of their research but also the *outcomes*.

Fundamental challenges However, tools such as the RAE are underpinned by the peer review system, which itself has been found to be problematic by tending to discourage problem-centred, inter-disciplinary research. Policy-makers are also finding it hard to arrive at a method for allocating ‘third stream’ funding to universities. In summary, and as concluded by the 2002 *Cross-Cutting Review*, there seems to be a long way to go before contributions to public policy are seen to be of central importance in the academic sector.

UK background to evidence-based policy

The BSE crisis and the ensuing Phillips report³ form the background to the current emphasis on evidence-based policy in the UK. The report drew a large number of lessons about how Government could improve the way in which it uses scientific advisory committees, and expert advice more generally. Prior to the Government's response in 2000 to the Phillips inquiry itself, in 1997 the Chief Scientific Advisor had already initiated a set of Guidelines that were updated in 2000 and complemented with a Code of Practice for Scientific Advisory Committees in 2001⁴. The Guidelines set out the strategic framework while the Code makes recommendations for the day-to-day operation of advisory committees.

Together, these are now regarded by Government as the framework for addressing many of the concerns raised by the BSE inquiry (and other worries over science-based decision-making), but the research behind this report indicates that they are clearly still in the early stages of being implemented. Those promoting the Code centrally have little power to ensure its uptake, but following the BSE crisis, Departments have received legal advice that the Code of Practice will be used as the 'gold standard' in inquiries into any such events in future. These are central to the whole official UK approach to these issues now, so some of the main issues relating to the Code and the Guidelines are outlined briefly next; other UK policy developments are then discussed.

The Code and the Guidelines: on-going challenges

The Guidelines 2000 said that departments should:

- think ahead and identify early the issues on which they need scientific advice;
- get a wide range of advice from the best sources, particularly where there is scientific uncertainty; and
- publish the scientific advice and all relevant papers.

The first of the aims outlined above is intended to result in more attention being paid to strategic, medium-term issues that may not ordinarily get attention due to the other more immediate pressures on officials and Ministers. The third is designed to encourage review of the work of committees, by the scientific community but also by others who may have reasons to challenge how the underlying *science* has been turned into *advice*.

While most people would now accept the wisdom of the third suggestion, there is an element of 'begging the question'⁵ about the first two. This is because, with respect to the first; many of the problems with science-based advice in the recent past have been caused by 'surprises' that are inherently difficult to 'identify early'. As a result, 'horizon scanning' and 'other Foresight-type arrangements' are suggested as possible means of achieving the necessary longer-term view, although precisely what these entail is not clear; some departments have experimented with horizon scanning and other related techniques; these are outlined in Appendix A.

In the second, most would accept that, in principle, policy-makers should use the 'best sources' of advice, but this is again begging the question because part of the problem with

³ See www.bseinquiry.gov.uk for full information about the inquiry and a full copy of the report and evidence.

⁴ All of these documents can be seen at www.ost.gov.uk

⁵ 'Begging the question' is one of those much-misused-and-misunderstood English expressions; the dictionary definition is something like 'assuming in the answer precisely those ideas that need to be questioned'.

new and complex problems such as BSE is that it is not always clear what constitutes the ‘best advice’ where there are competing scientific explanations for phenomena. The emphasis on ‘a wide range of advice’ is therefore welcome, as it holds out the possibility of picking up unfashionable views that may turn out to be useful. However, scientific paradigms can exert strong control not only on ideas but also on purse strings, so policy-makers need to be prepared to back some risky ideas with research money in order to keep their options open.

The Guidelines and the Code are due to be reviewed in Spring 2003. As already noted, uptake of the Guidelines and the Code varies across government. The 2002 Cross-Cutting Review of Science and Research⁶ stated that in relation to the implementation of the Guidelines, ‘all agree that there is more that could be done, and that action is needed to create a dynamic for improvement in effectiveness’.

One particular challenge relates to the Code’s advice that Advisory Committees need to re-consider their terms of reference and the range of expertise on the Committee, and should consider recruiting members with a more diverse set of perspectives, so that they might ask difficult questions and bring lay perspectives to bear on what can often be treated as specialised ‘expert-only’ problems. This suggestion reflects the growing realisation that many of the public-trust problems with science advice in policy relate to the tendency for advice to focus on a narrow range of issues, ignoring wider factors. This is connected to the observation that, as the 2001 quinquennial review of the Research Councils put it: ‘The public are often more interested in the issues raised by science than by the knowledge or know-how itself’.

Other UK policy developments

Apart from the Code and the Guidelines, various other government initiatives have stressed that policy development should be informed by the best available evidence. A brief review of these initiatives follows.

A central plank of the **Modernising Government White Paper**⁷ in 1999 was that:

‘Government should regard policy-making as a continuous, learning process, not as a series of one-off initiatives. We will improve our use of evidence and research so that we understand better the problems we are trying to address’.

According to some observers, the 1999 White Paper’s ‘enthusiasm ... for evidence-based policy contrasts with the near silence of its 1994 and 1995 predecessors on the Civil Service’⁸.

In order to help identify and spread best practice in this regard, the white paper announced the establishment of the Centre for Management and Policy Studies (CMPS) in the Cabinet Office. This is the home of much of the Government’s work on evidence-based policy. The White Paper also called for policy-making to be more ‘joined-up’ and strategic, and for the users of public services to be the focus rather than the providers. These principles came to be used by, for example, those conducting the quinquennial review of the Research Councils.

⁶ *Cross-Cutting Review of Science and Research: Final Report*, March 2002, on www.hm-treasury.gov.uk

⁷ *Modernising Government White Paper*, 1999, Cm 4326, March.

⁸ W. Solesbury 2001 *Evidence Based Policy: Whence it Came and Where it’s Going*. ESRC UK Centre for Evidence Based Policy and Practice, citing Cabinet Office and HM Treasury, 1994, *The civil service: continuity and change*, and 1995, *The civil service: taking forward continuity and change*.

The Cabinet Office has published two relevant reports: the first in 1999 on **Professional Policy-Making for the 21st Century**⁹, and the second, which formed its response to the Modernising Government White Paper, was a CMPS report on **Better Policy-Making**¹⁰, published in November 2001. This report, based on the largest-ever survey of policy-making across government, found widely varying approaches to, and uptake of, evidence-based policy-making (EBP) across central government. It found evidence that policy-makers were sometimes ‘paying lip service’ to EBP rather than taking the rigorous approach set out in the White Paper. It provided a range of examples of good practice, and reported on the means for delivering EBP, including the Treasury’s ‘**Public Service Agreements**’ with Departments, which are the mechanism through which it sets out ‘targets to drive good performance by clarifying the final outcomes on which services should focus’. These are linked to the Public Spending Review process, of which a ‘first priority is to ensure high quality, efficient and responsive public services, and a prerequisite for this is to obtain good evidence on what works’.

The Cabinet Office/Treasury ‘**Adding it up**’ initiative¹¹, launched with the ‘Adding it up’ report in January 2000, was aimed at:

‘creating the conditions in which rigorous analysis is routinely delivered and demanded for policy-making. The Prime Minister was concerned that although a great deal of good analytical work is carried out in central Government, there is considerable scope for improvement. He asked for a fundamental change of culture to place good analysis at the heart of policy-making’.

This conclusion differed significantly from the position taken in the 2002 Cross-Cutting Review of Science and Research, which focused its discussion of scientific expertise in government departments on the physical and life sciences, finding that ‘Comparable arrangements already exist for social and economic research’.

The **Better Policy-Making** report outlined a significant number of obstacles to the thorough use of evidence in policy. It suggested that there were not enough analysts in government, particularly those with up-to-date knowledge in specific areas of expertise and with experience in doing systematic evidence reviews and evidence-based policy more generally. The report identified a need to train policy-makers and Ministers to ask the right questions – to be ‘intelligent customers’ of research and evidence. The initiative is therefore about developing both the demand for appropriate knowledge and the supply of those that can help marshal such knowledge. The recruitment of analysts rarely succeeds in attracting enough good candidates. Analysts need: better career prospects (partly through having a larger number of high-grade analytical posts); the possibility of converting to more generalist positions; closer involvement in the development and analysis of policy options; and to be better integrated across departments and specialisms.

Two ministerial groups are involved in overseeing science-based policy¹². The **Ministerial Science Group** is an informal Ministerial committee established in 1999 to promote a ‘co-ordinated and coherent approach to S&T policy-making across Government’. It has particular responsibility for overseeing the Foresight programme and the implementation of the OST guidelines on the use of scientific advice in policy-making. In addition, a Cabinet **Ministerial Committee on Science Policy** was established in June 2001, chaired by the Secretary of State for Trade and Industry. Its role is to provide ‘a framework for the collective

⁹ *Professional Policy-Making for the 21st Century*, Cabinet Office 1999, see www.cabinet-office.gov.uk

¹⁰ *Better Policy-Making*, November 2001, Cabinet Office CMPS, see www.cmcs.gov.uk

¹¹ See www.addingitup.gov.uk

¹² See www.ost.gov.uk/policy/bodies

consideration of, and decisions on, major science policy issues' including 'policies in relation to scientific advances and public acceptance of them'.

The **Council for Science and Technology (CST)**¹³ was revived in 1997 as 'the Prime Minister's top level advisory body on medium to longer term strategic issues concerning the Government's policies and framework for ensuring that science and technology meet the needs of the UK'. Although recently criticised for having a low profile, some of its investigations have shed useful light on science in government. For example, in 1999, its **Review of S&T Activity across Government**¹⁴ considered how Departments use and organise S&T spending, how they set priorities, and the level of scientific management and literacy in Departments. The Departments studied were concerned mainly with the natural sciences and engineering, although the CST stated that 'We would expect many of our findings and recommendations to be equally applicable to departments which make more use of the social sciences...'

The report concluded:

'We were not convinced that any department was really staffed, organised, or sufficiently aware to make the best possible use of science and technology... We are concerned that the resulting weaknesses in their ability to understand, and to respond to, rapid change in the external world create an increasing risk that wrong decisions will be taken, with potential for substantial damage and costs to Government and society... We were struck by the part played by history in the levels and distribution of Departments' S&T expenditure... budgets may need to change substantially to reflect future needs.'

The CST also found the need to draw attention to 'the central role that S&T does or should play in policy formulation, decision-making and executive actions in departments', and found a need for a 'more forward-looking, strategic approach' combined with 'better connections, within Whitehall and with Research Councils'. A Government response that acknowledged the usefulness of the CST report was published later in 1999 and an implementation plan in 2000¹⁵.

¹³ See www.cst.gov.uk

¹⁴ Available at the above web site.

¹⁵ See www.ost.gov.uk

The Policy Process

There are a number of different ways of seeing the links between research and policy. Figure 1 gives an introduction to some of the dynamics involved. It uses three principle characterisations of the policy process itself: as a rational and linear process; as a power-based struggle involving different groups with their various interests; or as a series of negotiations developed through and with networks of diverse players. These are naturally rather crude representations of reality, in which all three can exist side by side. For our purposes, they serve to flush out some of the varying ways in which research-based knowledge is used in policy processes¹⁶.

Figure 1: A crude characterisation of the policy process and its use of research

	Characterisation of the policy process	Characterisation of research	Contributions from research to policy	Problems/ challenges at the research-policy interface
Rational/ Linear policy model	Define problem – commission research – identify solutions – implement – review.	‘Ivory tower’, separation of research and policy, ‘two cultures’. Knowledge as cumulative.	Instrumental – the provision of information in response to policy agendas.	Communication and language. Lack of mutual awareness. Insufficient research resources, or ‘absorptive capacity’.
Power-based/ political/ muddling through model	Use of power to control policy. Conflict-based. Policy change is mostly incremental, occasionally dramatic.	‘Knowledge is power’. But research embodies normative perspectives and can frequently be ‘irrelevant’. Research as a thorn in the side, or to be controlled.	Opportunistic: ideas and information to be used by combatants to support their aims. Research can be used as a delay tactic to put off difficult decisions.	Time limits in policy for analysis. Research contributions rarely fit policy timescales. Researchers are naïve about policy processes. Normative commitments prevent engagement.
Policy networks model	Diffuse – many actors including research. Cooperation within networks. Common aims through negotiation. Policy changes through ‘cultural’ change.	Research contributes to policy paradigms, and therefore inertia. Other research challenges these paradigms. Research contributes but also needs resources. Knowledge as non-cumulative, especially social knowledge.	Most significant research contributions are conceptual: research provides ideas, language and ‘discourse’. Also ‘network infrastructure’ e.g. newsletters, meetings. Most influential over long timescales.	Interaction is vital to bring about fruitful exchanges between research and policy, but time-consuming. Interaction can enhance the legitimacy of research, but can also undermine ‘impartiality’.

¹⁶ For more detailed discussions of the relations between research and policy, see either the author’s report published in 2000 by the European Environment Agency ‘Disseminating the results of environmental research’, which can be downloaded from http://reports.eea.eu.int/Environmental_issues_No_15/en or another report for the 2001 Swedish Bridging the Gap conference at <http://www.bridging.naturvardsverket.se/>. Alternatively both are available by contacting the author.

The table does not pretend to be comprehensive; the aim is to illustrate the large number of factors involved in the relationship between policy and research. Research can be an instrumental tool for answering questions that derive from policy requirements, or it can be used to buttress the positions of various interest groups involved in policy development. Equally, research can be a source of new ideas or new ways of framing problems. The common assumption that knowledge is cumulative does not always apply, particularly when one paradigm takes over from another, and especially when it relates to social and economic processes, which can shift dramatically even over short time periods, in ways that are less common with natural or engineered systems.

Few experienced commentators now see the linear model as being a reliable reflection of policy development in the real world¹⁷. Nevertheless, it continues to command strong appeal, partly due to its simplicity and clarity. Most commentators see policy developments being influenced by a combination of precedent, information, ideas and interests. Increasingly open approaches to policy – where policy is formulated by a diffuse range of players from various sectors – allow a greater role for information and ideas than previously.

Similarly, consultation has grown in importance in recent years, encouraged by the Modernising Government White Paper, the controversial nature of issues such as BSE and GM food, and the establishment of the Consultation Unit within the Cabinet Office. Consultation is a way not just of discovering the different positions and interests of the various groups that will be affected by a policy, but also of uncovering new ideas and information. Yet significant challenges remain in ensuring strong connections between consultation processes and policy development: how do the results of consultation get incorporated into policy debates? Officials tend to be sceptical of the idea of ‘open government’, and this can be reflected in the use to which the outcomes of consultation are put. Furthermore, does the use of consultation simply provide another way for strong voices or the status quo to prevail?

Policies, like scientific ideas, develop into paradigms – a whole way of seeing an issue. As Thomas Kuhn’s work on scientific paradigms showed in the 1970s¹⁸, a paradigm may be wrong but the strength of the incumbent network of people, institutions and ideas that underpin it may mean that it takes years for a better alternative to emerge. This can create significant problems, as part of the power of the incumbent paradigm is expressed through control of research budgets, not necessarily through direct bureaucratic control, but through peer review processes that decide what is ‘good’ research.

In such circumstances, it can be extremely difficult to keep options open for future by funding research that might challenge the effectiveness of the dominant paradigm. This can mean that if a policy proves to be ineffective, very little information may be available on possible alternatives. This then raises the importance of policy experiments and demonstration/trial projects, and warns against a ‘one-size-fits-all’ approach to policy.

Evidence-based policy

The term ‘Evidence-based policy’ (EBP) has been adopted with particular vigour in the medical profession, in an attempt to ensure that treatments are diagnosed on the basis of

¹⁷ See the PIU’s paper on *Better Policy Delivery and Design*, February 2002.

¹⁸ T.S.Kuhn, 1970, *The Structure of Scientific Revolutions*, University of Chicago Press.

evidence of their effectiveness. One of the first attempts to set up an infrastructure to support EBP was the so-called '**Cochrane collaboration**'. Now international in scope, it was first established in the UK in 1992 (with modest support from the Department of Health), a series of centres aim to inform decisions about health care by preparing and disseminating *systematic reviews* of the effects of medical interventions, based on a professional fee-based service for both those involved in central policy decisions and practising physicians. Such centres have now been established in 11 countries worldwide. Each systematic review takes into account evidence published anywhere in the world, costs around £50,000 - £100,000, and takes up to six months.

A new equivalent in the public policy domain is the **Campbell collaboration**¹⁹. Set up in 2000, this initiative is initially covering the fields of education, crime and justice, and social welfare.

A similar initiative is known as **EvidenceNetwork**, the Centre for Evidence-Based Policy, being supported by the Economic and Social Research Council. This is coordinated from Queen Mary, University of London²⁰. Its aim is to keep the field of EBP under review²¹, and, through its partner organisations, to conduct reviews in six areas.

What evidence? What limits?

As a review²² of EBP for EvidenceNetwork found, there are four key requirements for improving evidence use in policy and practice:

- agreement as to what counts as evidence in what circumstances
- a strategic approach to the creation and accumulation of evidence in priority areas
- effective dissemination of evidence, and more generally making the evidence available
- initiatives to ensure that evidence is integrated in policy and practice.

In EBP, there is a tendency to privilege certain types of evidence above others. For example, in evidence-based medicine, there is a clear hierarchy, with reviews of randomised control trials (RCTs) being at the top, then specific RCTs, then case controls, then cohort studies, surveys and finally expert panels.

In most areas of policy, the systematic review is a key tool in EBP. Systematic reviews attempt to find and analyse all of the relevant information available on a particular topic, and can often be conducted very rapidly (two months) by internal experts or consultants, and this will often pick up the most important evidence in an area. Nevertheless, there is frequently a temptation to commission a slower, more thorough review that can take up to 18 months, and such a timescale rarely fits with policy imperatives.

Some officials and consultants report a need for guidance on best practice in commissioning such work. The key points are the need for a clear and unambiguous statement of the outcome that is desired rather than a detailed specification of process; bidders will then be able to suggest competing approaches, some of which may not have been anticipated and may bring benefits.

¹⁹ For the Campbell Collaboration, see <http://campbell.gse.upenn.edu>

²⁰ See www.evidencenetwork.org for the ESRC Queen Mary-based Centre for Evidence-Based Policy.

²¹ See for example W.Solesbury 2001 *Evidence Based Policy: Whence it Came and Where it's Going*, ESRC UK Centre for Evidence Based Policy and Practice.

²² *Evidence Based Policy and Practice: Cross Sector Lessons from the UK*, 2002, Nutley, Davies and Walter.

Limits to EBP

Although EBP has much to offer, and investments in it probably yield substantial returns, it has various limitations. Many of its practitioners will acknowledge that EBP tends to shed light only or mainly on those aspects of policy and programmes that are measurable. But complex social phenomena often do not lend themselves to measurement, which means that evidence can be asymmetric. For example, it may be straightforward to demonstrate the benefits of an out-of-town shopping centre – such as jobs, infrastructure enhancement etc – but much less easy to assess its negative impacts, as many of these will be diffuse, with long causal chains, and hard to measure (e.g. impact on town-centre shops, lack of access for those without cars). And even when the focus of interest does lend itself to measurement, the evidence collected can be highly complicated and inconclusive.

Some commentators therefore hold that although EBP is apparently a neutral and anti-ideological process, it leads to privileging economic factors above other social and environmental factors simply because they are more easy to measure. The implications of the above analysis also include the observation that there is still a central place for judgement in designing and assessing the effectiveness of policies.

Practitioners of EBP acknowledge that these limitations mean that EBP can help to highlight ways in which policies have failed (for example, in other countries), but often provides only limited assistance in designing new policies. While EBP can be a powerful tool for providing information, it does not remove the need for judgement. Policy-makers should not expect too much of it, and should not use the excuse of the need for evidence to delay action. Some practitioners even suggest that when trying to design policies in the context of a complex mix of social, economic and environmental factors, what is needed is ‘anecdote-based policy’, which brings the power of case studies and ‘stories’ to bear; these can provide more joined-up assessments of the factors that have led to policy success and failure in such situations. This approach is valued and used in some departments, for example the use of ‘participant observation’ by evaluators involved in urban renewal.

The CMPS and Cabinet Office Policy Evaluation Division are identifying best practice and training needs in EBP, and acknowledge the need for methods that are suited to the questions in hand. It points out that in North America, there has been more emphasis on experimenting with policy approaches through demonstration projects and trials than in the UK; policy ‘experiments’ are used for evaluation before policies are adopted more widely. These units have been commissioned by departments to evaluate potential new policies, by collecting evidence through systematic reviews and providing capacity and a ‘neutral’ learning space that has more distance from immediate policy commitments than may be possible within departments.

Intelligent customers: government capacity for using evidence

Research inside government has changed greatly in the past twenty years. Much research capacity has been privatised, and the relationships between officials and researchers have undergone significant changes. This section outlines some of the main factors in determining the effectiveness of the use of evidence within government. The next section analysis the ways in which research conducted outside government can contribute to policy.

This section starts by looking at ‘people issues’, pointing to a tendency for departments to face shortages in skilled research staff, which in turn can seriously affect their ability to marshal evidence effectively for policy purposes. Next, this section analyses how the people involved in the generation and use of evidence within government departments are organised and used. It then goes on to examine the use of advisory committees, the balance between short and long-term research, and the role of the OST in overseeing science-policy interactions across government.

People issues

The Rothschild Report²³ led to the establishment of a presumption that, where possible, government research should be organised on the basis of a ‘customer-contractor’ relationship. This led to the privatisation of many government research establishments, which in turn led not only to a substantial fall in the number of specialists employed directly by government – something favoured by the Treasury, with its emphasis on minimising the ‘head count’ in the civil service – but also to a shrinkage in the potential recruitment pool for central government departments. There is a feeling that the emphasis on head count is now counter-productive in relation to departmental research skills.

This issue has not been examined in detail by other inquiries, although the QQR of the Research Councils did state that ‘The effectiveness of the customer-contractor relationship between Government Departments and Research Councils should be examined, if possible as part of the cross-cutting review of science and research’, and the Cross-Cutting Review of Science and Research in turn found that ‘Most departments no longer run their own dedicated research organisations, and rely on outsiders for this function. Consequently they have lost an important source of supply of experienced scientific talent. And little effort is now made to take a systematic view on the areas of policy that need scientific input, or the critical mass of scientists needed at the science/policy interface’. These are significant structural challenges that do not seem to be being addressed, and would take time to address if they were.

There is little available analysis of whether this emphasis on ‘head count’ has actually led to cost savings, given that much analysis is now undertaken by private consultants. Officials also report wider costs, such as the de-skilling of research staff who have essentially become contract managers, and also the fact that while the codified knowledge gained through such contracts is reported in traditional form and is therefore theoretically available to officials, the tacit knowledge that is often a crucial part of the outcome of the activity is gained by the consultants rather than civil servants. Time pressures might also mean that these officials have little time to digest the reports, let alone ‘get inside’ the issue to the extent possible had they done the research themselves or had they been more closely involved.

²³ The Organisation and Management of Government Research and Development (the 'Rothschild Report'). 1971.

Figures supplied to the Science and Technology Select Committee's inquiry '*Are we Realising Our Potential?*'²⁴ by the Institution for Professionals, Managers and Specialists showed that personnel engaged in R&D in UK Government civil departments continued to decrease in recent years, by 24% from 8232 to 6237 between 1988 and 1998. The committee's report highlighted the supply of skilled personnel as a growing problem.

With respect to policy analysis, there is a widespread perception of a steep decline in the number of analysts and the use of academic research in the 1980s. Although precise evidence is hard to obtain, the abolition of the Central Policy Review Staff in the late 1980s is seen as emblematic of the attitude to the value of professional analysis at that time. However, the '*Adding it Up*' report found there to be around 1800 social researchers, economists, statisticians and operational researchers in government departments in 1999, a substantial increase in recent years.

For research and other evidence to be used constructively in policy, those involved in policy need to have the capacity to be 'intelligent customers'. Research-based evidence can be complex, communicated in its own unique terminology, and it can take years to acquire; it can therefore be intimidating for generalist policy-makers. Many of the already-mentioned enquiries into these issues in recent years have raised this issue, including the need:

- to ensure a sufficient level of highly-qualified specialist staff within government;
- to train generalist policy-makers and Ministers to ask the right questions of research;
- to use in-house specialist capabilities to inform policy processes more;
- to use other mechanisms such as secondments to access specialist advice and capabilities, and;
- for government departments to consider collectively their needs for people with scientific and technical backgrounds and to ensure that career prospects attract the brightest.

'Intelligent customers' believe that research has a lot to offer them, so they are demanding of the research process and the researchers involved. By contrast, if research is unconnected to policy debates, policy-makers will be indifferent to it. In-house specialists are able not only to do and commission research themselves, but can also maintain a 'watching brief' on independent research conducted in universities and elsewhere. They can perform a 'knowledge entrepreneurship' role, making sure their department knows what it needs to know.

Secondments have long been used in departments such as the DTI, and also in problem-focused teams such as those at the PIU, where the need to bring in specialist knowledge of particular market sectors or issues is well recognised. Similarly, secondments from firms and consulting organisations have been widespread in other departments as part of the drive to bring in private sector management expertise into government. However, the use of independent specialist expertise from the university sector seems to be less frequent. For example, the *Adding It Up* initiative currently organises ten academic placements in Whitehall each year, a relatively small number given the huge range of potential areas in which expertise from outside government could be brought to bear.

²⁴ House of Commons Science and Technology Select Committee 2001, *Are we Realising Our Potential?*.

The CST recommended more use of such secondments, and scandals such as Enron/Andersons may provide incentives for government to increase the number of academic secondments relative to those from consulting firms. While academics are never completely objective in their perspectives, they usually come with fewer immediate commercial commitments, and they are often cheaper, even when they charge full-cost rates. Such academics' experience within government then has the wider benefit of informing their research, teaching and administrative functions – all with public benefits.

A little-discussed potential for the use of secondments is the desirability of seconding government officials to academia, consulting firms or civic groups as a way of broadening networks and facilitating knowledge exchange. University 'sabbaticals' for officials might be one way to enhance life-long learning and to give individuals a chance to examine a topic in depth.

Organising research in Departments

The organisation of research within departments varies widely across government. Many of the initiatives described earlier in this document were based on the premise that the mechanisms for organising and using research could be widely improved. Indeed, the *Cross-Cutting Review of Science and Research* noted that 'Departments need to take a more strategic approach to setting R&D budgets'. It also noted the precarious position that research can be in in departmental budgetary planning exercises:

'Research spending can be even more vulnerable to urgent spending pressures than capital investment in buildings and equipment, because its outputs are less tangible and more uncertain, although [they are] often of major long-term importance'.

The organisation of research within government departments needs to allow for flexible and strategic central planning while at the same time ensuring that research is sufficiently close to policy processes to be of relevance. Inquiries by the CST and the Science and Technology Select Committee²⁵ recognised the value to Departments of combining a central overview of their use of S&T with decision-making about specific S&T issues and research priorities that is distributed among 'those responsible for the policies and services that the service supports. Research programmes are therefore linked directly to an individual policy area'. Such a system was used by the then DETR.

By contrast, other Departments such as the MoD and the DoH:

'have a centralised system in which the decisions on the priorities, content and balance of the research programme is taken centrally... This approach has the advantage of pooling research management expertise and providing the flexibility to re-allocate resources to meet changing priorities, though it can be perceived as having a weaker link to departmental objectives, with a central research budget seen as a soft target for cuts'.

There is a feeling that departmental research budgets sometimes do not relate closely to policy development, with researchers being unclear as to how their research has been used, and policy-makers unclear about the value of the research function. This is especially likely to be the case where there is a single central analytical services directorate.

The CST concluded that it thought it possible to combine both approaches – a central overview and distributed, policy-guided research. However, they found that responsibility for departmental science strategies and the management of departmental specialist staff were

²⁵ Government expenditure on R&D: The Forward Look'. House of Commons Science and Technology Fifth report, 2000.

rarely combined; Chief Scientists and heads of research typically ‘each have part of this combined role’. The CST recommended that a senior official should be made accountable to Permanent Secretaries and Ministers for the development of both science strategies and the level of scientific expertise within each department.

The Government’s response to the CST report²⁶ in September 1999 included a commitment, alongside that made in the *Science and Innovation White Paper*²⁷, that all Departments ‘whose work is relevant to science and technology’ will publish science and innovation strategies as part of their Public Service Agreements introduced in connection with the Comprehensive Spending Review system. The CCR found that the introduction of such strategies ‘has been an important step in linking research and development to delivery of departmental objectives’. The main elements of these strategies are summarised below.

However, the CCR also hinted that research budgets may not always have been subject to the same amount of scrutiny that is applied to other parts of the budgetary planning:

‘Research spend typically represents a very small proportion of departmental budgets (1 per cent or less). Because it is such a small proportion of the overall budget, research spending is usually not separately identified until late into, or even after, the Spending Review process, and does not normally form a significant part of discussions between the Treasury and departments. At present, therefore, there is little central influence or challenge over what proportion of their budgets departments choose to spend on science’.

At the same time, others have expressed concern that departmental R&D budgets have fallen consistently in recent years. The Commons Science and Technology Committee stated:

‘A suspicion persists that the increased Science Budget is being asked to bear the brunt of cuts in departmental allocations. Such a policy of robbing Peter to pay Paul is neither sensible nor sustainable’²⁸.

Main elements of science and innovation strategies

All departments whose work is relevant to science and technology now publish a science and innovation strategy. These strategies consist of:

- Measurable S&T policy objectives, showing how they relate to priorities and Public Service Agreements, and how they take account of Foresight;
- A plan for meeting the objectives, including identifying relevant activity and knowledge in the science base and overseas; R&D programmes to fill gaps; and identification of the Department’s core research and analytical capabilities;
- A statement of how R&D needs will be met, including plans for procurement and collaboration;
- An assessment of risks that might threaten achievement of objectives, and plans to offset these risks;
- A statement of innovation/knowledge transfer goals and mechanisms;
- Where relevant, a statement of policy on commercial exploitation of research;
- An account of evaluation processes used to assess research quality, relevance and progress;
- A description of the department’s use of scientific advice;
- A description of the approach to stakeholder dialogue.

²⁶ See www.ost.gov.UK/policy/advice/cst_review/plan.htm

²⁷ *Excellence and Opportunity: a science and innovation policy for the 21st Century*, DTI, 2000.

²⁸ *Government expenditure on R&D: The Forward Look*. House of Commons Science and Technology Fifth report, 2000.

Despite the above discussion, few of the recent inquiries have said much about exactly *how* research and policy might be more closely integrated within departments. However, officials acknowledge the need to enhance the interactions between researchers, specialists and policy generalists; these still tend to work separately, with different lines of accountability. One model for working together is the ‘Bill Team’, which has traditionally combined people with a variety of skills to meet the inter-disciplinary requirements of a problem-based and often very time-constrained task. Such a model is rarely applied to other tasks.

Work in project teams can bring other benefits, such as ‘organisational memory’. More generally, there is a need to blur the boundaries between generalists and specialists, for example by giving specialists the chance to do generalist policy jobs, and to raise generalists’ evidence-handling capabilities so that they can engage with research. At the same time, if analysts are to be distributed to be involved in policy development, they need to be given strong mentoring and to maintain a coherent peer group. As one official put it, this helps to ‘keep them honest’ when policy pressures may be demanding a particular outcome from a piece of analysis.

Keeping options open – short and long-term research

There is a tendency for Ministers to feel that they are not getting research-based answers to their immediate policy needs, and to interpret this to mean that there is a need for more short-term research. This may be the case, but several people interviewed for this research said that officials should not forget the value of long-term research, as a means to keep policy options open but also to build up relationships with networks of analysts; research shows the importance of familiarity and trust in building effective research-policy partnerships.

A challenge for all Departments is the ability to support research that may take a different perspective to the current policy paradigm. As the CST put it:

‘The hardest challenges...are to ensure that proper consideration is given to research that could call existing policies into question, and that appropriate linkages across Government are made’. Such research, with its longer-term perspective, can be cut as a result of efficiency measures. There are clearly tensions here between one of the laudable aims of the departmental science and innovation strategies – ensuring that departmental S&T relate to policy objectives – and the longer-term desirability of ‘putting money on several horses’.

In its latest available review of departmental science and innovation strategies²⁹, the CST again repeated its concern that:

‘Departments are not taking a sufficiently long-term approach...all departments need to reflect on their ability to mobilise resources or switch priorities at short notice...we were not convinced that, in another BSE-type crisis, departments would be able to put in train the research in the time scale or on the scale required’.

The role of advisory committees

Another means for government to collect and process scientific information and to use this to inform policy is through the use of scientific advisory committees. There are many such committees across most government departments. The BSE inquiry had much to say on the role of advisory committees, and the CSA’s Code of Practice and Guidelines are largely pointed towards ensuring that such committees are effectively managed and that their advice is used.

²⁹ CST *Review of Departmental Science and Innovation Strategies*, March 2001, at www.cst.gov.uk

While many of the conclusions of the above inquiry will be familiar to many readers, and some of the main aspects of the Code and Guidelines have already been highlighted in this report, there are some challenges with respect to advisory committees that remain.

First, there are questions about the incentives and rewards for those serving on such committees. These tend to vary widely from committee to committee, from no pay to the equivalent of low-level consulting fees. Quite apart from the fact that a lack of rewards for those serving on committees would seem to be reinforcing the ‘low price culture’ in universities, of which the CCR was so critical, as academics come under increasing pressure to raise more ‘third-stream’ funding (from sources other than the first two streams of research and teaching), and as commercial opportunities for scientists continue to increase, individuals are likely to face increasingly difficult decisions about the opportunity costs imposed by serving on an advisory committee.

These effects are likely to be reinforced by a second challenge, which relates to issues around conflicts of interest. Officials are already reporting difficulties in recruiting to committees, as any researcher’s affiliation to industry, which includes having done research sponsored by industry, is seen as bringing potential conflicts of interest with respect to the impartiality of the advice being given by that researcher when serving on an advisory committee. This leads to a situation where, as one official put it, ‘it’s then difficult in some fields to get anybody because there is such a push towards research funding from outside [universities]’. The OST is currently considering writing a further document on this matter to go with the CSA's Guidelines and Code of Practice.

Another challenge relates to the resources that advisory committees are provided with to support their work. While individual experts on committees are supposed to bring an overview of their field as part of their contribution to the work of the committee, there may occasionally be a need to commission further research or reviews of evidence, especially where a new or complex issue is being addressed. The challenge related to this task is that at present, it is not clear what resources committees can access to perform such tasks, and again there seems to be variability across government.

A final challenge relates to how advisors are selected. The question here is to what extent advisors are chosen on the basis of their direct knowledge of the question in hand, or on the basis of their scientific eminence. Ironically, it seems to be the case – and officials acknowledge – that the more strategic an issue, the more likely it is that advisors will be chosen on the basis of their eminence rather than their direct working knowledge of an area. The question then becomes whether this amounts to advice, or as one commentator has put it ‘good old boys sitting around talking turkey’, as discussed next.

External advice, or GOBSATT?

In its response to a Commons inquiry³⁰, the Royal Society of Chemistry found that ‘it can be a matter merely of historical accident as to who is consulted and who is not...’ There is a suspicion that some scientific advice can be based on what has been termed GOBSATT: Good Old Boys Sitting Around Talking Turkey. Those who have risen to the top of their discipline may have access to senior officials and Ministers, but may not be well suited to giving advice in areas outside their experience, particularly across broad topics such as science policy or the economics of innovation. Yet discussions with officials indicate that,

³⁰ House of Commons Science and Technology Select Committee 2001, *The Scientific Advisory System*.

particularly at the top of government and for strategic policy issues, officials and politicians tend to develop policies on the basis of ‘feel more than on evidence’, and for this they rely on their discussions with eminent people rather than on commissioning or reviewing any research-based evidence, or consulting researchers who may have more direct theoretical and empirical knowledge of the area.

It is often the case that younger researchers will be at the cutting edge of research in such areas, and that advice would be better coming from teams that combine these active researchers with more senior researchers with direct experience in the field. Eminence clearly has its role to play in identifying useful sources of advice, but in all events, it would seem important to ensure that advice based on eminence is at least complemented with advice based on research and evidence relevant to the issues at hand.

The CMPS now offers a consulting service to help government departments to find advisors or possible secondees from outside government. Based on the observation that the growing rate of knowledge production in many fields generally means that an expert’s ‘shelf life’ is now much shorter when not actively involved in a field, the service places great emphasis on finding people who are up to date with the evidence.

The role of the OST

The Office of Science and Technology plays a number of important roles in connection with research and policy. It sponsors the Research Councils, is the home of the Chief Scientific Advisor, and also provides cross-departmental advice on science policy and the use of scientific advice.

There is some evidence that it has difficulty in fulfilling these roles. For example, the Commons Science and Technology Committee recommended that ‘the coordination role of the OST and the CSA should be enhanced, with a more explicit remit to intervene, where necessary, with departments’³¹. They also noted that ‘the CSA may require additional support to carry out his trans-departmental coordination role effectively’.

The OST’s job in this regard is not made any easier by the clear tensions that exist between its role as a central unit generating best practice, and this being regarded by departments as another interfering layer of bureaucracy. The OST has few levers that it can use to ensure the uptake of best practice, so it tends to rely on slower mechanisms such as entrance and refresher courses for interested officials. Many of the OST’s concerns regarding the Code of Practice and the Guidelines are regarded by others as too abstract or ‘high level’, leading to problems with cascading best practice throughout government. This is perhaps one reason for the existence of so many of the on-going problems with ensuring more effective links between research and policy that have been highlighted throughout this report.

Some of those interviewed for this project also pointed to what might be seen as a structural problem with the positioning of the OST within the DTI. Apart from the observation that many of the strategic and cross-cutting functions would appear to be better located in the Cabinet Office, there is the wider concern that the OST’s location in DTI seems to signal that public funding of science and technology are purely designed to benefit the private sector.

³¹ *Government expenditure on R&D: The Forward Look*. House of Commons Science and Technology Fifth report, 2000.

This apparent close affiliation with private sector interests may be the source of some of the public unease about the role of science in society.

Oversight of the work of the OST and others involved in science-policy interactions is another issue that has been raised. The Commons Science and Technology Select Committee recommended that the role of the Ministerial Science Group should be ‘clarified and expanded to oversee the OST in its coordination role and to act as a forum for resolving disagreements’. It also pointed to the confusing plethora of acronyms, strategies and documents that characterise work in the science-policy area, and recommended that these be rationalised to enhance clarity and transparency³². In the same report, the Committee also criticised the fact that the *Cross-Cutting Review of Science* was only made public after its prompting (‘we find it hard to understand why it was not published at the time of the Spending Review’) and they also found it ‘ironic that it has taken so long to bring transparency to the Transparency Review’.

³² House of Commons Science and Technology Committee, 2002. *The Office of Science and Technology: Scrutiny Report 2002*, November.

Research outside central government

A significant proportion of the total funding available for research is for research conducted outside government departments. For example, the CST reported that while in 2000-2001 civil Departments spent £1.3 billion on research, Research Councils were at that time spending £1.4 billion, with a further £1.1 billion coming from the funding councils.

Research conducted outside government can influence policy in a number of different ways. This section seeks to review the most significant sources of advice, and the various challenges that have been highlighted by officials and various inquiries in connection with their contributions to policy. This section discusses the various incentives and disincentives that researchers face in considering whether to become involved in policy debates. It also examines the Research Councils and the Funding Councils, all of which have been making increased efforts in recent years to make their work more accessible, but which have nevertheless still come in for some criticism in recent enquiries.

One strategic conclusion is that while many research policy initiatives have sought to emphasise the relevance of science to wealth creation, few have paid much consistent attention to the question of how research can underpin public policy, and what incentives can be given to researchers to encourage them to develop their activities in this way. There is a suspicion that, to paraphrase the Science and Technology Select Committee, this relates to ‘what the Treasury would wear’ in terms of its expectations of the outcomes from research investments. Certainly, as noted by the Baker report³³, research organisations can probably do much more to ensure that commercial benefits flow from research investments, but for wealth creation to become the dominant aim of such investments would seem to be harming their potential to bring benefits to quality of life and the effectiveness of public policy, which were the two other aims for publicly funded research outlined in the 1993 White Paper *Realising Our Potential*.

But what factors affect whether researchers take part in policy processes? A number are immediately obvious:

- the policies and priorities of research funding bodies, and whether these allow researchers to propose and conduct research that is relevant to current policy problems;
- the ability to propose and conduct inter-disciplinary, problem-focused research; many indicate that there are still significant institutional barriers to inter-disciplinarity;
- the incentives and rewards for doing so, including payment;
- the effects of such involvement on their status among their academic colleagues, which may not always be positive (rather like similar tensions around academics appearing in the media)
- the benefits that such involvement might bring for their research work, such as profile among those with research budgets;
- the opportunity costs brought about by the time spent on such activities;
- wider perceptions of the value of academic research and academic careers; in the last thirty years, academic salaries have halved in relation to equivalents in the civil service.

³³ *Creating Knowledge Creating Wealth. Realising The Economic Potential Of Public Sector Research Establishments*. A Report by John Baker to the Minister for Science and the Financial Secretary to the Treasury, 1999.

Although many researchers clearly regard involvement in policy advice as rewarding, and some still regard it as a public duty in return for public funding for their work, it is by no means clear that the current patchwork of incentives and rewards is sufficient to ensure an optimum outcome for those developing policy.

Officials indicate that they are often more willing to engage with those researchers that have long-term funding, as these are more able to engage in policy processes than those on short-term contracts, who are too busy applying for grants, doing the work, and reporting.

It is certainly the case that the rewards of, for example, being on an advisory committee vary widely, sometimes even within the same committee. Few committees pay the commercial rate that researchers – especially those with a world-class reputation – may be able to command in other consulting activities. In a context where researchers are under pressure to raise more ‘third stream’ income (that which comes from activities other than research and teaching), it may be the case that policy processes are losing out to more commercial activities. The Commons Science and Technology Committee raised the issue of the level and consistency of payment for those serving on advisory committees³⁴, and was awaiting the Government’s response to the Phillips Report’s recommendations on this matter.

Identifying sources

It can be difficult to identify the best sources of advice outside government. The Cross-Cutting Review of Science and Research (CCR)³⁵ discussed the various mechanisms that have been set up to help identify research conducted in universities, mostly for export purposes. However, the various websites ‘provide disparate information and are not widely known’. The CCR states that there ‘is likely to be benefit in the creation of a single source of information which is well known and easy to use, such as www.scottishresearch.com’.

Policy-makers often find it hard to identify who is doing research on a particular subject in universities, so such sources of information might be as useful for connecting research with policy as for facilitating exports. Officials sometimes use research infrastructure like email groups to keep track of developments, but few read academic journals and many linkages rely on personal contacts.

The Learned Societies can be a useful source of advice and contacts for officials seeking people with detailed knowledge of a subject. In its report on the *Scientific Advisory System*, the Commons Science and Technology Select Committee found that many of the Learned Bodies considered that they were ‘undervalued and underused as sources of scientific advice’. The Committee made some more detailed observations in its report on the *Learned Societies*³⁶, finding that:

- Government Departments do not consult the Learned Societies on relevant issues as a matter of routine;
- These bodies could provide advice not simply on policy matters, but also for example on other areas of public expenditure such as purchasing (e.g. major computing projects);

³⁴ House of Commons Science and Technology Select Committee 2001, *The Scientific Advisory System*.

³⁵ *Cross-Cutting Review of Science and Research: Final Report*, March 2002, on www.hm-treasury.gov.uk

³⁶ House of Commons Science and Technology Select Committee 2002, *Government Funding of the Scientific Learned Societies*.

- Departments commission work from commercial consultancies that could, in some cases, be undertaken by the Learned Societies;
- There is little consultation between the Learned Societies on policy issues, which provides an indication that they do not have a highly sophisticated approach to providing policy advice.

Such organisations currently have few resources to devote specifically to any advisory work that they may wish to undertake, and are rarely compensated for any such work that they undertake proactively. For example, the Royal Society had a budget of £100,000 and 12 full-time staff for scientific advice work in 2002-03, a very small percentage of its overall budget of around £29m.

One official pointed out the conundrum that if government provides resources for this function, the bodies themselves could face questions as to their impartiality. However, this does not appear to be a problem for the US National Academy of Sciences, which has always been mandated with a substantial role in providing advice, and is provided with the resources to do so. The Commons Select Committee suggested that ‘Learned societies should be able to bid for funding to provide scientific advice work they feel competent to do’.

Nevertheless, there is a perception that the Learned Bodies are becoming better at communicating research to policy; official consultations can provide the signal and mechanism for doing this. Some of the most useful interventions are when such organisations provide both a ‘definitive tome’ that brings together the available evidence in an area and provides scientific credibility, along with a brief, accessible summary.

Organisations like the Royal Institution maintain databases of scientists willing to speak on particular topics in the media, and these are occasionally used by officials to identify sources of advice. Other officials report that non-governmental organisations such as campaign groups can act as useful information spreaders, particularly around controversial issues where other more conservative organisations inside and outside government may be less willing to lead debates.

In some areas, outside advice may come to be dominated by a few individuals who have the resources or the inclination to be involved. This can have the effect of artificially narrowing the range of policy options examined. Many officials recognise that although the process of research should be about the impartial assessment of evidence, researchers themselves cannot be completely objective, particularly where there are competing explanations of events. In this context, it is vital to consult a range of opinion.

The Research Councils

Government takes a close interest in the work of the Research Councils, and is represented on each of them. Although there is an expectation that government departments and Research Councils know what each other are doing through Concordats and the involvement of officials on research committees, such strategic involvement cannot be a replacement for more active connections at the operational level; officials should seek to get involved in research programmes and projects, and researchers need to interact with policy-makers during the course of their work in order to generate the relationships that are needed for effective mutual understanding.

There are clearly, on occasions, tensions between maintaining an ‘arms length’ relationship, as established under the Haldane principle, to ensure the independence of the research funded by the Research Councils, and on the other hand the wish on the part of the Research Councils to ensure the relevance of their research by building close relationships with Departments and other public bodies.

This tension becomes especially acute when Research Councils fund research that may call Government policy into question, with officials occasionally accusing Research Councils and their researchers of ‘biting the hand that feeds them’. This is especially the case with the ESRC, which by its nature tends to fund research that is more closely involved in scrutinising the assumptions that inform policy. The pressure applied to the ESRC’s forebear, the Social Science Research Council, in the 1980s, and its near closure, provide a salutary reminder of the difficulties in ensuring that researchers and their funding bodies be allowed an ‘independent space’ in which to conduct their work.

The quinquennial review (QQR) of the Research Councils³⁷ found that they need to interact more effectively with key stakeholders, and to adopt a set of ‘principles of public service delivery and make them the bedrock of the Councils’ dealings with the users of their services’. These principles include

- ensuring that policy-making is more ‘joined up’ and strategic;
- making sure that public service users, not providers, are the focus; and
- delivering public services that are high quality and efficient.

The QQR found that the dual support research funding system ‘is widely considered to be out of balance’. Concerns raised by the QQR include:

- **‘research assessment** – whether and how far the current Research Assessment Exercise (RAE) affects the balance of incentives as between research, teaching and knowledge transfer;
- **the exploitation of research** – the development of a coherent set of support programmes combining ‘science push’ and ‘demand pull’;
- **incentives for multi-disciplinarity** – science increasingly involves multi-disciplinary team work whereas the RAE is perceived as having focused more strongly on the research records of individuals in particular disciplines;
- **research trajectories** – the contrast between traditional patterns of long-term, tenured, university employment on research (and teaching) on the one hand, and the growth in short- to medium-term, time-limited, project-based funding from the Research Councils on the other’.

All of these are relevant to the effectiveness of relationships between research and policy. More specifically, the QQR recommended that ‘Relations between Government Departments and Research Councils should be more systematic and strategic, take place within the context of science strategy for the relevant areas, and be reinforced at working level’. Recognising that there are currently few concrete resources to help researchers undertake such activities, the QQR also recommended that:

‘An earmarked knowledge transfer fund should be established within the Science Budget to finance the Research Councils’ knowledge transfer activities and their participation in knowledge transfer programmes with other partners. The scope and scale of the fund should be settled during the cross-cutting review of science and research’.

³⁷ *Quinquennial Review of the Grant-Awarding Research Councils, Stage 2 Report* November 2001, available at www.ost.gov.uk

Funding Councils

The Funding Councils such as the Higher Education Funding Council for England provide the other main stream of funding for universities under the dual support system. Although HEFCE states that one of its strategic aims is to encourage effective interaction between academics and those in industry and other sectors, there is a widespread feeling that the incentive signals it sends are overwhelmingly biased in favour of encouraging academic outputs rather than improved economic or social outcomes.

The Science and Technology Select Committee, in its report on the *Research Assessment Exercise*, stated:

‘At present there is no policy dimension to HEFCE’s QR funding: the system takes no account of the value of an area of research to society or the economy’.

This inquiry found considerable and widespread concern about the perverse effects that the RAE is having upon the priorities within universities, and particularly in connection with the involvement of research staff in applied and inter-disciplinary research, knowledge transfer and business/community/policy involvement such as secondments³⁸. Further, in its inquiry into the *Scientific Advisory System*, the Committee stated that:

‘Academic scientists are discouraged from joining advisory committees by the fact that their university is not compensated for their absence. Indeed, under the Research Assessment Exercise, their university will actually lose out’³⁹.

These observations were strongly echoed by the *Cross-Cutting Review of Science and Research*, which was conducted to inform the 2002 Comprehensive Spending Review⁴⁰. The RAE is currently under review.

As the Minister for Science and Innovation, Lord Sainsbury, has acknowledged:

‘The Research Assessment Exercise has created great pressures on universities to focus mainly on research. This for many universities may not be the best strategy. And so we have introduced a third leg of funding, the Reach Out Fund, to sit alongside the Research Assessment Exercise and the Teaching Quality Assessment. This should enable universities to choose from a diversity of strategies. The level of funding in the first phase is modest, certainly in comparison to the level of funds available for teaching and research. But nor should we underplay the significance of what the fund is trying to achieve; a sustainable, systemic change in the culture of our knowledge base, in which the value and esteem accorded to working with business is comparable to the recognition academics receive for research and teaching. And with "Reach Out" we are talking about a sustained programme of funding which I am sure will grow with time, not a "one-off" scheme’⁴¹.

Here, the Minister for Science is acknowledging not only the power of the signals sent by the RAE, but also that the ‘culture of the knowledge base’ needs to change to reward academic ‘reach out’ activities. Again the emphasis is on wealth creation, and the level of funding is ‘modest’. There would seem to be a long way to go until research funding schemes and wider academic incentives and rewards encourage researchers to see ‘supporting the quality of life and the effectiveness of public policy’ as mainstream activities.

³⁸ House of Commons Science and Technology Select Committee 2002, *The Research Assessment Exercise*.

³⁹ House of Commons Science and Technology Select Committee 2001, *The Scientific Advisory System*.

⁴⁰ *Cross-Cutting Review of Science and Research: Final Report*, March 2002, on www.hm-treasury.gov.uk

⁴¹ Lord Sainsbury, *Speech to University of Oxford Science and Technology Day*, 1999.

Peer review for policy relevance?

Although the RAE has been the target of much critical comment along the lines given above, it is underpinned by the peer review system which itself has a number of problems, as reviewed by a recent POSTnote⁴². Although no better system immediately presents itself, peer review is seen as stifling risky and innovative research in new areas, reinforcing conventional wisdom, discouraging inter-disciplinary work ('since peer review committees that do not contain individuals qualified to judge all aspects of a proposal may be less likely to approve the funding'), and discouraging work that is driven by practical or policy problems rather than academic originality. As discussed above, a similar assessment was made by the QQR of the Research Councils.

These shortcomings all have significant influences on the relationship between academic research and policy; if policy should only use 'high quality' research, and peer review is the gate-keeper of quality yet is biased against inter-disciplinary, problem-focused and innovative research, the quality criteria of the academic and the policy communities would seem to be in conflict.

Some authors have suggested that in the case of research that is dealing with highly complex topics where the stakes in society are high, those commissioning the research should extend peer review processes to include decision-makers and practitioners⁴³. This is because:

- such people have substantive expertise of their own about the topic in hand and;
- the questions as to what such people should do in the face of their complex challenges should form a central part of the research.

As a result, involving these people in peer review is a means of building into research processes a wider set of quality criteria, as well as generating interactions between researchers and decision-makers from the start. Although some research funding bodies involve such practitioners in their project selection processes, there is a perception that 'academic' perspectives on quality still dominate decisions.

Third stream funding criteria

As noted by the Cross-Cutting Review, encouraging 'third stream' activities (those activities other than research and teaching in universities that are designed to generate wider social benefits) requires an ongoing stream of funding. However, the design of mechanisms for measuring such activities, and arriving at related funding decisions is a complex challenge: as the CCR stated, 'we have concluded that the emerging picture is not yet sufficiently clear to allow future funding to be allocated on a formula basis...'⁴⁴. A team at SPRU developed a set of third stream indicators for the Russell Group of Universities in 2002, and these have been used to inform debate on the topic.

There would therefore appear to be some way to go until third stream activities are a central feature of the work of universities, and are appropriately organised and rewarded as such. What is more, the emphasis in the CCR on those university-based activities for which users are willing to pay, and its stated opinion of the need for third stream activities to become self-sustaining, will tend to privilege those parts of the university portfolio that have commercial

⁴² *Peer Review* POSTnote number 182, September 2002.

⁴³ Funtowicz, S.O. and J.R. Ravetz, 1992, *Environmental Problems, Post-normal Science and Extended Peer Communities*, paper read to Environment Department, World Bank, Research Methods Consultancy: London.

⁴⁴ For a thorough discussion of this complex area, see the SPRU report for the Russell Group of Universities at www.sussex.ac.uk/spru.

potential, rather than those with potential ‘public good’ benefits such as relevance to policy or community development. This emphasis on the commercial potential of university activities, while understandable from an economic standpoint, may also contribute to the perception that science is becoming too closely linked to commercial objectives. This has important consequences for the links between science and policy, and is a part of the ‘science and society’ agenda that government is now trying to address.

Concluding comments

This report has attempted to provide a review of many of the initiatives and inquiries aimed at improving the connection between research and policy development. A range of remaining difficulties and challenges were outlined.

The following quotation from the recent *Cross-Cutting Review of Science and Research* provides a useful summary of the challenges that remain ahead. In discussing the funding of science, it stated:

‘The establishment of a sustainable system for the future will depend on more than just better funding. It will require close attention to the behaviours of all the key stakeholders and the system-based incentives that drive those behaviours. In the case of the funders, a considerably greater degree of interaction will be required so that the various funders are aware of the consequences of their own and each others’ behaviours on the research system. In short, the major funders need to behave more strategically, both individually and collectively’.

The same could be said about the various factors that influence the relationship between research and policy.

Appendix A: Horizon scanning, scenarios and foresight for policy

Departments are now encouraged to use processes that will help them anticipate future challenges. The currently-favoured term is ‘horizon scanning’, although ‘foresight’ processes have been in place for some years, intended to help build ‘the national capacity to think ahead’, in particular with respect to the exploitation of science and technology.

The Foresight process is managed by DTI and was established in 1993 as part of the outcomes of the ‘Realising Our Potential’ science White Paper⁴⁵. Foresight can take various forms, but is intended to help bring together people from a wide variety of sectors and interests to work together on emerging trends and opportunities that might affect activities in science, business and public policy. It is hoped that its focus on the longer term and on networking can help those involved to think more strategically about the future, and also to understand the perspectives of others involved in research, innovation and policy.

The UK Foresight programme was reviewed in mid-2001⁴⁶, the main finding of which was that the Foresight process seems to have made little impact on Government policy or thinking; this was reinforced by a perceived lack of governmental and departmental support for the process. This may be linked to another criticism, which was that staff turnover in the secretariat was too frequent, weakening the support function and continuity. Impact of the process has been found hard to assess, although this is not a uniquely British problem; ‘colleagues in Europe and internationally struggle with this question’. This has led to the recommendation that panels should place more weight on identifying action points in future, to ensure outcomes. Government has accepted the CST’s recommendation that departments should make more systematic use of Foresight, as part of their more systematic approach to science-based policy.

Foresight processes sometimes use ‘**futures techniques**’ such as **scenarios** to ensure that current trends and currently-known technologies are not simply projected forward⁴⁷. These techniques deliberately pose a range of different possible development paths, and then use these as tools to help shed light on how actions now will help determine possible outcomes.

Following the spending review 2000, the OST has required Departments to use a proportion of R&D budgets to support ‘**research areas identified by horizon scanning**’. The extent to which this is being implemented, and how, is unclear. DEFRA, the Department for Environment, Food and Rural Affairs, which was particularly bruised as a result of BSE and other food and agricultural crises, has launched a programme of horizon scanning to inform its research activities⁴⁸. It seems to be a leader among departments, explaining its thinking as follows:

‘Whilst all research is forward-looking to some extent, most research is concerned with resolving problems that are identified from within specific and bounded frameworks of ideas, assumptions and priorities shared by a research community and its sponsors. These shared ‘expert’ perspectives about what is important, useful and worth investigating largely determine which problems are analysed, how they are analysed and who analyses them. While normal

⁴⁵ *Realising Our Potential. A strategy for science, engineering and technology*, 1993, HMSO, Office of Science and Technology, May.

⁴⁶ The full review can be found at www.foresight.gov.uk

⁴⁷ See DERA’s international review of ‘Strategic Futures Thinking’ for the PIU, June 2001, available at <http://www.cabinet-office.gov.uk/innovation/2001/futures/main.shtml>. For other work in this area, see also <http://policyhub.gov.uk/servlet/DocViewer/docnoredirect=447/>.

⁴⁸ DEFRA Horizon Scanning web site: www.escience.defra.gov.uk/horizonsscanning

scientific research has a record of success, there is a danger that it remains ‘locked in’ to the assumptions of research and policy communities. Mainstream research is often poor at questioning these assumptions, and has failed to identify potential new threats and opportunities to pursue alternative development paths. This has left policy vulnerable to the unexpected and unprepared to facilitate changes’.

Horizon-scanning research ‘aims to question current policy approaches and assumptions, to analyse data in new ways, and to offer a route for commissioning work on subjects that are not yet seen as current policy priorities, but that have the potential to be so in the near future. The questions addressed may be uncertain, speculative and risky’.

DEFRA expects to spend £2 million of its £140 million research budget on priorities identified by horizon scanning. It has developed a set of principles and an action plan. The **principles** recognise that horizon-scanning research ‘carries a still greater risk of error or failure. It will be important to judge horizon scanning in a different way’. The activity needs to be pursued in a way that is ‘designed to be more than the sum of its parts’, by building linkages between researchers, encouraging cross-disciplinary thinking and developing dialogue with other Departments so that emerging ideas that go beyond DEFRA’s immediate interests are ‘appropriately considered’.

The OST is currently considering best practice in the field of horizon scanning, and may issue a supplementary letter to the CSA’s Guidelines and Code of Practice in this connection.