

DINNER/DISCUSSION SUMMARY

Science advice and the management of risk in government and business

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Chair: **The Earl of Selborne KBE FRS**
Chairman, The Foundation for Science and Technology

Speakers: **Sir John Beddington CMG FRS**
Government Chief Scientific Adviser, Government Office for Science
Sir David Omand GCB
War Studies Department, King's College London
Professor Dougal Goodman FREng
Visiting Professor, The Risk Centre, Cranfield University
Professor David Spiegelhalter OBE FRS
Winton Professor of the Public Understanding of Risk, University of Cambridge

SIR JOHN BEDDINGTON outlined the changing global risk landscapes produced by the World Economic Forum at Davos. They had covered such risks as a declining Chinese economy, extreme weather conditions, financial collapse and chronic diseases; in 2009/10 the emphasis had been on the financial crisis and chronic diseases. The UK National Risk Register itemizes priorities such as pandemic disease, attacks in crowded places, and extreme weather. In three areas - civil contingencies, climate change, and financial crisis, he explained how the government examined the risk and how it should respond. It looked at likelihood - based on historical evidence and advice, plausibility, and the capability and intent of actors; on impact - economic and psychological damage, social disruption and environmental damage. He explained why the register had not warned of the risk of volcanic dust from Iceland disrupting air travel - a 50 year quiescent period of the volcano, new patterns and frequency of air travel. There will always be new risks - such as the recent bomb scares in freight. He outlined the structure of the Civil Contingencies Committee (COBR) and its Scientific Advisory Group (SAGE), with representatives of academia, research councils and government scientists with issues such as climate change it was important to break down generalities and examine impacts on specific areas - food and water supplies, acidification of oceans, and melting polar ice. In financial markets new risks came from high frequency trading. As the "flash crash" showed, failures could result in disruption and loss of confidence in markets, and severe impact on individual stocks. A new GO Science Foresight study on how computer trading might evolve, financial stability, market integrity, competition and market efficiency was about to be announced.

SIR DAVID OMAND said the increasing use of risk management in national security was aimed at reducing and managing the risk to the UK from terrorism, cyber security, civil emergencies and instability and conflict abroad. Good intelligence optimises action by reducing ignorance - secret intelligence was no more than information which could not be shared. The format for analysing risk was, first, a strategic review of possible threats, then an assessment of factors such as what risk, by whom and where; then an examination of causal relations, and a prediction of where and when next. Finally, what can we do? But useful intelligence must have some data points, access to information from them, analytical interpretation, and be sent to policy makers in time. The dangers are group think, observer expectancy, paying too much attention to one item and "perseveration" (sticking to a theory long after facts have undermined it). Policy makers must then understand the significance of the assessment and make the right decision. Policy makers will accept the assessment and act if the facts are obvious

(the ash cloud is there); they accept the authority which tells them they must; it is logical; and it fits their mind set. Failure to accept it may lead to loss of life, economic damage and loss of individual reputation. Analysts' and decision makers' tasks were quite different. Analysts must be impartial, stick to the evidence, be cautious, take the necessary time and use complex language. Decision makers will want to fit the assessment into a world vision, to challenge the relevance of evidence, keep options open, to express certainty in public and override objections. Analysts must preserve their reputation for independence and impartiality; understand how to reduce the risks of the decision maker; disclose the limits of the assessment; and separate out "secret" information (data points exist) from "mysteries" (there may be something there, but no data). Decision makers must accept that risks can be managed, but not eliminated, that low risk does not mean no risk, be open with the public and understand the limits of the analysis.

PROFESSOR GOODMAN said that from 2006 HM Treasury agreed all government departments should have risk registers, which would include high impact, and low probability risks. The Financial Services Authority published each year a risk outlook. In 2009 the report characterised the financial crisis as "a self reinforcing process of exuberance". There was much to learn from industry about risk management. The new regulations, Solvency II, for the insurance industry required all insurers to demonstrate their risk management processes, and their models were robust and handled low probability, high severity events. Government and industry should exchange notes on how to manage risk. Lloyds of London tested the strength of the underwriting syndicates by requiring syndicates to test their survival under a range of scenarios - for example the total liability for a London flood loss could be £6.2bn - could syndicates survive this loss? Government to consider what would be the outer limit of the impact of the risk they can manage - say a 5% drop in GDP. But there were other risks that could not be quantified such as public outrage or reputation loss. Financial time series typically are volatile around a slowly varying trend but from time to time step jumps may suddenly occur. Managers need to anticipate such jumps. In both business and government risks must be taken to get things done, but government must communicate the results of any of its assessment of risk to the public. While analysts must build the model, and seek a basis for a risk distribution, it is for managers to decide whether to accept a risk and understand the implications of accepting the risk. Management decisions may be driven by emotion rather than a rational, analytical choice. Managers should step back from day to day operations to consider the low probability, high severity risks that could destroy their businesses.

PROFESSOR SPIEGELHALTER opened the discussion. He agreed that with extreme low probability/high impact risks we were at the limits of science. The problem was putting numbers on risks. The insurance industry modelling techniques were valuable, but government had much wider interests to take into account, and greater difficulties in communication. It was possible to quantify too far - for example, a 1:200 risk as a "worst case" - would be difficult for the public to understand or accept. It was very difficult to acknowledge openly the limitations of analysis - indeterminacy, and ignorance. There will always be future events which are unavoidable and unpredictable.

A number of speakers in the following discussion were concerned that the issue of emotional intelligence had not been fully addressed. It was essential that the impartial and rational processes of analysis took place, but it was seen as increasingly important to understand the emotional reactions people had to the results of any modelling and risk assessment. Sir David Omand had indicated that there were emotional issues which could influence even the assessor's work, but it was more likely that emotions would feature in the reactions of decision makers and those to whom they had to communicate decisions. At one extreme, there were those whom no evidence would ever convince them that a threat existed (some climate change deniers, for example). But, climate change was a good example of how public opinion could be swayed by perceptions which were irrelevant to the science underlying analysis of risk - before the UEA and IPCC problems, public opinion had been supportive of the scientific view of climate change risk; since then it had shifted against, even although the basic analysis had not changed. A lesson was that any uncertainty in analysis must be emphasised, and public reaction to uncertainty better understood. Group think was endemic in public reaction; opinion would always follow the crowd. A common failure by ministers was to allege that their policies were evidence-based. But governments did not base policies on evidence; they proclaimed them because they thought that a particular policy would attract votes. They would then seek to find evidence that supported their view. It would be more realistic to ask for policies to be evidence tested.

Speakers queried the sharp distinction that had been drawn between the tasks of analysts and decision makers. Surely, if an analyst was firmly convinced that his analysis was correct and urgent action should be taken, he must have a duty to work hard to ensure that action was taken? But there would be great dangers in analysts acting as advocates for their view. It would undermine their impartiality and risk giving the impression that their analysis was biased - a criticism that had been launched at the Intergovernmental Panel on Climate Change. Of course, it was not always easy to distinguish, in reporting the results of analysis to Ministers, to distinguish between presenting the case in such a way that it is comprehensible, and takes account of the decision maker's concerns, and covertly advocating a particular decision. But it is the professional duty of the analyst so to distinguish.

In business and in government, there were greater rewards for avoiding risk, than accepting it. This led to over caution, and unfortunate use of the precautionary principle, in order to avoid risk, even when the probability was low and the impact not severe (although whether the public could ever accept that only a few deaths was acceptable, is questionable). The EU directives on agricultural chemicals were an example. Any analysis ought to make a qualitative judgement about the consequences of action, although not such as to foreclose a decision maker's decision. Decision makers sometimes wished to evade a decision through delay. Analysis should always include a time frame for decision making.

A new language was needed to describe uncertainty and the impossibility of removing risk from ordinary life, without restricting personal freedom. The media had a vital role to play, and it was frequently irresponsible - playing up fears and responding extravagantly to individual cases. But if the media were to deal

better with scientific issues, it needed much more help from scientists. They often did not respond in time for a media news item and respect public anxieties; they did not explain clearly the limits of their knowledge in terms that the public could understand. Scientists should send evidence to The BBC Trust which is currently examining the reporting of science. But, bad and exciting news will always get media priority, and it is pointless to object. For sixteen days news about the Kings Cross fire were headlines in the papers; meanwhile more people died daily on the roads than at Kings Cross. But this demonstrated, not the ignorance of the media, but news priority and that people felt very differently about risk when they accepted it themselves, by driving a car, and when they expected other people to take it, e.g. when on an escalator or a train. Perception of risk is very different from an intellectual analysis of it.

Speakers raised concern about the current administration's policy in abolishing and merging quangos. There were fears that this might lead to a reduction in the independence of scientific advisers, and that when an independent body was brought within a government department, its scientific advice might be bent to conform with political wishes. But the meeting was told that this fear was misplaced. A clear assurance had been given that advice would remain impartial and no pressure would be brought on scientists to modify their views. If there was any concern that this assurance was being broken, Chief Scientific Advisers in Departments were to be told, and if necessary, the Government Chief Scientific Adviser would be brought in. This assurance was welcomed, but at the same time, the warning was reiterated that advice was advice and decision making something else. Scientists and other advisers were often frustrated when their advice was not followed, but they must accept that they were not the decision takers.

Two clear messages emerged from the discussion. First that "emotional intelligence" was crucial to analysis itself, to the framing of advice and to communication to the public. Second, as long as we wished to preserve Parliamentary democracy, we must stick to the rule that Ministers responded for their actions to Parliament, and eventually to public election. They must, therefore, have the right and duty to say, whatever the advice, "my constituents will not agree, and so I cannot accept it". Governments cannot trade off operational risk; they must decide, and, if disaster results because of the decision, it must be their responsibility. If once we pass over the duty of decision to bodies which are not accountable to Parliament, democracy is hollowed out.

Sir Geoffrey Chipperfield KCB

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