

## DINNER/DISCUSSION SUMMARY

### Looking into the future – can we anticipate technological change?

Held at The Royal Society on 24th May, 2006

We are grateful to the following for support for this meeting:  
Research Councils UK  
and  
Horizon Scanning Centre, Office of Science and Innovation

- Chair:**           **The Earl of Selborne KBE FRS**  
                          Chairman, The Foundation for Science and Technology
- Speakers:**       **Sir Brian Bender KCB**  
                          Permanent Secretary, Department of Trade and Industry
- Sir David King KCB FRS**  
                          Chief Scientific Adviser to UK Government and  
                          Head, Office of Science and Innovation, DTI
- Jeremy Bentham**  
                          Vice-President, Global Business Environment, Royal Dutch Shell

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SIR BRIAN BENDER said that it was a crucial function of the Department of Trade and Industry to promote wealth in the economy through the application of knowledge. The background had been set with the 2003 Innovation Report and the Ten-Year Science and Innovation Framework document. What was needed now was to identify gaps where knowledge was poor, not transferred to business or not used, and then seeking to fill them. Science and innovation were key. Progress required effective risk management, whether it is policy, financial, public reputation, or project delivery risk. Part of effective risk management was effective contingency planning to deal with unexpected crises such as BSE. The Government had learnt - as was shown in the 7/7 bomb incident - what contingency planning involved, but it was necessary to ensure that civil servants had the necessary professional skills to both work with academia and business to see where help could be given to promote knowledge and wealth (see Case 2<sup>1</sup>), to manage risk and understand how to cope with major disruption. The skills included people and financial management, project delivery, analysis and strategic thinking, and communication.

SIR DAVID KING gave policy on stem cells (Case 7) as an example of how intelligent anticipation of problems and opportunities led to legislation and regulation which enabled science and industry to give the UK a global advantage. But Case 1 - GM foods - showed how insufficient understanding of public reactions, and inadequate preparation resulted in the loss of £2bn revenue and industry moving away with no effect on the global growth of GM foods. The CSA (Chief Scientific Adviser) guidelines said that Departments should develop Fore-

sight/Horizon Scanning scenarios to spot early trends and ensure that they were appropriately considered in strategy and policy. This meant full understanding of industry and commercial structures (e.g. a problem in BSE was inadequate knowledge of the industry's structure). He described some of the Foresight Projects so far – studies of brain science, addiction and drugs, detection and identification of infectious diseases, intelligent infrastructure systems, and tackling obesity. Crucial to success was getting the commitment of a Minister, interdepartmental working, and involvement of outside stakeholders. Even if the problem (or opportunity) was thought to be far in the future the outcome must be to focus on work to be done now to prepare for the event. He would revisit the work after a year to see what action had been undertaken. The projects were labour (and paper) intensive - scoping, reviewing existing science, writing up the science intelligibly, working across disciplines, exchanging information and raising excitement. In horizon scanning one had to take account not only of scientific and technical possibilities (Delta Scan) but also societal assumptions and reactions (Sigma Scan). You can't predict the future, but you can prepare for, at any rate, some of it.

MR. BENTHAM said that underlying scenario planning was the need to change the question "What will happen?" to "How do we respond to changes which may happen?". The scenarios then aimed to develop "rich narratives" across various time horizons, which enabled policy makers to think through choices which might face them. Key assumptions had to be clarified and predetermined trends – such as demographic changes in different parts of the world, concerns about carbon emissions, national policies and market structures – recognised. One can then see that current trends could lead to erosion of market trust, enhanced anxiety on

<sup>1</sup> The case studies referred to are in the OSI/Foundation document handed out at the meeting. If you would like a copy or the Shell scenarios document please e-mail office@foundation.org.uk.

security, and greater demand for state intervention and regulation. Scenarios could then look at futures where, in various countries, the future might emphasise markets and security ("low trust globalisation"), or markets and social harmony ("open doors") or security and social cohesion ("flags"). The scenarios showed interesting outturns in GDP - 3.8 % growth in "open doors"; 3.1% in "low trust globalisation" and 2.6% in "flags". They could not tell you what would happen, but they could indicate what sign posts to look for, and what some of the consequences might be. The process could be found irritating, because it was bound to challenge preconceptions; but that was its value.

Underlying much of the subsequent discussion were concerns about the choice of Foresight projects, doubts about the practical value of scenarios, and whether, and if so, how, the results of Foresight projects or Horizon Scanning were communicated to those outside government who should be acting on them. There were, undoubtedly, a very wide range of foresight projects which could be considered, and the best way of choosing between them was (as had been done) to involve a wide range of people in consultation, and then refine the choice in intense discussion. Key criteria were established – interdisciplinary work, value added results, and crucial support from stakeholders (inside and outside government) and ownership by a Minister (or, successive Ministers, in an era of quick Ministerial turnover). Leadership was essential. Much depended on Departments following the CSA guidance and establishing CSA posts in the Department, and ensuring that he/she had sufficient resources and clout to require plans and policies to be evidence based. There was still much to do, but the Foot and Mouth saga had alerted government about the need for proper contingency response – which, inevitably, these days, depended on science, analysis and communication. However, some speakers were sceptical about the results of past activities – it was interesting that Shell had (as their booklet "Shell Global Scenarios to 2025" handed out at the meeting explained) seen a noticeable change in emphasis in successive generations of scenarios, and it would have been interesting to know how earlier scenarios had influenced policy. Similarly, what had been the result of earlier Foresight projects? Were these efforts really altering the mindset of Ministers and Chief Executives? There was certainly evidence that the Government took much more seriously than in the past the importance of science (see the increase in the science budget) and in the formulation of at least some policies (stem cells, flood prevention), but it would be unrealistic to suppose that Ministers will not always want to react with immediate measures, which might, in the long term, be damaging, when faced with a media clamour. The civil service needed help to enable ministers to resist populist pressure; this could only come from stronger support from the scientific and academic community, who would understand the real problems. Government, probably more than industry, no doubt found Foresight planning as an "irritant" because of long standing prejudices, or manifesto commitments. But one should not be too pessimistic about the ability of the Government to plan long term policies based on sound research and consultation – the Pension proposals, due to be published soon, were an example of this. As for communication of results, the very process of selecting subjects for Foresight, and the intensive consultation which went on, should show who needed to be kept informed of results. But there were some doubts about how effective this would be – the results of a project could not necessarily

be foreseen, and it might well be that those who should know of the results were different from those involved in the commissioning.

Speakers were also concerned about the ability of those in government and business to think more widely about problems; was there a tendency for scientists or technocrats involved to think that all solutions were only scientific? Experience – GM foods - showed that this was a dangerous fallacy; the answer must be to encourage wider thinking through the use of such techniques as "Sigma scanning", which aimed to capture sociological issues, transparency of operation and clear, speedy intelligible publication of results. A key problem was forecasting changes in public attitudes e.g. privacy, which affected wide ranges of policy such as road pricing or identity cards. Scientists should be adept in picking up signs of change and using their knowledge to bring new science from the science base to start the process of wealth creation through innovation. But it was the job, as well, of professional administrators to ensure they had sufficient understanding of the business world to spot problems and ask questions in sufficient time to allow proper analysis to be done.

But what about the possibility that the government might be giving away valuable information which should be protected by IP? Yes, a possibility, but the danger was far outweighed by the need to share information and we benefited more from others sharing information with us, than we lose by making our information freely available. Particular problems for Foresight planning and catastrophe response, perhaps, arose in the Ministry of Defence, where the need for pre-emption could foreclose options and battlefield, procurement and educational divides posed problems (Cases 4 and 18).

Sir Geoffrey Chipperfield KCB

The presentations are on the Foundation web site at [www.foundation.org.uk](http://www.foundation.org.uk).

Useful web links:

Research Councils UK:  
[www.rcuk.ac.uk](http://www.rcuk.ac.uk)

The collective body of the UK Research Councils – Arts and Humanities (AHRC), Biotechnology and Biological (BBSRC), Central Research Laboratories (CCLRC), Economic and Social (ESRC), Engineering and Physical Sciences (EPSRC), Particle Physics and Astronomy (PPARC), Medical Research and Natural Environment (NERC) Research Councils.

Horizon Scanning Centre, OSI:  
[www.foresight.gov.uk/horizonsscanning](http://www.foresight.gov.uk/horizonsscanning)

Royal Dutch Shell:  
[www.shell.com](http://www.shell.com)

Office of Science and Innovation:  
[www.dti.gov.uk/science](http://www.dti.gov.uk/science)

HM Treasury – Comprehensive Spending Review:  
[www.hm-treasury.gov.uk/spending\\_review/spend\\_csr07/spend\\_csr07\\_index.cfm](http://www.hm-treasury.gov.uk/spending_review/spend_csr07/spend_csr07_index.cfm)

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