

## 1. Executive Summary

### The context for our work: challenges to European scientific governance

This STAGE proposal was prepared in 2000, at a time when the public evaluation of, and response to, scientific and technological innovation were becoming seen as central to both economic and social policy. The spread in preceding months of bovine spongiform encephalopathy (BSE) and the consequent concerns about variant CJD had sensitized Europeans to a wide range of issues – such as the costs of GM food and medicines, the distributive effects of information and communication technologies and issues of environmental protection – which challenged scientific governance to take account of an expanding range of stakeholders and public assessments (including consumer choices and more diffuse expressions of anxiety). Thus scientific governance had become central to the relationship between public accountability and effective strategy and between social confidence and robust decision-making structures; and had achieved wide significance for the whole future of governance in Europe and the place of science and technology within European culture. At the broadest level, then, we could not understand the future of the European project itself without a better understanding of these ‘new politics of science’.

We were encouraged in this focus by the the debate which the Commission had stimulated on developing a *European Research Area*<sup>1</sup>, stimulated by concerns about Europe’s declining research competitiveness, poses relations between science, society and citizens as one of its central concerns. The Commission *White Paper on European Governance* included reference to

‘making scientific expertise more democratic in particular in the sensitive issues of health and safety’<sup>2</sup>

and the November 2000 Commission working document *Science, society and the citizen in Europe*<sup>3</sup> had the aim of provoking debate and stimulating proposals as to new thinking and action. Its prescription includes ‘stepping up the science/society dialogue’, ‘using scientific and technological progress responsibly’ and ‘involving users in definition and implementation of research programmes’.

### The STAGE work programme

STAGE took its cue from these developments. With other work supported at national and European level, it saw a need to find new mechanisms which could reconcile the needs for the continued development of science-based innovation, on which European economic competitiveness depends, with the demands for public participation and

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<sup>1</sup> **Towards a European research area:** communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions. Document reference: COM(00) 6 Date: 18 January 2000

<sup>2</sup> October 2000 – Document reference: SEC (2000) 1547/7 final – page 7

<sup>3</sup> 14 November 2000 – Document reference: SEC (2000) 1973

accountability. Within the confines of resources and approach of a thematic network, our aim was to make an input to understanding which could contribute to the broad shape of these new arrangements.

In research terms the goal of the STAGE thematic network was to develop a heuristic comparative typology of forms of public participation in decision-making about technology, innovation and science-bound issues. In particular we sought to:

- understand more about the structure, process and boundary characteristics of national policy cultures in confronting common issues of science and technology governance;
- analyse the particular science and technology issues, actors and processes which each policy culture highlights in relation to three technology domains – ITC, genetic modification in relation to food and medicines, and environmental management
- offer in consequence a more secure knowledge base to frame policy and practice concerning wider social participation in the governance of science and technology and disseminate the results to a range of potential users

STAGE was contracted to work for 36 months from mid-September 2001 to mid-September 2004. In the event, because we took longer to assimilate a set of case studies that was much more extensive than originally planned, and because of delays in our final dissemination events, our contract was extended to 39 months until mid-December 2004.

Although we followed our overall objectives quite closely, we modified our means of achieving them during the first year. This stemmed from the development of a much more sophisticated understanding of the dimensions of the governance of science and technology, which culminated in the production of our first discussion paper, *Consuming, Engaging and Confronting Science: the Emerging Dimensions of Scientific Citizenship* (Elam and Bertilsson, March 2002).

In parallel, progress made at our early conferences and workshops led to a much clearer view of how case studies could contribute to our work. This work in developing a perspective on our case studies was led initially by João Nunes and Marisa Matias. Nunes and Matias argued that case studies should be chosen for their ‘anchoring’ capacity: for their facility in providing entry points into other case studies which may serve as ‘qualifiers’ to the main case. Dialogue between the anchoring studies and these wider dimensions is intended to be a continuing feature of this approach and a continuing resource of the STAGE network. Working with this approach would achieve a better understanding of the way in which the local policy systems in our eight countries respond to common European and local issues of science and technology policy and management, compared to continuing with separate studies to illuminate the ‘top-down’ and ‘bottom-up’ aspects, as originally proposed. We believe that these methodological changes, in line with the ‘analytical and empirical flexibility’ in the interests of the wider project to

which we initially committed ourselves have enhanced the explanatory power of the network.

A bridge between this methodological approach and the conceptual analysis shown in the first working paper was provided by the original leaders of work packages 2 and 3, Egil Kallerud and Rob Hagendijk. After extensive discussions with the team they produced in September 2002 a *Framework for STAGE Case Studies*. This was further developed into Discussion Paper 2 – *Changing Conceptions of Governance in Science and Technology in Europe: a Framework for Analysis* - by March 2003. These papers set out a typology of scientific governance, with six principal forms presented as ideal types<sup>4</sup>, and some detailed guidelines for developing the case studies around key stages in the process of public engagement:

- setting the agenda;
- framing issues;
- framing expertise and publics;
- the forms and formats of participation used;
- outcomes – decisions and their effects;
- how this fitted into the overall sequential structure of the policy process.

Because of the significance of these two discussion papers for our work we have included them in volume 1 of this report.

As a result of applying this more developed methodology we produced a more extensive set of case studies – 29 papers as compared with the planned 8 – which are individually richer and which were the background for a fuller and more nuanced analysis of how national, European and global systems interact with different forms of governance in determining issues, actors and outcomes. Our detailed analysis can be found in the substance of this report and the case studies are appended in full; we hope that others will find the case studies useful for secondary analysis and thus add to the value of STAGE's work. In this executive summary we first summarise some of the main patterns of scientific governance across Europe, then give a synthesis of our conclusions about current science and technology governance in Europe, look more closely at the deliberative mode, and offer some reflections on the potential of this body of knowledge to be used, through careful analysis and selective learning, to generate some competitive advantage for Europe. Finally, in summarising our conclusions, we present our ten lessons for deliberative practice and scientific governance.

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<sup>4</sup> These are set out more fully in section 3.3 of this report. These framing discussion papers, 1 and 2, can be found in full in annex 2 to this Report, published in Volume 1. The case studies appear as annex 3, in Volumes 2,3,and 4.

## **Main features and issues in current science and technology governance in Europe**

### ***(a) Technology as a driver of the governance agenda***

In attempting to learn lessons for the future of S&T governance we need first to try to understand how far the particular features of particular technologies have influence on the particular forms of governance response. Can it be argued that the same cases and technological developments evoke essentially similar patterns of governance and public response across Europe?

In our judgement, the development of public controversy is unlikely to be a matter of *either* technology *or* context but instead a combination of the two. Thus, in European nations where certain religious views hold strong, issues of the sanctity of human life may resonate especially (eg with regard to stem cell research), whilst in others questions of globalisation are seen as more significant (for example, in relation to GM foods). There is a particular danger of over-generalising across technologies and contexts in this regard. We recommend that further research be conducted into these questions of ‘technology specificity’ – especially with regard to new and emerging technologies. Technological characteristics alone cannot explain patterns of social response and we resist the idea that certain technologies *cause* public controversy. Instead, our case studies suggest much more complex patterns of social construction and response. Further reflection on our case study material could be a useful starting point for the early identification of future controversies.

### ***(b) Multi-actor governance***

Governance implies processes of policy setting, implementation and assessment which are not confined to government itself but which extend through a network of organisations and agencies and collective actors. In this narrow, literal sense, all contemporary scientific governance is multi-actor: the participation of government - be it European, member state or local – is necessary, but insufficient.

In looking at the broader role of multi-actor governance in this study we have been interested in the scope of these government centred networks and the dynamics by which they are constructed and maintained. Who is involved, what are their constituencies, and how do these relate to wider publics? Our cases also show the functioning of multi-actor governance in a narrower sense – in terms of the interplay of the executive, the judiciary and the legislature, and the way in which those processes interact with wider public and stakeholder engagement.

Multi-actor governance of science often echoes wider governance arrangements in other policy domains. In Norway, it exhibits aspects of ‘inclusive corporatism’ seen by some observers to be an entrenched part of Norwegian political culture. It includes among its members a number of representatives from major stakeholders, including ‘critical’ NGOs and experts. To balance between these various groups and functions has been a delicate task but it also contributes to the exclusion from debate of the general public. The

technology board is a ‘proxy’ public debate on biotechnology, providing a sufficiently broad framework and credible standards for debating biotechnology issues to secure a key role for its input to public debate and to the political process. Corporatist structures and processes also lead to the exclusion of citizens from debate in Finland, where the partners are firms, research institutions, state agencies and ministries. A form of deliberation takes place between these, but a tradition of acceptance of new technology and the authority of the state means that unlike Norway, contacts with NGOs are generally weak. However, in the case of forest biotechnology, Finnish scientific corporatism is modified, and reflects the diverse set of interest groups and stakeholders connected to the forest sector, although NGOs complain about the limited impact of their opinions. Some of the inclusivity reflected in the governance of this sector may reflect ownership patterns – approximately every fifth Finnish family owns some forest, and private ownership accounts for over 75% of the wood used by the industry.

If the UK GM crops debate turned into a tentative if vulnerable experiment of a multi-level corporatist-deliberative-discretionary hybrid in science policy, the more or less contemporaneous GM food debate in the Netherlands can be seen as something of an anti corporatist experiment, having its roots in the public engagement turn allied to scepticism about industry and NGOs having dominated a nuclear energy debate in the 1980s. The nuclear energy debate itself, having roots in popular protest against nuclear power plants, had been an attempt to broaden the range of participants, but had produced a decisive ‘no’ response which the government went on to ignore. Whilst responding to the momentum participatory approaches had established, a principal aim of the exercise was to ensure that the GM crops debate did not get hijacked by participants and the broadest scope for decision-taking was retained by government.

The Danish Board of Technology may be seen as having established one of the distinctive roles in multi-actor governance. Although its work is seen to be grounded in public participation, the public cannot be seen as its clients. Rather the Board can be seen as working for industry and for central and local government in testing the real social space available for new technologies: anticipating where opposition may surface in the real world, and helping sensitise participants in the exercise to the complexities of managing change – potentially shaping as well as reflecting new technology (an approach exemplified in the electronic patients’ records case).

### ***(c) Dynamics of engagement***

Engagement can display a wide range of aims, processes, frameworks and dynamics, locating itself upstream or downstream, and demonstrating anticipatory (pre-innovation), participatory (usually at the point of innovation) or even post-participatory features (as when engagement exercises encourage further debate about the exercises themselves).

Although the wider public debates and protests that have surrounded participatory exercises in the Netherlands have developed a wide agenda of issues, formal public participations have always had a downstream focus, being narrowly politically and technically framed: thus the nuclear power debate was framed as being about the siting of

reactors rather than broader issues of energy and environmental policy, and GM food about the conditions in which GM products and processes would be acceptable rather than the desirability of GM itself or its place in wider food policy. The Netherlands exception was the broader anticipatory approach in the IT debate of the early 1980s, with a focus on technology policy and preparing the public for technical change, and on establishing an ongoing capacity for technology assessment. However, even this debate was downstream in the sense that IT was assumed to be a technological imperative.

Until the early 1980s biotechnology was not seen as an independent field for regulation in Denmark and as a result the early approach to genetics issues was anticipatory. In 1980, with genetics being introduced to pharmaceutical products as well as to human reproduction, concerns were demarcated between risk, framed as a technical issue, and ethics which was perceived as an issue of general public concern. The establishment of the Board of Technology in 1986 led to the adoption of a wide range of techniques for assessment and citizen involvement applied to an equally wide range of issues, selected from an annual bids process.

In countries with strong corporatist traditions, like Greece, the public is less likely to get involved into the debating of new science and technology issues. This has been a recurring theme in the Greek case studies, especially in the ENGOs case, where, in order to depoliticise the debate, the State attempted the corporatist inclusion of the leading groups.

The UK has witnessed or contemplated most forms of public participation in the last somewhat fevered decade. Agonistic action in particular on GM crops has been influential in prompting media coverage, which in some quarters of the press turned into media campaigns which supported consumer boycotts. The food producer industry was trying to appeal to the government for rationality in the face of prejudice just as consumer forces were rushing to align themselves to a new reality of the marketplace. Supermarkets were aided in anti-GM food policies by similar action by food-processing companies who supplied them.

Arguably the most sustained public deliberation during the period in the UK has been on the idea of deliberation itself. Academics and NGOs were very influential in this and in particular in the framing of the Jenkin Report, *Science and Society*. Since *GM Nation?* there is some evidence of the coalition of interests between academics and NGOs trying to consolidate deliberative processes, push them upstream, and extend their scope to cover decision-making within, for example, the research councils.

Although countries have introduced procedures for incorporating scientific advice into government decision-making, there appear to be no regular patterns across Europe in post-participatory processes.

#### **(d) Transnational dimensions**

The UK Jenkin Report, *Science and Society*, pointed up a paradox in that just as science and technology dramatically increased its offer of products and processes, the possibility arose that this might be prejudiced by public distrust. At that time the UK was playing

science governance catch up in relation to many established countries of northern Europe, but nevertheless the full-hearted way that Jenkin embraced a more dialogic approach to public engagement temporarily catapulted the UK into a 'leadership' role on issues of scientific advice and on participation. The more ambitious claims for participation - as a new social technology which would extend democratic approaches into science and provide new trajectories of socio-technical change enjoying wider public consent - foundered in part on a new paradox: that EU policies and processes, but also those of global trade and economic regimes, can be seen to be the wider framing processes at work. Neo-liberal approaches to competition and trade, in which the need to develop a competitive knowledge economy dominated, strongly determined an agenda of issues, and set restricted frames for public engagement on them.

This new paradox recurs in our case studies. We see the problem of the articulation of public concerns being out of step with increasingly transnationally defined technology policies in the Netherlands, whilst Finland becomes a model of the knowledge economy, as one where participative mechanisms largely do not need to be invoked. Swedish trust in their own scientists leads to an expanded 'republic of science' where the wider social choices surrounding new technologies are left for the scientists themselves to judge and manage. Even in Denmark, the reference point on European pluralism and public participation on S&T, the Danish Board of Technology underwent a period of political threat. European restrictions on opt-out were seen to provide constrained room for manoeuvre of the UK government in relation to GM crops.

Of course, in other cases transnational borrowings and reference points helped to challenge existing positions and open up space for debate. In 1993, as the suspicion arose of the existence of BSE cases in the country, Portuguese authorities invoked scientific uncertainty on how to diagnose the disease as an argument to declare its non-existence. In 1996, however, as a consequence of the Europeanization of the BSE controversy, the Portuguese political authorities were forced to accept the existence of the BSE risk and of cases in the country.

Further, Europe itself has become a space for study, analysis and social learning. Here the EU itself and in particular the Citizens and Governance in Knowledge-Based Society and the Science and Society streams of FP6, have been important contexts of learning. Portuguese social movements took advantage of their short and recent history to draw in a selective way on other European experiences, appropriating and adapting some of the most innovative initiatives and avoiding responses that had failed in other contexts. The overwhelming majority of borrowings of institutions and processes appear to be from within Europe and this may contribute evidence to the existence of a distinctive European model. However, the foreign tag on counter-expertise has not always played well in domestic politics, and this is particularly true in Greece where national solutions have particular political salience. In addition, it appears that the Greek environmental NGOs, in attempting to read a European programme into their domestic politics, may have neglected opportunities to learn about Greek popular priorities in the environmental field.

**(e) *Convergence and divergence***

In their most open form, deliberative approaches to scientific governance might be expected to open up a variety of issues and values, reflecting the diversity we have found in national systems across Europe. They would be bottom-up agents of divergence. But our case studies have made us aware of the importance of the framing of deliberative exercises. Framing can be inclusive or restrictive with regard to the choice of issues, the selection of participants, the construction of evidence and the significance of results in determining policy outcomes. Such framing can reflect and enhance the significance of local concerns, or it can reflect European or global agendas.

As we already noted, global neo-liberal pressure towards economic competition within and between the triads of Europe, Japan and the U.S. and in relation to developing East Asian economic power, is one of the strongest drivers towards contemporary convergence of national and world regional systems. The analyses that support these developments are variants on the old linear model of innovation, tying economic success closely to achievements in science and technology.

Following convergence down this route we might expect deliberative mechanisms to develop in future into a restricted role in providing information on the socio-technical space open for market motivated and market or discretionary delivered solutions. However, there are other possibilities open. Looking behind the surface, the limits of consensus may be in the course of being reached. The case of biotechnology controversies in Denmark reflects fundamental political disagreements about what constitutes the good society, as do the conflicts between GM and organic production in the UK. Such developments present a challenge to governance – that of coexistence rather than consensus. They may leave behind politically fragile settlements whose legitimacy can be called into question.

Our reading of the Portuguese cases seems to apply across most of the countries we have studied. On the one hand, it is an environment that promotes market modes of governance - many countries that were used to dealing with scientific governance issues primarily in other terms, like the Netherlands and Denmark, are forced to acknowledge and adapt to this change. On the other hand, it is one in which agonistic modes of governance will be increasingly significant. So the wider economic policy environment may look for consensus within societies and convergence between them, but may promote dissensus and divergence.

Some states are not yet fully subject to the deliberative turn, and although presenting different features, they suggest that convergence is a slow process. Norway, self-consciously identified as a laggard, conservative state, demonstrates a view of technology strongly anchored in regulatory law and practice. The ethics, social utility, sustainability, and the precautionary principle that defines the restrictive and ‘conservative’ regulatory policy adopted by Norway, may also at the same time be seen as a ‘provident’ policy, as these concerns have increasingly become parts of European regulatory policy. More deliberative modes of governance in S&T policy have emerged in Norway during the last decade with the establishment of an institutional structure of S&T policy by which some completely new institutions have been charged with a

specific responsibility to stimulate public debate and facilitate broader public participation in processes of science and technology policy. As these develop they may take a different course from the market led – and market-constrained - initiatives of other countries.

In terms of the pressures for convergence, the implications of international economic competition for scientific governance is not a new issue. Discussion amongst European governments of the extent to which public scepticism towards science and technology is an obstacle to the creation of an ‘innovative knowledge society’ dates back over 20 years.<sup>5</sup> However, there is little doubt that global regulatory regimes and pressures within Europe from the Lisbon agenda have given market governance additional impetus. In consequence it has been argued that the deliberative agenda and the Danish model of participatory science and technology governance are being subsumed into the discourse of economic growth - changing the deliberative mode towards more discretionary and educational modes, co-existing with the market mode as for instance in the GM labelling case. Thus Danish consensus conferences mix ideals of deliberation between citizens and consumer contributions to policy.

Portugal is in a unique position, having deliberately ‘de-selected’ popular participation as a contribution to democracy in the period of ‘normalisation’ which followed a plethora of popular and citizen initiatives in 1974-75. Portugal today represents discretionary scientific governance with a strong educational component, and no institutions for experimenting with participatory procedures. Unlike Greece, agonistic struggle is seen on particular issues and in the co-incineration case enjoyed a kind of victory after a general election changed policy. This capacity for mobilisation, and its local roots, are one potential for new approaches to scientific governance; another is the contradiction between the attention to the promotion of scientific education and culture, and the absence of the Ministry from most public controversies on S&T; and a third is the discrepancy between the positions on controversial issues such as environmental problems taken in European forums and those for internal consumption.

Of the countries we have studied Norway and Portugal may be those most likely to produce new trends in scientific governance.

### **Some conclusions on the current governance of science and technology across Europe**

The results of our work show that these are indeed fascinating times for the political treatment of science and governance across Europe. Our cases suggest a diversity of European governance practice – but also certain thematic links and common debates.

Of particular relevance to this report, social initiatives in democratic engagement, once limited to a small number of European nations, have now become more widespread. The

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<sup>5</sup> To the Versailles Economic Summit of the EU in June 1982, which had on the agenda public resistance to technical change.

Danish model of ‘consensus conferences’ has been widely borrowed and, even more widely, discussed. Dutch approaches to national debate and consensus formation (for example, around energy policy) no longer appear quite so unique in the European context as they did in the 1980s. The UK has moved from its previous reliance on expert committees to some experimentation with public debate and engagement (notably, in the context of genetically modified foods but likely also in the area of nanotechnology). The European Commission itself has adopted a ‘Science and Society action plan’ in which issues of public support and engagement are given prominence.

On the one hand, matters of science and technology policy (especially genetic modification, stem cells and nanotechnology) have become central to political and institutional action within Europe. On the other, there would appear to be a growing acceptance (fuelled partly by experience of previous controversies) that such matters cannot be tackled without public engagement and support (or at least legitimisation). In this situation, it is perhaps tempting to talk of a new European paradigm for scientific governance in which science and society work together and innovative forms of social partnership are being created. In this report we examine the evidence for a new European governance style – but also consider a series of critical issues concerning the future of science, technology and governance in Europe.

Certainly, there is a significant disparity between this (admittedly partial) turn towards engagement in the countries of Europe and the wider experience of global scientific governance. European discussions of the need for public consultation appear very different in focus and tone from the treatment of science and innovation in North or South America, Africa or Australia. Of course, there have been (and indeed still are) initiatives of this type in the USA, Canada and Australia (to offer three obvious examples) but such initiatives have not generally been supported at the national institutional level nor are they ‘mainstream’ in the manner talk of public consultation and engagement has become in Europe.

In drawing attention to this apparent trend, it is also important to maintain a critical perspective on the kinds of change that have taken place. As a number of colleagues within the STAGE network have observed, there is a danger that this shift is taking place largely at the level of rhetoric – of ‘talk about talk’ (Bertilson and Elam, Hagendijk, Horst, Irwin). Equally, in an entity of the scale, complexity and diversity of the European Union, it is unlikely that any trend will be uniform or one-directional. As previous research in the EU has suggested (Irwin, Rothstein, Yearley and Mc Carthy) standardisation and diversity often accompany one another so that attempts to impose a common European pattern can actually accentuate questions of local identity and difference. Immediately, therefore, we encounter the necessity for analytical scepticism about claims to a commonly applied European paradigm or a sweeping shift in international institutional practice. There is also a methodological requirement to move beyond broad statements about paradigm shift and towards a more careful empirical and comparative treatment of national practices.

One major aim of this report will be to examine the balance between national/ and supranational statements of policy intent and the actual ‘on the ground’ (or lived) experience of policy formation and enactment. Included in this will be a discussion of the often-implicit aims of the new governance style: does public engagement necessarily lead to policy consensus? Will such deliberation facilitate or impede the innovation process? At the heart of the discussion here will be an attempt to evaluate recent governance initiatives across Europe and to consider their implications for the political direction of science and technology.

Our argument is **not** that a new paradigm of engagement has swept across Europe, pushing aside the old emphasis on innovation and economic competition. Although interesting social experiments in engagement have taken place, it is not plausible to suggest that these have replaced more familiar modes of governance and institutional action. In any case, significant debate still surrounds the form and effectiveness of such experiments.

What we **do** argue instead is that Western Europe represents a particularly important site for the study and development of scientific governance. As our typology of governance will convey, it is over-simplistic to portray European scientific governance as caught in a battle between two models of governance (the neo-classical vs the deliberative). Instead, we present a situation where a number of governance modes are in loose (often implicit and unacknowledged) co-existence and (sometimes) competition. We do not view any single ‘paradigm’ as being entirely dominant (although the ‘market’ mode appears to be growing in influence across Europe right now). But we do portray a European scientific culture into which there has been an infusion of deliberative ideals and a consequent questioning of the best route to social and technological innovation. We also argue that concrete examples of deliberative governance are shaped by the simultaneous existence of several other modes of governance: deliberation cannot simply be viewed as an ideal but must also take tangible shape in settings where there are other influences on the form and direction of scientific governance.

What makes Europe distinctive is not the replacement of one governance mode by another. Instead, there is a distinctively European culture of scientific governance in which new questions are being asked and issues of ‘science, society and innovation’ have become more mainstream than in the past. Our report represents one attempt to explore this contemporary scientific and governance culture in Europe and to assess the lessons for analysis and action. Going further, however, our report also raises more critical questions for the European governance of science. As we will suggest, the notion that scientific governance can operate exclusively at national level is very much open to question. It is also necessary to consider the wider challenges to governance under three broad headings: the *global* context, the context of *innovation*, the *social, economic and cultural* context of science.

## **A typology of governance**

Our argument then is that it is necessary to move beyond a simple bi-modal presentation of governance styles. Too much discussion has taken the form of either/or presentation: typically, *either* an emphasis on innovation and competition *or* a concern with democracy and engagement. As a means of moving beyond this, we next present a basic taxonomy through which different forms of governance may be characterized and related to one another.

One important aspect of this taxonomy (or typology) is to compare the roles assigned to ‘public’ groups within each mode. Is ‘the public’ being constructed as active or passive; as consumers or as citizens; as homogeneous and stable or as fractured and dynamic? Each mode ‘performs’ the relationship between scientific/technological innovation and wider society in a distinctive manner. In what follows, some very broad generalisations are offered: no country fits straightforwardly into any single classification and all combine a mix of these elements. Equally, the categories are not intended to be watertight. Considerable overlaps can be identified, for example, between the corporatist and deliberative (or educational and market) approaches.

The typology proposed here comprises the following six types:

***Discretionary:*** In discretionary governance, policy making takes place with virtually no explicit interaction with ‘the public’. Decisions are taken with very little input to the policy process by any group outside the institutions directly responsible for science and technology policy (essentially, government departments and closely related industrial and scientific bodies). On a general level, science governance in Portugal and Greece can be seen to exemplify this discretionary mode in the sense that governance is presented primarily as a matter for government. Government is portrayed as serving universal goals of progress, welfare and growth. Equally, the public interest is easy to define and enact. Within this mode, there is no sustained effort to incorporate the views of various publics in policy processes, let alone to develop a culture of scientific citizenship;

***Corporatist:*** Within corporatist governance, differences of interest between stakeholders are recognized as inputs to processes of negotiation in which workable compromises are sought. The processes of negotiation take place within a closed or highly regulated space, so the decisive feature is the question of admission and recognition of legitimate stakeholders. In Finland and Sweden the creation of a knowledge society as a necessary prerequisite for the establishment of a well-functioning national innovation system has been seen as a commonly shared goal. Hence, all relevant stakeholders have been expected to contribute to the fulfilment of this vision, leaving very little room for opposing voices to be heard. Norway and Denmark, on the other hand, can be seen to have shaped an inclusive corporatist mode of governance where various oppositional voices are sought to be included as stakeholders in the processes of negotiation. Perhaps the basic assumption within corporatist governance is that real differences of interest

exist but that these can be defined and then resolved through closed processes of deliberation and negotiation;

**Educational:** Educational modes of governance assume that conflicts or tensions regarding science and technology policy are founded on a lack of knowledge on the part of the public. Hence it is necessary to educate the public through dissemination of scientific (expert) knowledge in order to create an informed public of scientific citizens that understand the experts' assessment of the problems and possibilities of science. Educational modes seem to be part of the style of governance in many European countries, particularly in connection to the high-profile controversies surrounding biotechnology, where initiatives aiming at disseminating knowledge (exhibitions, special teaching material for schools, information campaigns) have been part of the governance portfolio. A notable example of this educational mode has been the effort to create a pervasive and widely spread scientific culture in Portugal through a national agency - *Ciencia Viva* – in charge of programmes for the promotion of scientific education and culture. But the efforts in Finland and Sweden to increase the public understanding of science as a necessary component of building a knowledge society can also be seen as exemplifying this educational mode of governance;

**Market:** Market governance is based on the notion that science and technology can be governed through the economic mechanisms of demand and supply. The value of science comes from the surplus value created through its commercialisation and the general contribution to the generation of wealth in society. Scientific governance should be supportive of this potential. In this mode, the public participates as customers and consumers in a market when they make decisions about purchasing a product. Compared to countries outside the EU (notably the US) European traditions of governance may be less explicitly market oriented (although science and technology policy discussion in the UK about the need for 'confident consumers' fits this model well). However, there are signs that economic liberalisation and deregulation are increasingly leading to a market mode of governance (as for example in Finland). This is exemplified also by the persistent European suggestion that GMO labelling is the best means of letting consumers choose for themselves rather than relying on complex regulatory structures;

**Agonistic:** Agonistic governance takes place under conditions of confrontation and adversity, when decisions have to be made in a political context where positions are strongly opposed. In general the political democracies of Europe are not primarily characterised by agonistic forms of governance. It seems, however, that certain policy processes regarding science and technology evolve in ways which can lead to a form of agonistic stalemate. Governance of nuclear waste in the UK, for instance, is an example where policy decisions have been made in the face of heated public opposition. Agonistic processes suggest a loss of control by the state (either deliberate or, more generally, not) as a variety of stakeholders struggle for authority and influence;

**Deliberative:** Deliberative governance rests on the ideal that governance of science can be based on strong public support deriving from a continuous public debate of, and

engagement with, science. Consensual agreements developed within the framework of the public sphere serve as foundations for legitimate policy decisions. In this mode, members of the public do not partake as consumers of science, but as scientific citizens who take on the perspective of the common good. This concept of public deliberation cannot be seen as a complete description of policy formation in any of the European countries. Nevertheless, it seems to be an ideal, which – as we have already noted - is rather important in the constitution of science governance, and various participatory exercises have been moulded around this aspiration. In particular, the consensus conferences arranged by the Danish Board of Technology have been influential in this context, but also the GM Nation public debate in the UK must be seen as a significant attempt to realise the ideal of deliberation. The assumption within deliberative governance is that lay participation will improve the quality of decision-making, stimulate rational debate and provide a new route to social consensus.

As this brief discussion of our typology has demonstrated, European scientific governance cannot be interpreted as a simple pattern of convergence or a linear, uni-directional development. Our European case-studies demonstrate that none of the examined European countries can be characterised by only one of these modes of governance. Rather, each country can best be described as a unique mix of several of these modes.

For example, the UK manifests just about every mode – although corporatism has largely been out of fashion there since the 1970s. Meanwhile, Denmark also contains a modal mix but has historically placed less political emphasis on market governance. Furthermore, it seems that the different national styles of governance are not stable, but rather in periodic transition (Sweden may increasingly be operating within an educational/discretionary mode whilst Norway shows signs of moving in a very different direction). Although there seem to be patterns of mutual influence, it is also clear that different countries follow different trajectories, individually shaped by local, national cultures. In this context, it is also interesting to consider how directly ‘European’ institutions (especially the European Commission) fit with our typology. Our suggestion again is that these typically combine several modes (sometimes within one policy statement) with the market, educational and deliberative approaches often being expressed.

Our argument is that it is specifically this co-existence of modes that represents the European framework (or style) of scientific governance. As this report will go on to discuss in considerable detail, the juxtaposition and ‘churning’ of modes offers a unique opportunity to consider the future possibilities for scientific governance. In that sense, Europe represents a distinctive social and institutional laboratory – although, given the close link between scientific governance and wider political and institutional cultures, it cannot be assumed that what works in one setting will necessarily work elsewhere.

We are not offering a unitary paradigm of scientific governance in Europe but instead a more complex – but distinctive in international terms – pattern of diversity, co-existence

and contradiction/complementarity. It follows that merely criticising individual nations for being ‘insufficiently’ committed to one mode or another (for example, for failing to live up to deliberative ideals) may be of limited intellectual and practical benefit. Instead, we should recognise that nations will almost inevitably combine modes. However, this inevitable combination in turn suggests the need for greater analytical clarity – and policy reflection. The current political tendency is to make different ‘modal appeals’ simultaneously: as when institutional rhetoric (for example, in government reports and major political speeches) shifts - at times, very abruptly - between public engagement and greater international competitiveness without pausing to consider their possible connection or tension. Our recommendation is that, rather than presenting each of the modes as separate and hermetically sealed, serious reflection should now be given to their mutual accommodation in policy practice. We see little evidence that this process of critical reflection has so far begun.

The typology of modes of science governance should therefore not be seen as a meta-framework for judging (or comparing) national styles of science governance, in order to assess whether they comply with a single European paradigm of science governance. Instead, the typology is employed as a heuristic model, which makes it possible to expand the understanding of the various patterns of convergence and divergence across Europe. It is also important to stress that the allocation of each governance case-study to a particular mode is likely to be contested (one commentator’s ‘deliberative’ mode may appear ‘educational’ to another). As is common to heuristic models the ‘modes’ distinguished are intended as ‘sensitizing devices’ (Blumer, 1969).<sup>6</sup> There are no rigid criteria to distinguish between modes in an indisputable manner. Different modes may also be rather less distinctive in practice than they appear to be in principle. Thus, the deliberative case for ‘broadening the stakeholders’ can develop in practice into an extension of older corporatist principles. These are fluid judgements, open to contestation. This suggestion is strongly supported by our empirical findings.

It seems to be an overall lesson from our case-studies that claims about procedural (un)fairness, accusations of manipulation/bias as well as the questioning of motives represent an important and integral part of debates over science governance. In the UK, for instance, parts of industry denounced the outcome of the *GM Nation?* public debate by stressing that the organisation of the exercise had allowed too much space for viewpoints from radical participants rather than maintaining a more controlled deliberative process (Healey)<sup>7</sup>. Passing judgements on forms of participation and governance are therefore significant and often constitutive elements in public debates with substantive consequences. They form a rhetorical reservoir of arguments that can be used by different stakeholders in order to sustain substantive positions, questions and outcomes and they should be analysed as such.

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<sup>6</sup> Blumer, H. (1969). Symbolic interactionism: perspective and method. Englewood Cliffs, N.J., Prentice-Hall.

<sup>7</sup> STAGE Discussion Paper 28, this report, volume 4

What we have dubbed ‘deliberative governance’ played a special role in our analysis as ideas about deliberative democracy have played such an important role inspiring governments and citizens to develop and engage new forms of public engagement with science. Evidently, the existence of a European deliberative rhetoric about ‘science and society engagement’ is an important phenomenon which has an effect in itself. What lessons can be drawn from our case studies for the conduct of future engagement initiatives? In the remainder of this executive summary, we will focus especially on processes of deliberation and engagement within Europe

### **The deliberative mode in European practice**

As has already been suggested, in all the countries studied within our project scientific governance has been on the agenda as an increasingly important aspect of policy making. Furthermore, ideals about public participation have surfaced in all countries, although there are significant differences in the extent to which such ideals have actually been implemented. Thus, countries such as The Netherlands, Denmark and the UK have been relatively energetic in this regard whilst deliberation has been less influential as a governance mode in Portugal, Greece and Finland. In this context, it should also be acknowledged that the need for public engagement has in some cases originated within the policy establishment – as, for instance, has largely been the case with GM debate in UK and the Netherlands - or from civil society - as was demonstrated in the case studies from Greece and Portugal.

In general, it is difficult to identify a clear pattern of convergence with regard to the relation between policy formulation and outcome of actual participatory exercises designed to make an input to policy. The case-studies do not suggest a straightforward connection between the conclusions of specific participatory exercises and changes in policy. However, the identification of a causal relationship between deliberative ‘output’ and policy change is less straightforward than is often presented: we are typically dealing with complex multi-variable situations where it is often hard to identify a single ‘cause’ of policy change. Rather we should see the relation as one of mutual shaping or, more accurately, as a *co-evolution* of public debate and policy processes. It is however also clear that there is a widespread demand for greater clarity about the status of participatory exercises ahead of their commencement. In particular, there is very commonly public scepticism about whether government will change its views as a consequence of deliberative recommendations.

While it is understandable that governments will wish to keep their options open in terms of awaiting the actual outputs of a deliberative exercise before committing to take the findings seriously, such a non-committal stance encourages a climate of suspicion and distrust (‘they’ll only accept the result if it tells them what they want to hear’). Once a government states that the goal of a participatory exercise is to have policy impacts, then government should be committed to incorporate (or at least pay close and explicit attention to) the outcome – otherwise the exercises might very well produce adverse effects in terms of lack of trust and engagement. One theme across our cases was a

persistent scepticism about the extent to which engagement exercises were ‘real’ or ‘legitimatory’.

It is important to emphasise the concrete situations in which public engagement in scientific governance is introduced. The case studies present a continuum stretching from a situation in which they are employed as way of trying to soften or avoid *agonistic* stalemate (as the debates about GM in Netherlands and UK demonstrate) or as a way of dealing with *anticipated conflicts* (as in the country cases from Sweden and Finland) in situations where the relation to the publics so far has been primarily corporativist or even discretionary.

The case studies also demonstrate a rather diverging picture when we ask whether the public engagement is supposed to be an *end in itself* or a *means to a particular outcome*. As an *end in itself* public engagement is introduced primarily as a way of empowering participants and creating a culture of scientific citizenship. As a *means* deliberative initiatives can be employed both to extend corporativist efficiency (by resolving potential conflicts through negotiation) and to learn about consumer/citizen preferences in order to make socially robust public policy. In this context a number of points seem relevant:

- It is important to establish whether public engagement with science is seen as a means to *support and sustain* a high rate of technical innovation (as in the educational modes in Sweden and Finland) or *oppose* it (as in Norway, where values and public scepticism are incorporated as a kind of legitimate stakeholder in corporativist negotiations);
- It is important to be aware of how notions of common ground, common good, rational arguments and responsibility for the whole enter the policy discussion about participatory exercises. In some cases these ideals seem to be expected as a form of outcome – for instance in the Danish model of consensus conference. But sometimes they also seem to be a necessary input – as in the Dutch case, when participants in the GM debate should be ‘innocent’ citizens with no prior strong opinions on the issue;
- There is a need to consider further the relationship between participatory mechanisms and marketization – it seems that, in some cases, participatory methods become a way of exercising consumer choice. In this context, it is interesting to discuss the difference between consumers exercising their rights to choose based on individual preferences, and the ideal of deliberation by citizens committed to being convinced by the better argument. This is not to say that the latter is better than the former, but in actual exercises confusion between the two might cause distress and distrust. Furthermore, it is possible that there are a number of issues which can probably not be dealt with adequately in a market mode (for example, broad issues of research ethics or regulatory frameworks);

- In close connection to the latter points, our cases raise questions concerning the best relationship between participatory initiatives and conventional policy institutions: should such initiatives be kept at arm's length from government or more fully integrated? The arm's length conduct of participatory initiatives is relatively common – with a semi-independent agency (eg the Danish Board of Technology or the UK Agriculture and Environment Biotechnology Commission) charged with conducting initiatives at a distance from government. From a governmental perspective, such a structure allows a very visible independence and autonomy for deliberative initiatives. However, this relationship can leave the agencies in question struggling very publicly for resources and vulnerable to political change – and can create a situation where they are seen as optional extras to the policy process rather than a central feature.

The cases also raise important issues about the relationship between wider public participation and scientific review of the same issues. One common way of dealing with this is for government to separate the 'public' and 'scientific' discussions of an issue (for example, the UK decision about whether to proceed with the commercialisation of GM crops). The alternative is to bring scientific experts and members of the public more directly together in order to allow an exchange of views and assessments (this is partially attempted within consensus conferences).

From the STAGE perspective, one vital aspect of any participatory process is the actual 'framing' of the debate ie deciding which questions to ask, what sources of evidence are necessary, how the key issues are to be defined. This is especially important when the issues dealt with across the network can be encapsulated in a variety of ways: is the nuclear power debate in Sweden about the science and technology of radioactive waste disposal or the maintenance and encouragement of the larger nuclear fuel cycle (including military uses)? Very often, ethical, political, scientific and legal issues are not easily separated so that implicit decisions are made to prioritise certain questions over others and to define the issues in particular ways. Our suggestion is that this phase of problem definition and framing is integral to the policy process. If deliberative initiatives are to be worthwhile then we recommend that public groups should participate in the initial stage of problem definition (ie in deciding what needs to be discussed and how) rather than being forced into a sometimes-problematic framework. 'Upstream' participation in defining and framing of debates does not preclude that major struggles about the 'proper' framing of questions, issues and procedures will continue to play a role. The Dutch debate about GM food in 2001 illustrates that.

It is also important for those sponsoring deliberative initiatives to take a broader look at the kinds of evidence that will be considered relevant and important. There is still a tendency to see public groups as contributing only to ethical and political discussions rather than having legitimate evidence and forms of knowledge to offer. Strict separations of 'public' and 'scientific' review can also mean that legitimate questions (eg about the need for particular innovations) do not get fully addressed.

Looking across our cases where there have been attempts to put the ideals of public deliberation into practice, a number of further observations can be offered:

- In antagonistic circumstances, stakeholders experiencing lack of support for their views have a tendency to use accusations of a hijacked debate as a means of rejecting the exercise. In this way, deliberative exercises run the risk of making antagonisms even more pronounced. In additional deliberative efforts might actually make latent conflicts more explicit – as suggested in one of the Swedish case studies;
- The restriction or extension of legitimate actors is a crucial issue, and ‘exclusion by composition’ is a common theme within the case studies, although it takes different forms. In the Portuguese case studies it was obvious that several relevant stakeholders from the public were excluded from the process. But it may be the case that the explicit wish to engage with ‘neutral’ citizens (as in the Dutch or British GMO cases) is also a question of exclusion by composition, since stakeholders (with strong viewpoints) are seen to be ‘polluting’ the process of public deliberation;
- There is a tension between efficiency and legitimacy in participatory methods. Deliberative exercises need to be steered, but this steering can be overdone with a consequential loss of credibility. In many of our cases, considerable effort was needed to keep the initiative on-track and alive. As with the Dutch GM discussion, debates are not always successful and it would be useful to conduct further research into the circumstances surrounding success and failure;
- In many of our cases, there was a governmental desire to achieve social consensus through deliberation and so regain public trust. The view that greater engagement is a route to rebuilding public trust appears to be widespread across Europe – despite the evidence that deliberative exercises can exacerbate as well as resolve policy differences. Equally, consensus may not be an achievable – or necessarily desirable – policy objective. The view that the deliberative mode can in itself (ie without wider institutional change) settle public concerns about the direction and form of socio-technical change is not supported by our cases. Instead, it could be suggested that rhetorical statements about the need for deliberation which do not also consider the full institutional implications of this mode are likely to lead to alienation and increased scepticism.

One might be tempted to conclude from the above that the ideal of deliberation is too contested, contextually-sensitive and flexible to be of any intellectual or policy value. To do so at this stage would be wrong in our view. The situation is much more complicated and our assessment of the deliberative mode of governance should at least take the following features of deliberative practices into account:

- A **partiality** within the conduct of deliberation across Europe: only particular (generally high-profile) issues have been selected for deliberative discussion. Initiatives tend to be rather small-scale and marginal;
- A **conflictuality** within the cases: despite the enthusiasm among government bodies for deliberation as a means of consensus generation, we find considerable areas of dissent and disagreement;
- A **fragility** to these initiatives: deliberative processes have not become embedded in government but often appear to be at the point of termination. For example, both the Danish Board of Technology and the UK Agriculture and Environment Biotechnology Commission have been under threat at different points during our work.

Our argument is that partly it is the antagonistic elements, the confusion between the different modes and the constant threat of collapse that keep participatory exercises alive. Perhaps it is precisely these challenges that give participatory exercises their capacity to invoke (and provoke) change – although the promises of deliberation might never be fulfilled as such. However, these partial, conflictual and fragile tendencies need to be balanced with a policy framework which is open to the issues raised, flexible in the face of competing assessments, and committed to taking the outcomes of deliberative exercises seriously. We do think that the questions suggested by the STAGE network need to be reflected on more fully by policy institutions which still have a tendency to make statements about the need for greater deliberation without thinking through the consequences of such a significant shift in political and institutional culture or its relationship to other modes of scientific governance.

Contrary to widespread belief - it may often be the antagonistic elements, the confusion between the different modes and the constant threat of collapse that keep participatory exercises alive. Perhaps it is precisely these challenges that give participatory exercises their capacity to enrol people and to invoke (and provoke) change. Rather than trying to do away with partiality, conflictuality and fragility altogether, we need a policy framework which is open to the issues raised, flexible in the face of competing assessments, and committed to taking the outcomes of deliberative exercises seriously in formally democratic decision procedures. That might be just enough. To ask for more might not only be unattainable, but might actually become counterproductive as it sacrifices the fruits of continuing but constructive disagreement about fundamental values at the altar of premature consensus on issues of subsidiary importance.

### **Scientific governance in critical perspective**

So far in this summary, we have raised some basic questions about the practice of scientific governance across Europe. In this section, we raise more fundamental matters which take us beyond the specifics of institutional practice in the different nations. What

underlying issues of science and social change are being raised? And what are the consequences of these for the way we conceptualise scientific governance in the future?

There are many starting points for a critical perspective on contemporary scientific governance. As we will see in many of the case-studies, there is a lingering scepticism about whether engagement exercises are merely tokenistic – or whether they fail to address the ‘real issues’. It is also possible to criticise the very language of ‘governance’ for its imprecision. Certainly, the term is open to variable definition and, in particular, it is not always clear which groups are included/excluded (where are the parameters of governance actually drawn?). Here we will draw attention to three particular areas of challenge which take us outside the internal operation of scientific governance and raise wider issues.

For the purposes of this executive summary, these challenges can be presented as follows:

- the challenges of the *global context*: the fact that our cases are all essentially *national* in focus (albeit with strong international connections) is very revealing of the tendency for deliberative governance (and indeed the other modes) to be framed in ‘single nation’ terms. We would argue that there is something decidedly anachronistic in the idea that individual nations can adopt an independent approach to the fundamentally-global technologies and socio-technical processes considered in this report. Of course, this principle of international collaboration is fundamental to activities within the European Union. However, there is still a tendency for individual governments to present these issues as a matter for *national* debate (as in the UK’s *GM Nation?*) rather than taking seriously the global networks involved. This in turn raises wider issues concerning the operation of democratic principles within globalised techno-industrial systems. Generally, the determinedly national focus of most attempts at deliberative governance in particular fails to address such issues;
- the challenges of the *innovation context*: as we note in the main report, this point can be raised through the issue of consultation timing. Based on our cases, it can certainly be argued that serious public discussion generally only occurs after the basic processes of scientific research and industrial development have taken place. By the point of ‘GM debates’ taking place in countries such as The Netherlands and UK, substantial investment had already taken place and the product development was already at a very advanced stage. In this situation, the possibilities for deliberative governance are very constrained and it is certainly difficult to raise more basic questions of the need for and direction of change. In this situation, ‘upstream’ engagement has been presented as a way forward – but, as we note, there is no inherent reason why this will be less constrained than current approaches (although it may also have advantages);

- the challenges of the *social, economic and cultural context*: the current tendency is for deliberative governance to add a layer of ‘public debate’ to existing institutional processes without acknowledging possible tensions between, for example, economic competitiveness and democratic engagement. Governance is presented as a way of facilitating change but more fundamental questions of the relationship between science, democracy and the marketplace are not considered. This tension becomes particularly apparent when different forms of ‘evidence’ (whether based on scientific review, economic evaluation or public assessments) are brought together within processes designed to achieve speedy social consensus. In this situation, there is a tendency for ‘public’ views to be downgraded. Presented differently, the social context of innovation could be seen as fundamental to any form of successful technical change. The current tendency is instead to see societal evaluation as a hurdle to be cleared rather than the *sine qua non* of the innovation process.

These challenges all highlight the problematic character of scientific governance in contemporary Europe and it is tempting to reach negative conclusions about the future of such inherently flawed processes. Taken positively, however, they could also suggest a distinct *European advantage* for future innovation. Given our suggestion that Europe has built up a unique body of practice and experience in this area, European nations are also in a very strong position to develop new ways forward which do not simply recreate the governance problems of the past. Rather than presenting public ambivalences around science and technology as a weakness – as a handicap when dealing with competitor nations - it is possible to present the experience represented in our case studies as a rich source of learning and practical insight. To offer one example, the case studies discussed here in the area of gene technology should be of substantial assistance when dealing with the new issues of nanotechnology. This beneficial effect, however, will require open and reflective institutional processes that are receptive to the lessons of past experience. Certainly, it is safe to conclude that ignoring our own past and denying these experiences cannot provide a route to future success.

## **Ten Lessons for Deliberative Practice and Scientific Governance**

We have so far presented a series of findings and observations based on the cases studied within the STAGE network. We understand that the points raised are, on the one hand, condensed and sketchy (since we are generalising from a very rich body of empirical material) and, on the other, diverse and discursive (since these are subtle issues of overlapping modes and partial experimentation). At the risk of over-simplifying a large body of evidence, it is worthwhile to summarise some of our findings in the form of relatively specific policy recommendations. The number of these is somewhat arbitrary

and the relationship to STAGE-based evidence is admittedly variable. However, we offer the following as a contribution to policy discussion around these issues.

1. ***Don't promise what you can't (or won't) deliver. Do be clear in advance about the institutional response to and uptake of any exercise.*** Policy institutions embarking on a deliberative exercise should be as explicit as possible in advance about the status of the exercise and its recommendations. Failure to do this can lead to public disillusionment and scepticism (one of the most common questions asked by members of the public when participating in such exercises is 'will this make any difference?'). This also suggests that institutions should think carefully before embarking on any exercise about what they are trying to achieve (clarifying issues or achieving political closure?);
2. ***Don't assume that consensus is a practical (or desirable) policy objective.*** There would appear to be a common rhetorical move across Europe from 'engagement' to 'consensus formation' (and the concept of 'consensus conference' has been very influential here). We see no reason for consensus being more appropriate to policy than the identification of significant areas of disagreement and dissent. It may also be that the search for consensus within contested public issues is doomed to failure (and risks being seen as artificial);
3. ***Don't treat deliberation as a one-off hurdle.*** There is a tendency for governments in particular to view 'public participation' as an obstacle to be negotiated and then left behind as 'normal' bureaucratic processes resume. It would be better to view 'engagement' as a regular interaction designed to ensure that policy objectives and public assessments do not deviate over time. In this way also, the wider culture of governance cannot operate in isolation from (or ignorance of) public concerns;
4. ***Don't confuse a small number of high-profile engagement initiatives with the wider culture of European scientific governance. Institutions should consider the relationship between different governance modes.*** As our presentation of the governance typology above underlines, contemporary scientific governance in Europe can best be characterised as multi-modal with the deliberative mode simply one among many (and certainly not the dominant mode). This also suggests that any particular governance mode must co-exist with (often several) others – the 'market' mode is especially significant. Inevitably, this means that compromises and balances must be made. Currently, these seem to be implicit and indeed unconscious rather than explicit and reasoned;
5. ***The form – and framing – of engagement initiatives is crucial to the outcome.*** As a number of our cases demonstrate, the question is not simply *whether* public discussion occurs but crucially also *in what form* that takes place. The current tendency is for government to impose a framework on deliberation which suits its own short term policy needs rather than engaging with public problem definitions

- and concerns (as when ‘technical’ issues are artificially separated from ‘ethical’ problems or questions of ‘need’ or policy alternative are defined out of discussion). Our recommendation is that considerably greater attention should be given to the ‘pre-stage’ of any deliberation – with public inputs especially valuable at that point;
6. ***There is still a tendency to polarise ‘science’ and ‘the public’.*** Despite substantial criticism of the ‘deficit’ model of science-public relations, there remains a strong tendency for official bodies to present the public as both homogeneous and remote from scientific matters. Over-generalised talk of ‘science and society’ tends to reinforce this unhelpful schism. There is an urgent need to embrace more pluralistic and overlapping models of science-public relations by, for example, acknowledging the diversity of European publics and the considerable differences in scientific evidence across multiple contexts of policy formation;
  7. Linked to the previous point, ***there remain substantial and unresolved tensions around the relationship between ‘public engagement’ and ‘sound science’.*** As we have stressed at a number of points in our report, further policy attention needs to be given to the inter-relationship between contrasting governance modes and also to the wider relationship between public policy making and scientific advice. There is considerable lack of clarity right now about how scientific advice should feed into deliberative debates. The tendency is to keep science remote from engagement but this in turn places substantial constraints upon public discussions and arguably diminishes the effectiveness of science and technology policy making;
  8. ***Transparency and engagement are not enough.*** Whilst for many policy makers deliberation is seen as an end in itself, for many members of the public it is primarily a means to wider institutional and policy change. So far the implications of deliberative governance for the operation of scientific institutions have been barely considered. The assumption that deliberation is simply an add-on to current policy processes may come under increasing challenge in the future;
  9. ***It is important to consider what lies behind public concerns over these issues.*** In particular, there is a political tendency to reduce diverse public concerns over the form and direction of proposed innovations to a ‘risk’ framework. It is then relatively straightforward to present such concerns as uninformed and mistaken by comparison with a technical risk assessment. Such an approach is ultimately provocative rather than helpful and will cause further problems of public alienation from policy processes. Once again, the importance of planning the ‘pre-debate’ stage is emphasised. Equally, policy institutions will need to be more consistently attentive to public questions and issues as they arise;

10. ***Institutional learning is generally neglected.*** There is a tendency for initiatives to be completed and then immediately consigned to history as policy actors move on to the next challenge (or return to business as usual). It is essential that the experience of deliberative initiatives is brought together on a regular basis in order that lessons can be learnt from common experience. Given the richness of European experience in this area, there is considerable potential here for further reflection and policy development.