*Part I*

# Methodological issues: quality control and assurance in scientific policy advice

# 1 Introduction: the quest for quality as a challenge to scientific policy advice: an overdue debate?

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How can science best be harnessed to support political decision-making? How should scientific advice to policymakers be institutionalised in government to be more accountable to academic science and public concerns at the same time? Concerns about the quality of scientific expert advice to policymakers have been raised for years, particularly in the UK and on the European level. Public debates such as the BSE case, the controversy about genetically engineered food, the foot-and-mouth disease (FMD) or the failure of experts and their risk models in the global financial crisis, have demonstrated that the legitimacy of experts and of the policymakers whom they advise essentially depends on the reliability and transparency of scientific advice. They have highlighted the absence of clear rules to follow as well as the lack of a legal framework and organisational structures for obtaining advice from academics. This lacuna has been further highlighted by the recent call for an institutional reform of the Intergovernmental Panel on Climate Change (IPCC) in reaction to allegations of shortcomings in its most recent assessment report.[2] Thus, the issue of quality control and assurance in scientific expert advising is of vital importance for both decision-makers and the academic community.

In fact, under the guise of evaluation, quality control and assurance have become 'a mantra of modernity' (Pawson and Tilley 1997: 2). In many other spheres of government, formalised procedures of quality control and assurance have become the norm, most notably through the standard-setting procedures of the International Organisation for Standardisation (ISO). In academia as well as in science-based policy

[1] The views expressed are those of the authors and strictly personal.

[2] The debate about the IPCC highlighted at least three requirements for a quality management of scientific advisory bodies: First, being able to deal with conflicts of interest, second, having formal procedures to deal with allegations of error, mistakes or bias and, finally, making sure that the body sticks to its mandate (Pielke 2010; see also Tol, Pielke and von Storch 2010).

advice, methods for quality assurance, however, are to a large extent informal, with self-assessment and peer review being the gold standard. But this situation is about to change. Accountability measures, performance indicators, etc. have become central to the new professionalism that increasingly takes hold of the sphere of scientific policy advice as well. Science's jurisdictional claim for defining the 'quality' of research and research-based services such as policy advice is no longer uncontested. In a sense, quality management has become a new mode of the governance of expertise. Michael Power (1997) has diagnosed a trend towards an 'audit society', where not the performance but rather an organisation's proxies of performance are being monitored and measured (Nightingale and Scott 2007: 546). As a consequence, organisations tend to adjust their behaviour to audit goals rather than to their initial social function. Such 'inadvertent consequences' of the audit culture increasingly pose a challenge for the quality of scientific policy advice as well (see Weingart 2005).

Hence, quality control and assurance have become the fundamental commitment in scientific policy advice. The objective is not only scientific robustness, but also to achieve results that are 'fit for function' and enhance the legitimacy of political or regulatory decisions based upon the advice (Funtowicz 2001). However, controlling and assuring the quality of scientific advice for public policymaking is neither a straightforward nor a uniform and well-defined task.

The growing importance of policy-related modes of knowledge production described by concepts like regulatory science (Irwin *et al.*, 1997), mode-2 science (Gibbons *et al.* 1994; Nowotny 2001) or post-normal science (Funtowicz and Ravetz 1990) comes with a shift from a narrow notion of quality towards broader questions of relevance and reliability.

In addition, in policy issues involving science and technology advocates from both sides, politics and science, selectively use science to pursue an agenda driven by their respective partial interests. Thus, the question arises whether there is anything one can do to institutionalise advisory processes in such a way that they advance the public interest.

Amazingly, the question of the *appropriate institutional design* of scientific advisory bodies and how this affects the *quality* of the advice they offer, i.e. their capacity to bridge between science and politics, is largely unexplored.[3]

[3] For one of the very few exceptions, see Guston's case study on the US National Toxicology Program (Guston 2005). Bijker, Bal and Hendriks (2009) recently conducted an ethnographical study of the practices of scientific advising in the Netherlands' *Gezondheidsraad*, focusing on what they call 'coordination work', a further development of the concept of 'boundary work' (Gieryn 1983; Jasanoff 1990). Drawing on this case study, Bijker *et al.* try to make a case against the 'democratisation' of scientific advisory bodies.

In order to close this gap, this volume assembles the perspectives from expert advisers and practitioners from organisations that serve as role models or points of reference in the debate: various kinds of advisory bodies, covering a spectrum from think tanks, governmental policy-oriented research institutes to agencies and academies.

The guiding idea of this volume is that the question of quality has to be answered on the level of organisations. The focus of the book is therefore on fundamental principles of quality control and on the institutional mechanisms and practices implementing them. Each chapter is organised around a structured set of guiding questions to ensure that the overview is as coherent as possible. These questions concern the normative commitments; informal and codified criteria; treatment of uncertainty; complexity and value-ladenness; institutions and routines of quality control and the political dimensions. The effort to assemble different organisational practices is long overdue. Whereas much has been written about expertise and many case studies have been produced, the question of organisational design has not yet been dealt with systematically. Exactly this is attempted here.

## The problem of quality in scientific advice to policymaking

Although the topic of the 'nature of expertise' is not a new one, up to the present there is no well-developed theory of scientific policy advice available (see Owens, Chapter 5). In one sense, this is a surprising and disturbing circumstance as governments, more than ever before, seek advice from a myriad of different sources, expert committees, councils, think tanks and agencies, etc. But policymaking is a complex process. Moreover, advice can take a multiplicity of different organisational forms – depending on the intended function, its relation to government or the time horizon. Finally, recent developments in the relationship between science and politics are also affecting the system of quality control (see, e.g., Maasen and Weingart 2005; Hemlin and Rasmussen 2006).

Thus, the institutionalisation of scientific advice to policymaking on an unprecedented scale has raised the issue of quality control. The problem appears on several levels. First of all, there is the question of what has caused a dramatic increase, not to say inflation, of supply of advice. It is due to a confluence of several developments. The expansion of state functions has led to an increasing complexity and technical content of policy- and decision-making in political administrations. This development has gradually exceeded the expertise that was typically assembled in ministries and specialised agencies, although the extent

to which governments retain such in-house expertise differs according to political culture. In France, for example, the government bureaucracy still commands the largest share of expertise, supported by a highly professionalised education of public servants, while in the US think tanks and other research institutions have a much stronger role in providing expert advice.

A second development related to the first is the impact of neoliberalism and its derivatives such as the paradigm of lean government and new public management. Many governments have actively cut staff in their administrations, outsourcing the needed expertise to independent bodies and to industry. Especially in the broad field of regulation, which makes up a large share of policymaking, relying on the expertise of stakeholders obviously poses problems of differentiating interested from neutral advice and, thus, raises one of the crucial quality issues.[4]

A third development is a direct outcome of the other two. As governments have increasingly cut their in-house expertise, they have helped to create an advisory market. The more money governments invest in expert reports, the design of events and campaigns, special assessments and the like, the larger this market becomes as think tanks, NGOs, independent research institutes, commercial consulting and PR firms, and corporate or individual lobbyists acting as advisers are drawn into it. Only a fraction of these is committed to serious academic research. The larger part either uses the label of being scientific or does not even lay claim to the authority of science. These players on the advisory market are often dependent on the income from their activities and operate under the constraints of having to keep the chain of commissions uninterrupted.

Obviously, quality of advice is a serious problem on this market, not least because it is virtually impossible to convince the actors to accept best practice standards of giving advice. At the same time it is evident that the lack of reliable expertise and the abundance of conflicting information is a burden rather than helpful assistance for policymakers. Thus, the availability of advice says nothing about its quality, and quality of advice appears to be the problem. It is not only a problem because

[4] On the particular problem of the role of academic scientists in quality control and assessment of scientific advice in the regulation of drugs, toxic chemicals, etc. see, e.g., Krimsky 2003: 228f.; Wagner and Steinzor 2006. The dimensions of the problem become clear considering the future impact of the new EU guideline on the registration, evaluation and authorisation of chemicals (REACH) that delegates the assessment of chemicals to companies. For a recent historical study of how ideology and corporate interests have distorted the public understanding of some of the most pressing policy issues see Oreskes and Conway 2010.

unreliable expertise could misguide policy decisions. Such knowledge, because of its dual function with respect to politics, may also pose problems of legitimacy. Although democratic governments are legitimated by public consent, they also have to act in accordance with the state of knowledge, i.e. they cannot act completely irrationally (even if there is considerable room for interpretation). This mandate of rationality explains why governments are keen to have their policies supported by expert opinion. But it also has a dark side to it. Since new knowledge is communicated via the media, it can have a de-legitimating function to governments if it contradicts their policies. Announcements by the IPCC that the mean temperature keeps rising and indicates an unabated global warming are communicated via the mass media and have an immediate effect on governments. Whether justified or not, they will create the expectation on their part that, unless they demonstrate an active role in implementing measures to curb emissions of $CO_2$, popular support may erode. Thus, any communication of knowledge, be it utopian promises of future advances or dystopian scenarios of impending catastrophes which enunciate pressures to act, may undermine the authority and the legitimacy of governments.

This implies that governments have a genuine interest in controlling the kind of advice given to them and, if possible, the individuals or organisations where it is generated. On the other hand, this control may not be conspicuous because only if the expert advice given to them appears independent and objective does it carry the authority to add to the legitimacy of policy. Partisan advice does not count. This constitutes the interest of scientific advisers, in particular, not to become too involved in the politics of their clients. Politicisation undermines their authority.

## Quality as a question of organisational design

The particular connection between scientific advisers and policymakers has been identified as an institutional layer between science and politics with its own rules. Expert knowledge communicated by advisers has to meet standards that are not sufficiently identified by epistemic criteria of validity and reliability.[5] Rather, it has to have a dual reference. It must be

[5] In a seminal paper William C. Clark and Giandomenico Majone (1985) already advise against overvaluing the importance of the credibility of knowledge or expertise at the cost of two other attributes, namely 'salience' (or relevance of expertise to decision-making) and 'legitimacy' (whether a knowledge generating procedure fairly considers the values, concerns and perspectives of those affected by the decisions or actions based on the very advice).

scientifically sound, *and* it must be politically useful and acceptable. In short, it must be epistemically *and* politically robust.

Epistemic robustness refers to the quality of knowledge in the sense of its validity. As the knowledge generated in advisory contexts responds to political problems and, thus, usually transcends purely disciplinary knowledge it has to meet different requirements of exactness and validity than academic research. Ideally, epistemically robust knowledge claims do not leave any room for interpretation, cannot be disputed by competing evidence, and, thus, cannot be abused. But even knowledge that is characterised by uncertainty and ambivalence may be robust if the probabilities of the postulated functional and causal relations are reliable. Most advice to politics is given in areas of uncertain knowledge which is particularly susceptible to ideological interpretations.

In light of this insight, Oreskes (Chapter 3) suggests an alternative rationale for organising *robust* advisory processes that does not deny uncertainties but rather enables us to live and work with them. The *unitisation model* she advances stems from the world of business. The idea is the same used by oil companies to divide the shares from an oil field amongst the different owners: use mid-course corrections instead of waiting for perfect knowledge at the outset. In this way it is possible to design advisory processes that can cope with uncertainty and indeterminacy even when stakes are high – an idea that is also central to adaptive management. This idea is further illustrated in the chapter by Sluijs, Petersen and Funtowicz (Chapter 14), who describe a structured approach to quality assessment used at the Netherlands National Institute for Public Health and the Environment (RIVM).

Political robustness of knowledge refers to the acceptability and the feasibility to implement recommendations based on it. An advice is robust if it can be politically implemented and meets the needs of the policymakers. Political robustness normally implies that the knowledge and the preferences of those who can be considered stakeholders are taken into account.

Distinguishing between the two dimensions of quality throws new light on two common assumptions underlying most advisory arrangements: first, that *good* or sound scientific knowledge alone provides the best possible foundation for public policy, and second, that the freedom to mutually monitor and criticise each other's contribution (i.e. peer review) is the best possible way to secure inputs of highest quality to public policy (Jasanoff, Chapter 2). Jasanoff argues in her chapter that we have to fundamentally rethink these assumptions in the light of recent scholarship in science studies: Not only is knowledge-making inevitably intertwined with social practices guided by non-epistemic norms and

values, but it also has to proceed in the mode of expertise – not academic science – in order to inform political decision-making. The task of an expert body is thus to translate scientific knowledge into 'serviceable truth' (Jasanoff 1990). Quality controls on science for policy, she concludes, will have to be responsive to normative as well as to cognitive demands. At the same time they will have to be concerned with legitimacy as well as with questions of truths. This is the rationale of what Jasanoff calls the *virtuous reason* model – a model that situates the quality question within the more complex framework of public reason and legitimacy.

The last paper in the first part by Sarewitz (Chapter 4) functions as a provocative counterpoint to the first two by Jasanoff and Oreskes: Sarewitz argues that it may sometimes be better to disentangle science and politics. It can be much more promising to look for effective technological interventions to cope with complex and contested challenges to human well-being than to generate and deploy scientific knowledge aimed at improving decision-making and public policies. What makes certain *technological fixes*[6] such remarkably reliable cause-and-effect machines is that their problem-solving capacity is localised in a particular technology whose performance is largely insensitive to the surrounding context and background conditions. Insensitivity against unexpected disturbances and surprises from the context and background conditions is one of the core ideas of the concept of robustness as well. However, technological fixes not only solve problems technically, but in reducing contextual complexity they also reduce uncertainty and disagreement about certain policy goals.

The quality of scientific advice to politics thus depends on the degree to which these two requirements of robustness are being met. It is obvious that they cannot be met equally at the same time. There is not one ideal advisory arrangement but many, all of which are suboptimal. The overall question is: which form must expert advice have, and in which institutional arrangements must it be generated and communicated to meet the dual requirements of political acceptability and scientific validity? Phrasing the problem in this way means that the quality of expert advice to governments is primarily an issue of organisational design. The focus is on organisational conditions because they influence the quality of advice and, at the same time, they can be shaped by scientists and policymakers. Any attempt to influence and improve the

[6] The term as such is not new. It was probably Alvin Weinberg who first used it (Weinberg 1967).

quality of advice has to take recourse to organisational measures, including, of course, general principles and rules of law.

The advisory organisations in any political system reveal a great variety due to the historical contexts in which they were established and the functions they are supposed to perform. As legitimacy and credibility of expert claims are, to a large extent, bound to national contexts and governance regimes, some authors speak of 'national styles' (Renn 1995). Others allude to the 'civic epistemology', meaning the institutionalised practices by which expert claims are constructed, validated or challenged within a given society (Jasanoff 2005; Miller 2008). On the other hand, comparative analysis shows that such differences may as well be due to sectoral differences as to national ones (see, e.g., Bijker, Bal and Hendriks, 2009: 42). Beyond all national differences, particularly after World War II, certain prototypes of advisory organisations based on the very same general principles are copied from neighbouring regimes – a phenomenon that sometimes is described as a process of mimetic institutional isomorphism (DiMaggio and Powell 1983). In general, the formal and informal rules and mechanisms that structure the internal processes within advisory organisations function quite similarly across sectors and national styles of science advising.[7]

Both variability and convergence can be seen as an expression of the potential threat that any advice poses to the legitimacy of governments and, likewise, that politicisation poses to the authority of scientists, i.e. the reciprocal interest to control the advisory process and outcome described above.[8] With some simplification it could be said that the shaping of any organisation of scientific advice reflects the conflict between independent and dependent advice. All advisory bodies and their procedural rules are situated somewhere on a continuum whose endpoints are dominated by one or the other: dependence of the advisers and their politicisation on one end, and independence or autonomy of the advisers and the technocratic shaping of politics on the other. This conflict constitutes an inherent instability of any advisory arrangement. In particular, it implies that the *intended functions* of

[7] Sectoral and/or national differences come into play when it comes to the wider issues of governance and *policy outcomes*, i.e. the actual 'impact' advisory organisations may have on the policy process. See also Bijker *et al*. 2009.

[8] Pielke has a similar thought when he normatively claims that the design of advisory organisations should reflect the exigencies of the 'issue context' (i.e. degrees of consensus about political values and of the uncertainty in the knowledge base) and its role in the policy process (i.e. broadening or narrowing the spectrum of political choices) (Pielke 2007).

procedural rules may be and typically are altered and factually assume different functions in the process.

## Model organisations for scientific policy advice

What are the implications for the organisation of advisory processes? The chapters in the second and main section of this volume focus each on a particular model or reference organisation for scientific policy advice. By this we mean organisations that serve as blueprints or points of reference for the institutionalisation of policy advice across countries (and sometimes even across policy fields). Considered from a very general perspective, roughly three basic kinds of advisory organisations can be distinguished: collegial bodies (such as various forms of councils, committees, etc.), hierarchical, research-based organisations (ranging from policy-oriented think tanks to intermediary agencies) and academies.[9]

Parts II and III on collegial bodies illustrates the broad range of differences. On one end of the spectrum, there are purely scientific advisory bodies like the International Commission on Radiation Protection (ICRP) (see Streffer, Chapter 6). Established as early as 1928, its parent body is still the International Society of Radiology, a cooperation of about eighty national societies (Clarke and Valentin 2005). Registered as an independent charity in the UK, its recommendations provide the basis for regulation in the field of radiation protection all over the world. The ICRP is a paradigm example of a genuine scientific advisory committee operating according to rules under the auspices of a scholarly society. Its mission is to provide recommendations on appropriate standards of protection without unduly limiting beneficial practices giving rise to radiation exposure. Hence, as Streffer illustrates, a transparent risk-benefit communication is essential for the credibility of the organisation.

A different kind of collegial body is described in Owens' chapter on the Royal Commission on Environmental Pollution in the UK (see Chapter 5). In terms of long-term impact on policy formation, the Royal Commission presents a remarkable success story. Owens' case narrative reveals that the success is firstly due to its character as a 'committee of experts' (versus 'expert committee') that combines specialist expertise, alternative disciplinary perspectives and what she calls an 'intelligent lay perspective'. The body as a whole deliberates and in this way constitutes

[9] Due to the particular focus of this book, one important institution of science advice is not covered in this book, namely the presidential or chief scientific adviser. For the US American presidential adviser see Pielke and Klein (2009; 2010).