Changing Conceptions and Practices of Governance in Science and Technology in Europe: A Framework for Analysis[1]

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Introduction and summary

In this second discussion paper we explore how the theoretical discussions from the first phase of the project may be turned on the study and comparison of the various case studies. In section <u>one</u> we summarize the main theoretical and methodological arguments made during the first phase of the project.

Section <u>two</u> presents the methodological approach of extended case studies and an overview of the case studies that have been singled out for detailed analyses. In accordance with the design of the project most examples are primarily located in national contexts of governance. Some can be considered to be specific to a particular country and the result of grass roots initiatives in policymaking. Others transcend the boundaries of nationally defined policy processes as they concern transnational issues. The combination of case studies confronts us with processes of convergence and differentiation in the development of new formats of public engagement. More detailed and empirically rich analyses are needed to foreground these dynamic and constructive features. The extended case study approach is intended to do that.

In section <u>three</u> we explore the communicative fields involved in initiatives to enhance public participation in decisions that involve science and technology. What distinctive formats of public engagement with science and technology emerge from the case studies? Along which dimensions do we expect such initiatives to differ from one another? Organizational frameworks adopted in initiatives to enhance public engagement seem to be a key issue and more specifically how such initiatives relate to the formal political arena and government bureaucracy on the one hand and to the public arena on the other. Furthermore, cases will differ in terms of the assumptions concerning state, economy, science and individual liberties that are implied in the framing of issues and options by organizers and participants.

The <u>fourth</u> section develops these expected differences into a six-fold typology of 'formats of engagements'. These are ideal types and there will be all sorts of grays in between them as soon as one applies the typology to actual cases. The typology is therefore primarily intended as a sensitizing device to focus on the distinctive features of case studies that are of interest for the project in the empirical analyses.

In the <u>fifth</u> and final section we discuss how to relate the typology, levels of governance and questions of convergence and divergence in the case studies and their discussion. This leads to an appendix of topics and aspects to be considered in doing the case studies.

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1. Scientific citizenship – education, deliberation, hegemony

Terms such as 'scientific citizenship' and 'citizen science' have been proposed as a framework for analyzing emerging forms of governance in science and technology (Irwin, 1995). This provides an explicitly normative and constructionist framework for assessing, as well as assisting in the construction of, appropriate structures and practices in terms of core norms and values that should underpin political processes in liberal democracies. Public participation and engagement are emphasized as both inevitable and desirable in the framing and assessment of issues, validation of knowledge and weighing of evidence on which democratically accountable decisions are based.

In recent debate about 'science and the public', several models of this relationship have emerged as a consequence of a reimagination of the science and society relationship (Elam & Bertilsson, 2003). The separation and distance between science and society has collapsed into one of "mutual embrace and varying depths of entanglement" (ibid), as emphasized by concepts such as 'contextualized knowledge production' (Gibbons et al, 1984), and of science and innovation as 'collective experiments' (Callon, et al., 2001), and as 'enlargements of politics' (Latour, 1998). The educational or enlightenment model of public understanding of science (PUS), as epitomized in the infamous 'deficit model', has been replaced within the PUS movement by more reflexive approaches. A 'democratic turn' has taken place, by which the agenda of PUS has been modified and moved beyond its predominantly educational framing. Under conditions of high uncertainty, the hesitations and cautiousness of the public in adopting and accepting major innovations may be natural and well founded. "Rather than simply correcting public opinion from a position of high authority, the new task for PUS is to help the public help itself in forming adequate opinions on controversial issues pertaining to science and technology" (Elam et al, 2003:[11]). Thus, PUS evolves into broader approaches for designing new contexts and arrangements for extended debate and discussion about contemporary science and technology, through which individuals are asked to pass judgment on issues and possible future products about which there is inevitably much uncertainty. The more reflective forms of PUS is then to sustain processes by which the public may form adequate opinions and preferences of their own through informed public debate.

These new PUS approaches are increasingly phrased in terms of deliberative models of democracy. A conception of PUS as *public engagement with science* (PES) has emerged through critical assessments of various deliberative positions. These represent a more adequate conception of the science/public relationship, in terms of their opening up for more conceptualizations of the science/public relationship that allow a broader range of legitimate forms of public participation, and of promoting more reflexive PUS policy approaches. Nevertheless, continuities with earlier, less reflexive conceptions of PUS may be seen to linger. At least, in some respects and variants, this appropriation by the PUS movement of deliberative conceptions of democracy is an adaptation and extension of hierarchical models and restrictive assumptions about rationality as embedded in PUS. Deliberative democratic theory takes as its model an idealized version of scientific discourse, emphasizing rational consensus and the 'powerless power of the superior argument'.

These conceptions and ideals of democratic politics may, thus, amount to a model of democracy which conforms to and favours forms of discourse and participation with which scientists are already well versed: "By valuing rationality, reserve, selflessness and power of argumentation, deliberative is a democratic politics played out on the scientists' home turf" (ibid: 14). Thus, these conceptions of deliberative democracy may reproduce those very relationships of hegemony and hierarchy between expert and lay knowledge, insider and outsider participation, which should be deconstructed and reversed through the broader conceptions of participation and governance that are envisaged.

There is a need, then, to take deliberative conceptions of policy processes one step further, and develop sensitivity to the ways PES conceptions of deliberation and dialogue are some times taken up as part of strategies to reconstruct public acceptance of science-based and -driven innovation. There is a risk with PES conceptions of deliberative politics that the irreducibly political dimension of power and hegemony embedded in political debate and governance practices be obscured. Narrow procedural versions of deliberative democracy may limit the range of legitimate expression of scientific citizenship. The strong preference in PES for deliberative formats of governance and democratic politics should, then, be critically assessed, drawing on alternative conceptions of democratic politics and scientific citizenships, including those of agonistic or radical conceptions of democracy. Such alternative conceptions not only value consensus, but also dissent, and institutions that allow and stimulate dissent to be expressed. Hence, a conception of scientific citizenship is envisaged that allow *alternative public understandings of science* (APUS) to emerge, often outside institutionalized deliberative forums, and through forms of public confrontation with science that cannot be precluded as legitimate parts of democratic governance and scientific citizenship.

To develop these ideas in the case studies we need a methodology that allows us to analyze the organization and framing of public involvement. The methodology should also sustain and enhance our sensitivity to the ways and forms that relationships of power and hegemony are constituted, played out and contested. In particular the methodological approach should allow a careful scrutiny of cases to bring out the ambiguity of dialogue, openness and transparency, promoted as venues for overcoming oppressive and agonistic politics, while also being amenable to being used to constrain the scope and forms of dissent that are taken into account. The method of extended case studies outlined in the next section should sustain the development of such sensitivities. It should additionally offer a framework for instructive comparisons between case studies.

2. Methodology and case studies

Beyond models of 'the national'
The participants in the project hold that a methodology that starts from a typology of national policy contexts to account for differences between cases would not be adequate. A first objection concerns the reductionism implied in such a typology. It would reify the highly dynamic contexts in which new forms of public engagement with science and technology nowadays develop. We prefer

to conceive of participatory initiatives and policy contexts as equally dynamic and fluid. In Europe (as well as in other parts of the world) one sees new initiatives towards enhanced public participation everywhere. Process of mutual learning and mimicking of what is seen as best practice abound both within national arenas as well as transnationally. Such initiatives are part of, or in any case related to, attempts to change and redefine policies and to develop new regulatory and policy frameworks. Policies and policy contexts are on the move at the same time due to adjustments made in response to economic, political, cultural and scientific developments. Our methodology needs to take this dynamism into account and look for the relations between our cases studies and the articulation of wider politico-economic and policy dynamics.

To argue this is not to deny the relevance of accounts that emphasise differences between countries or regions to explain variations, successes and failures. No doubt there is often considerable truth to such accounts, if only because actors involved in the processes we refer to do themselves account for differences in terms of national differences and model their own actions accordingly. National traditions and culture do play a role, but in ways that are not easily reduced to a limited n-dimensional grid of independent variables on which cases can be said to depend. Parties and people perceive and conceptualize national context and styles and bring these interpretations to bear on the processes in which they are involved. How this works out is hard to say and depends on time, circumstance and who else is around. We hold that such perceptions and interpretations as well as their effects should be part of the empirical analyses, but to do that and retain the richness of local contexts and variations it seems more fruitful not to introduce this or that national policy culture as an objective backcloth to the events and processes in which we are interested.

There are also other objections to use a fixed typology of national contexts. Such a typology of national policy cultures tends to obscure cross-sectoral variations that exist in individual countries. How environmental issues are dealt with in a particular country may be radically different from the ways ICT policies come about and are implemented in that country. Even within the field of environmental policies detailed studies find important differences depending on the specific areas one is looking at, the scientific, professional fields involved and the specific regulatory bureaucracies as they have evolved around particular issues (Halffman, 2003). Another objection is that typologies of national contexts tend to ignore that policy development has become part of much broader, transnational development patterns both in the political economy of the EU as well as in the ideology and practice of civic engagement. With respect to the first it would be unwise to ignore how initiatives to promote public engagements are nowadays a part of the economic and political restructuring of the European and global economy. Many of the controversies and debates about new technologies and their consequences are at the heart of these broader processes of political, economic and cultural readjustments. What goes on in our cases is often as much the product of these changes as constitutive of these processes. A typological approach that takes institutional differences between countries that go back to the mid-nineteenth or early twentieth century as an unproblematic given easily misses these transnational dynamics. To us these transnational dynamics seem quite important, however.

Extended case studies - the methodological primacy of selected 'anchoring'cases
The methodology of the extended case studies allows us to follow the interplay between the initiatives for public engagement and how these draw on policy contexts and contribute to their redefinition at the same time. It acknowledges that each national context displays specificities related to the diversity of histories and policy cultures. It allows us to address the difficulty in selecting and defining quite similar areas and cases for all countries involved in a strict comparative approach. If one looks at the variety of initiatives to enhance public participation with respect to science and technology, one sees an enormous variation in topics and formats of engagement. Variations that are not likely to be sufficiently explained if one compares a limited set of cases in terms of an unambiguously operationalised, yet equally limited set of variables. The solution adopted in this project is to explore in an iterative process which specific dimensions appear to be especially prominent in key cases and then to compare these 'anchoring cases' with other case studies for the same country as well as with cases analyzed as they develop in other contexts.

Starting from this idea, key case studies have been selected because of their expected exemplarity and density. They have been chosen for their "anchoring" capacity, that is, for their ability to provide entry points into other case studies, which may serve as "qualifiers" to the main cases. An overview of these cases is given in Appendix A to this paper. Case studies will be dealt with in their unfolding, their specific histories. Some countries will provide "anchoring" cases that may be used by other countries for comparative purposes. Some such comparative studies may be pursued by scholars outside the STAGE network: the case studies will be more generally available as a resource.

The method of extended case studies - as we have dubbed the approach - does not adopt a naïve ethnographical approach that attempts to make no assumptions whatsoever about the cases studied. Rather, we analyse the cases with a view on the organisational forms that emerge and their implementation. Furthermore, the case studies are expected to bring out assumptions with respect to the relations between state, economy, science and individual liberties that are part of the framing the questions and issues. Such assumptions are not taken for granted in our analyses, nor are they used as explanatory categories to account for the dynamics of the cases. Rather, such assumptions are explored in terms of their interconnections and how their combinations and interactions allow for certain forms of public participation to emerge and not others.

3. Formats of engagement and assumptions about publics and democratic decisionmaking

Political, public and scientific arenas
In most of our case studies, public engagement with science and technology takes place within national political arenas. Even where a strong transnational dimension is undeniable (GM food for example), national political frameworks remain of key importance for public participation. And yet, considerable activity often seems to be going on independently of the formal national political system, for example activities initiated by NGOs, community groups and individual writers and

commentators that use the mass media to communicate their views to wider audiences. Scientists and professionals often engage in debates in their own specialized media to discuss policy issues. To grasp the dynamics of controversy and public participation it is important to consider both what goes on in the formal political arena and what organizations and individuals outside the formally political arena do in adjacent fields of communication. It is important to pay attention to this differentiation into distinct fields of communication and engagement. How do things and perspectives developed in one domain translate or spill over into other domains? To analyze such processes and their effects it is helpful to distinguish between the formal political arena and the public arena. The political area refers to the formal system of political representation and decision-making and includes the activities of political parties as political parties, the government, related bureaucracies and the institutionalized consultations between representatives from industry, trade-unions and government. Public arena refers to the realm of the mass media and related forms of communication. Here we find interest groups, civil organisations and individuals who engage with one another in deliberations about social, cultural, moral and politico-economic problems. This public arena is part of civil society.[2] It is as if it were the central marketplace for ideas, information and opinion of civic society. In the public arena mass media (including mass entertainment) dominate, but it is important not to restrict it to what the mass media do. The public arena encompasses all sorts of actors that seek to get the attention of non-institutionalized publics for issues and arguments about the public good. Even groups that are highly critical about the structure of the public arena and the role of the capitalist mass media depend on the public arena to reach larger groups in the population and to mobilize them for or against particular causes. Mass media corporations evidently operate in the public arena as well as outside it in the economic field. For political parties one can make an analogous observation.

As Hilgartner and Bosk (1988) have argued, public arenas are not only highly competitive, but they are also highly competitive in ways that distinguish them from the formal political arena. Competition in the public arena is concentrated on the chances to capture the attention of wider audiences or publics. The extent to which mass media publics are able and willing to devote time to particular topics is extremely limited and so is the time during which attention will remain focused on one topic. As a result, groups and individuals compete with one another constantly for attention from the general public or their envisaged target audience. For these and other reasons both the public and the political arena are best conceived as *agonistic* rather than consensual. In so far as they can be said to rest upon shared assumptions these often only surface in struggles to explain and justify positions and views. So, if one looks for the agonistic encounters one will run into common frameworks and implicitly shared understandings soon enough. Whenever a sort of consensus is articulated and supported by participants, it will most probably be temporary, and disappear from view as soon as 'new' issues show up on the 'public agenda'.

One reason why the differentiation between the political and the public arena is relevant to the study of public participation and engagement is that topics and issues prominent in the public

[2] See Cohen and Arato (1992:ix). To relate the existence of a public arena with the concept of civil society opens up a space for debate on various theoretical issues. For the classical pluralist view see Almond & Verba (1965). For neo-Foucauldian critique see Rose (1999).

arena as may or may not be taken up with similar priority in the political arena. And if they are taken up it might well be in a form that diverges from how the issues and concerned would be framed in the public arena. And of course the reverse may also be true: Issues of considerable priority and relevance in the political arena may not get any attention in the public arena. Current concerns of policy makers with projects to enhance public participation in decision making have to do with the mismatch between public opinion as expressed in the public arena and in public opinion studies communicated in that arena and the politico-economic and administrative agendas drawn up by governments. Although both the political arena and the public arena are agonistic and competitive in nature, it is therefore important for analyses of public participation to acknowledge that they differ in structure and dynamics.

Furthermore, the differentiation between institutionalized political arenas and the public arena can be said to exist in all the liberal democracies included in this project. As all EU member states are formally liberal democratic states, we find minimally comparable differentiations between the political system, civil society (which encompasses the public arena), the economy and the scientific and professional sectors. Yet, the interesting part of our research is how countries, sectors and individual cases differ beyond this minimal common ground. The question is how public engagement will be framed and initiated differently in various countries and sectors, how this echoes specific differentiations into public, political and private domains and what that implies for the course and outcomes of public engagements. When governments initiate public consultations it is important to investigate how they themselves apparently conceive of the relation between the political and the public arena in doing so. In each case study we have to ask what makes this case a unique example of public participation and ask how this bears upon the differentiation between the political, the state, the private and the public arena as it apparently operates for that case.

To distinguish between the political arena and the public arena, between science and the public arena or between the economy and the public arena, does not imply that they are completely independent from one another nor a realist understanding of such boundaries. They are and remain the outcome of politico-economic and social cultural interactions and the continuities across such 'boundaries' are as much part of how they operate as the differentiation between the one side of the boundary and the other. Liberal democracies presuppose civil society and the public arena and vice versa. Without a public domain and a private sphere that functions in a particular way, liberal democracy as a political system would be impossible (Dean, 1999, Rose, 1993, 1999). In each of the democracies of the EU particular differentiations into distinct fields or spheres, including the 'private sphere' make up the institutional architecture and ideology of governance. To investigate issues of governance and participation or public engagement we have to take into account how the demarcations into distinct spheres part and parcel of public debate and constitutive of the various publics involved and their relative abilities to speak with authority.

Analogous points can be made with respect to the economic field or arena[3] and fields of professional and scientific expertise. They can be said to constitute relatively independent arenas

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[3] Field and arena are used as synonyms and interchangeable in this text. Fields and arenas are supposed to be always competitive and agonistic, if not antagonistic, regardless of the word used.

characterized by specific agonistic and competitive forms, differentiated from the political and public arenas. The differentiation between the various fields or arenas will be anchored in formal institutional arrangements supported by law - but the actual relevance of the boundaries for what is going on may be a matter of constant re-interpretation and struggle inside and across these same boundaries. Once again, the boundaries between such different fields or arenas are as much the outcome of public encounters as part of our understanding of why public engagements take on specific forms in specific sectors and countries.

Reflexively speaking, the very debate about public understanding provides a perfect example itself of the arguments outlined above. In the debate over the deficit model the boundaries between science, civic society and political democracy are redrawn as a part and as a result of the struggle to define public understanding, why it is at all important, who should be allowed to talk, who should listen and how decisions with respect to science and its (ab)uses should be taken.

For our case studies, it is important to establish how issues are positioned by participants vis-à-vis the arenas distinguished. Are the issues defined in terms of a non-continuous distribution of distinct responsibilities and discretion, for example between scientists who are expert and others who are lay people? Do initiatives seek to enroll specific groups in the debates and consultations? Are consultative formats and problem definitions contested or taken for granted? Are experts and particular institutions claiming positions of authority? If so: How and to what effect for the opportunities and forms of participation by others? To what extent and how public engagement remains limited to the topic at hand or branch out into a more principled political struggle (and why this should be the case) is another important topic to be studied empirically.

Our first attempt to formulate a heuristic framework of various types of governance implied in initiatives to enhance public participation will rely on the differentiation between the public and the political arena. How do initiatives relate to that boundary in the organizational approach towards consultation or mobilization? How is the initiative framed with respect to the role and responsibilities of the state, those of consumers, individual citizens and private organizations? Do people contest the initiative with respect to this or is the basic differentiation of roles and responsibilities taken for granted. How is opposition staged and dealt with in various phases of the debate?

Inclusion/exclusion

In recent years initiatives to promote public understanding of science have often been initiated by governments in response to public concern or to elicit public opinion and public opinion formation. Most of our case studies involve such initiatives and they are at the center of our analyses. Yet, there are also case studies in which the initiative for debate started with non-governmental groups. Initiatives will differ - regardless of who first instigated the issue and the debate - in the extent to which their approach and definition of the issue aims at inclusion of a wide range of actors or is more exclusionary.

Initiatives will also differ depending on whether they aim to intervene in the public arena as it exists or seek to operate at its margins. If intervention in the public arena is the goal, initiators may either restrict themselves to putting issues on the public agenda or play an active role in the

debate itself. Governments may for example prefer to initiate public debates, but stay out of these debates themselves, positioning themselves instead as observers of civil society. Such arrangements may be inspired by the wish to avoid accusations that the government tries to manipulate.

A somewhat different situation occurs when initiatives aim to 'correct' or 'complement' the mechanisms and formats of the public arena so that 'voices' will be heard that would otherwise be excluded from the debate. Such initiatives may include mass media, open meetings, surveys, online debates, phone-in arrangements etc. The new media (websites, email) may be important resources for such initiatives.

If governments seek ways to 'correct' or 'complement' the debates of the public arena they easily become themselves active players in the public arena. This may lead to tensions and conflicts with mass media and NGOs that already have taken positions. To avoid such situations governments may delegate initiatives to intermediate agencies outside the formal political arena. Such intermediary agencies then organize participatory events and to report on them. Direct involvement leading to accusations of manipulation is avoided this way, while at the same time such delegation preempts accusations that the government shows lack of initiative. Recent debates in the Netherlands with respect to biotechnology provide a rather unsuccessful attempt at a hands-off approach that nevertheless sought to correct the functioning of the public arena and the dominant role of NGOs in that arena.

In recent years there has been an upsurge in the activities of such intermediate agencies. A small 'industry' of agencies involved in organising debates, focus group research and consensus conferences seems to be emerging. The formats employed are intended to elicit information about the concerns, views and interests of so-called lay people but in a more systematic and controlled way than would be possible by indirect initiatives that work through the public arena and its organisations. Yet, it is important to investigate how the emergence of this intermediate sector relates to the public arena as it exists independently of government and government-sponsored activities. Only through such an analysis can we address the question whether the upsurge to enhance public understanding and engagement is a form of political marketing or an genuine contribution to public participation and democracy.

Yet another form of public engagement ignores the public arena more or less and focuses instead on the corporatist belt of consultative bodies and advisory committees surrounding the formal political arena. Here the format of engagement is less inclusionary with respect to the general public. The debates and consultations are not so much conducted in the public arena but in more exclusive environments like advisory bodies and consultative councils. Industrial representatives and trade unions often have a considerable stake in such restrictive deliberative formats, but other groups may be represented as well like consumer associations, nature conservancy groups and a whole range of professional organizations and their representatives. These 'corporatist' forms of deliberation will often be employed in sectors with a high degree of organization of the most prominent stakeholder groups (health, food, housing etc.).

Assumptions underpinning and framing debates

Apart from the organisational format of public engagements with science it is important to look as closely at the ways in which the substantive issues for debate are framed by the various parties and how this again relates to conceptions of the boundaries of governance vis-à-vis the public and the private sphere as well as the economy. One may expect a close connection between the format for public deliberation preferred by particular parties and such forms of framing the substantive issues. This not only concerns which groups should be included but also what roles and positions will appear as legitimate.

In some versions the public will be construed as an entity to be educated and instructed with respect to the pro's and con's of new technologies. In other versions they will be construed as a critical audience able to articulate what how their lives will be affected by technological decisions. And in still other formats the public might become an important factor in the actual definition of options and constraints on decision-making. It is not very probable that a format for public engagement that is highly corporatist and relies on institutionalised interest-representation will conceive of the public as a factor to be mobilised as such.

As a part of the case studies it is important to analyse how the issues to be discussed are framed and how particular forms of framing of technical issues are related to specific conceptions with respect to the role of the state, civil society and the private sphere of consumers and producers. If a problem is defined as having to do with regulation of the production of goods for markets and their admissibility, the role and responsibility to be attributed to state regulation and political decision-making beyond basic safety, environmental and health criteria will be limited. Yet there will be variances in the degree of regulation and surveillance by the state or supra-national agencies. If the problem is framed in terms of public ignorance and education the chances that the political decision is defined in terms of enlarged public participation is equally unlikely. If the area of concern is perceived as highly contentious and antagonistic by the interest groups involved public hearings will just reproduce that diversity and not much more.

In all the examples and possibilities just listed the specific substance of the topics of concern is expected to connect to the format of engagement and basic assumptions about the proper ways to address issues and problems. Some of these assumptions are quite basic and may concern for example the autonomy and independence of science vis-à-vis state, religion, society and the economy. Others concern the view one has on decision-making and democracy. Still others have to do with the relation between scientific knowledge and lay knowledge (expertise and public opinion). Of great importance in liberal democracies is the relation between the economy, the state and the private sphere. To the extent that one or more of these assumptions are themselves problematised in the debates on which the case studies focus, the case may become 'antagonistic' because insurmountable struggles surface. In most cases, however, such basic assumptions are not confronted directly, but they do surface- often implicitly- in discussion over formatting and framing of public debates. We do assume that it is possible to analyse these instances with a heuristic typology of forms of governance that combines such basic assumptions with a preference for specific forms of engaging the public.

A typology of governance

The ambiguous and tangled relationship between rationality and power, discursivity and hegemony, in emergent forms of governance will, inter alia, be analysed on the basis of a preliminary descriptive taxonomy of types of governance. This taxonomy may provide a common frame of reference by which different forms of governance of science and technology may be characterized and related to each other. Each type or mode may be seen to represent typical responses and strategies in policy processes, in terms of selection and combination among options defined by the dimensions and assumptions sketched above. The typology builds upon the discussions in the previous sections and on the paper by Elam & Bertilsson. Especially important is the focus in this paper on the ambiguous relationships between educational and deliberative forms of governance, and its emphasis on 'APUS', i.e., acknowledging agonistic and adversarial forms of participation and governance as legitimate forms of performing scientific citizenship. These categories should, hence, be core parts of our framework for descriptive analyses and normative assessment of forms of democratic participation and governance in science and technology.

The forms of governance included in our taxonomy differ - first and foremost- in the roles and identities they assign to 'the public', how 'its' input is being defined and taken into account in the policy process. The approach does not assume that the 'public' is a given, stable entity that may be seen to exists independently of the processes in which 'it' participates and are taken account, nor that the notion of the 'public' may be an source and basis for assessing the appropriateness of governance conception and practices which they may reflect more or less selectively or adequately, or 'distort' to lesser and greater extent. Rather, the 'public' and its role in the processes of governance are constructed in and through the processes and modes of governance themselves. Each pre-define rules and criteria for the type of negotiation to be conducted, and what kind of voices that should be taken into account. These constructions define criteria of public accountability and responsibility, and make assumptions about whether an active or passive role is accorded to the public in the policy process (Hayrinen-Alestalo, Pelkonen & Snell, 2002). One may see, e.g., that, depending on the type of governance in question, 'the public' is constructed, and taken into account, as a basically passive *population* - e.g., in surveys of 'public opinion'; as *human beings*, when issues are framed in terms of (universal, intuitive) values that decisions must accord with, soliciting active public response, but in a clearly circumscribed framework ; as *consumers*, when appropriate policies are assesses in terms of (possible) consumer patterns and preferences; or as (active) *citizens*, when the voice of 'the' public is articulated and voiced by active members of constituencies that take part in all sorts of public deliberation on the issues at hand. The performative nature of public engagement with science and technology must be brought out.

Our preliminary typology comprises the following six types:
   - discretionary
   - educational
   - deliberative
   - corporatist
   - market
   - agonistic.

Discretionary governance (DISC)

In *discretionary governance* policymaking takes place with virtually no explicit interaction with 'the public'. Decisions are taken without much formal nor informal input to the process by any group outside the governing bodies themselves. For science and technology policy, this may be seen as 'default' practice to a larger extent than for most other societal domains, where issues are normally more politicised. The institutional structures and practices of science policy has developed under conditions in which extensive implicit public trust has prevailed, based upon an image of science as a neutral and objective basis for making policy, and where science and technology have been seen as sources and drivers of uncontroversial, quasi-universal goals and values - progress, welfare and growth -outside and above contention within the normal political process. Thus, science policy has been able to develop, without loss of public legitimacy, in forms in which discretionary governance has played a salient role. In defining a mode of governance which take place within the confines of state politics, and in which the public - ideal-typically - plays no role at all, it falls *prima facie* outside the scope of STAGE analyses; however, it may be seen to represent a zero-value option against which all following modes are negatively defined. At the same time, forms of public participation, often agonistic, will in many cases arise in reaction to attempts to impose discretionary governance practices; the recognition of the need for broader, participatory processes may also be the direct consequence of learning - 'the hard way' - that discretionary governance practices will be inappropriate and inefficient.

Educational governance (EDU)

Educational governance reflects nascent or manifest tensions between prevailing policies and 'the public', as indicated, e.g., by characteristics of media coverage, voices in public debate, or public opinion (polls, surveys). Educational approaches assume, however, that a main source of and cause for the disturbances lies in lack of adequate information and knowledge. It is a policy approach based on the 'deficit model' or Enlightenment conception of the relationship between science and public/lay knowledge. Here, experts play the dominant, active part, either through information and dissemination, or by 'contribution to informed public debate'. Educational modes of governance differ from discretionary by their acknowledgment of some form of resistance, non-acceptance or -compliance, among the public with policies that are pursued or sought by powerful players; they also acknowledge that this resistance can only be neglected at the risk of loss of political support. While part of the resistance may be excluded as expressions of extreme forms of irrationality - anti-science and -technology - that can be dismissed as outside the scope of what has to be taken

into account when policies are articulated and implemented, some forms of resistance must be recognized as having a reasonable basis and needs to be taken into account in the policy process. In its pure form, however, the educational approach frames public resistance to the progress of, and exploiting the opportunities of science and technology merely in terms of ignorance and lack of information. This may not wholly be the fault of the public itself, policymakers and insider players may self-critically acknowledge having neglected their responsibility to educate the public which could have pre-empted the science/public alienation that have made science policy making ridden with complexity and conflict.

Educational approaches do not in themselves draw the policy process unequivocally towards to any one of the three dimensions of the policy process. They may be deployed in high as well as low emphasis on the public arena, as both PR- and public campaign oriented efforts, or in, e.g., educational reform. They do not either necessarily embed a preference for the state politics as against the market, and may be as well be discerned in agonistic configurations, as when NGOs see public consultation arrangements as opportunities for disseminating their message and educate the public on the science of the issue.

Educational approaches are in form and substance strongly *hegemonic*, conceiving the distribution of the essential resources in terms of haves and have-nots, and the negotiation or learning process as strictly linear, from one of the parties to the other.

Deliberative governance (DEL)
In its strong emphasis on consensus, ideals of deliberative democracy connotes a dream to reestablish the conducive socio-political conditions within which science policy could be formulated and implemented in its 'golden ages', i.e., when science and technology benefited from both strong growth and extensive autonomy on the basis of an implicit strong public support. This support was, however, to a large extent based on the black boxing of key policy issues as basically technical in nature, and for experts alone to address. However, under present conditions, there can be no consensus on the basis of black-boxing and implicit trust. The choices are no longer seen to be only or even primarily technical in nature, but have to be framed in terms of their socio-political implications and consequences, and the outcome cannot - under conditions of expert disagreement and counter-expertise - be decided on the basis of superior knowledge and 'best expertise' alone.

As indicated by Elam & Bertilsson, 2003, conceptions of discursive democracy are all-pervasive in contemporary debate about governance in science and technology. A wave of institutional innovations within this policy domain is to a large extent guided by normative assumptions derived from deliberativist conceptions of democratic politics, and focused on the creation of arrangements that may facilitate lay participation, enhance the role of rational public debate, and provide new means to achieve political consensus.

Deliberative governance unambiguously pulls the process towards the public arena. It is non-hegemonic in its emphasis on equal access and that no one voice should be seen as a priori more valid than others. Their impact and the outcome of the process should be determined by the Eigenlogik of the process itself. Deliberative forms of governance may to various extent be shaped by, and located within, formal state politics, as when it is emphasized that organized deliberative input should respond to and inform the political agenda of parliamentary lawmaking, of change of regulatory statutes etc.

A key issue in understanding the relationship between the educational and deliberative forms of governance is their overlap, to the extent that in many actual cases one shades into the other. These ambiguities may be detected in the familiar goal that organized deliberative initiatives should contribute to 'informed public debate'; here, educational, i.e., dissemination of 'correct' information, and sophisticated arguments, create an entangled amalgam of educational and deliberative elements. There is, as Elam & Bertilsson emphasise, a tension in the process by which deficit model notions have been superseded by notions of public engagement that draw on deliberativist ideas. Ideally, deliberative processes cannot but be open-ended, no party have at the start of the deliberative process an advantage over others in terms of the expected outcome of the process; the dice may, however, be loaded in favor of those with superior resources in many ways, including through better access to customized knowledge and rhetorical resources. What is deliberation in form may thus in fact be a means to maintain hegemony. So, counting on the impact of superior resource availability alone may make powerful actors see deliberation as a low-risk approach/strategy. Remains, in any case, the fact that deliberation in most cases is about advisory input to the political process, while decisions are taken by the empowered agencies or bodies.

Corporatist governance (COR)
In corporatist governance, real differences of interests between stakeholders are recognized to be at stake, and solutions that may bridge the differences are sought within closed processes of deliberation and negotiation. Corporatist governance is a pervasive form of governance in welfare state policy, having emerged as a result of a class compromise, often with social democrat parties in a key role for ensuring the terms of the 'contract' or compromise. Corporatist governance is more or less exclusively located in the *state politics* dimension, its dynamics pulls the policy process away from the public arena dimension, seen as a source of input to the process that may upset the precarious balance struck in the more controlled contexts of corporatist negotiation. Corporatist governance is hegemonic, primarily in terms of its in- and exclusion of players and interests that have their representatives in the negotiation process, i.e., who achieves the status of 'social partner' in the policy domain in question. The power structure of corporatist governance depends, then, essentially on to what extent corporate governance practices are inclusive or exclusive, i.e, to what extent they include, e.g., civic interests such as NGOs. Corporatist governance commit the social partners included, and the debates on the co-optation of NGOs have emerged as an issue of what price for influence in corporatist arenas to pay in terms of loss of capability in the public arena.

Corporatist governance becomes similar to discretionary governance as both pull the process state politics and away from the public arena. Actually, corporatist governance structures may form an effective basis for discretionary policy making, as a strategy for foreclosing or minimizing the - often costly, e.g, in terms of effective decision making, - detour via the public arena. British politics are often characterized in terms of a strong emphasis on discretionary policymaking, often seen as an antidote to the salient features of adversarial process in US policy; these discretionary structures may be set against, e.g., Scandinavian welfare state politics, which have strongly corporatist underpinnings. Some forms of corporatist governance that have emerged during the last decade or so, e.g., in environmental policy, are *inclusive* to the extent that they comprise extensive formal and informal consultation with civil society, in particular environmental NGOs. The tensions and dynamics of public participation that are addressed in STAGE analyses, may thus also be discerned in this mode of governance as a tension between inclusive and exclusive forms of corporatist practices.

Market governance (MAR)
The idea of market governance is based on the notion that science and technology, among other societal functions, are governed with strong attention put on market orientation. The value of science comes from the surplus value created through its commercialization and market appeal. From the side of the state this type of governance is illustrated in neo-liberal policies that emphasize results and customer orientation and competition. The notion of democracy is also infused with ideas of market competition and it is acted out in the market. In market governance, the public participates in, and on the terms of, the market - as customers and consumers. The public assesses and influences, then, science and technology policy *post hoc*, after the completion of the innovation process, by their decisions to buy or not to buy a product. The script of the consumer role emphasizes rational choice for the public in this capacity to fulfill its integral role in well-functioning markets. Through these choices 'the public as consumer' play an essential and substantial role that may profoundly shape policy choices, both in the next cycle of innovation, and in the establishment of a regulatory framework that complies with consumer rationality. While consumers do not as such have access to the decision making process itself, market sensitive policy making make the consumer role a powerful instrument in exploiting its indirect leverage on decision making, including by breaking the rules, and strategically exploit the consumer role as another channel for the public voice in the decision making process.

Market governance is then characterized by its inclination to draw the policy process away from the state politics and the public arena dimensions, framing choice in terms of commercial offer and individual consumer demand and preferences. It is strongly hegemonic, especially in science and innovation policy, where choices are made in terms of innovative, technological opportunities and on predicted or expected, rather than existing, demand.

Agonistic governance (AGON)

Agonistic governance take place under conditions of confrontation and adversity, when decisions have to be made in a political context where positions are strongly opposed, stakes are high, compromises are not easily found, and conditions are not in favor of processes for arriving at conclusions through negotiation and debate. Then direct action, boycotts, demonstrations etc. may be salient parts of the process. This indicates the limits of interactive-deliberative approaches, where dialogue in search of non-hegemonic, common solutions have stalled. At the same time, the expressions of the 'public voice' do not necessarily transgress the boundaries of acceptable forms of political action in democratic politics. When policy-making takes place under conditions of agonistic politics, and publics frame their voices in accordance with APUS conceptions, less tempered and constrained by the discursive rules and deliberative democracy, deliberative processes may no longer be effective, unless as a means to enroll an undecided 'public' against opponents which will not be particularly susceptible to changing their views. Thus, the argument may be heard that groups that will in all probability not change their views anyway should not be party to the deliberative process (e.g., the Dutch GM food case); they will merely exploit it as an opportunity to disseminate their propaganda, not as a context for reviewing and readjusting their positions within the process. Thus, however, the limits of deliberative politics may reflect on all parties, who have all to be questioned in terms of their willingness to change their views.

In agonistic forms of governance the main events and inputs take place in and are addressed at the *public arena*, and do to some extent adapt to the constraints set by *state politics*. Thus, focus is on efforts to address and change the given framework and its dominant framings, seen as inadequately structured in terms of key concerns of hitherto marginalised actors. Agonistic participation may, however, be compatible with and draw the process towards the state politics dimension, if agonistic participation is used for enhancing the scope and accountability of state politics decisions, as against, e.g., processes of privatization and deregulation.

Agonistic public participation is *anti-hegemonic*, since not only does it not comply with the terms of a policy framework seen to embody more or less overt forms of hegemony, but also the conflicts at the core of agonistic governance may often be over the very terms and rules of a framework seen as embodying hegemony. Thus, agonistic forms of participation will often be counteractive responses to policy agendas and processes seen as strongly hegemonic, and as too much a form of discretionary and/or exclusive-corporatist policymaking for outsider concerns to be heard and duly taken into account.

Agonistic forms of governance do, by default, to little extent pull the process towards the *market* dimension of the governance triangle; however, consumer protest to pressure corporations to act in environmentally and socially accountable ways be may counter-examples. These forms of market governance nevertheless conform with agonistic participation in bending the rules, here, as the power embedded in the consumer role is appropriated for broader civic or political purposes.

Configurations of models of governance

These broad categories may provide an initial and provisional characterization of cases from which lessons may be drawn about the dynamics of governance. They must, however, be used for this purpose in full recognition that cases often display a mixture or combination of elements listed under the different categories. Moreover, they may be characteristic in the ways that different modes overlap and combine with each other. Furthermore, these categories are not analytically given categories, but provide part of the reservoir of self-presentation and legitimation itself; so, various actors involved in a case will often hold widely diverging views on the nature and definition of the mode of governance 'applied' in a given case. What some will see as 'deliberative' politics might be classified as, e.g., educational by others, or even as hegemonic and oppressive to an extent which justifies adversarial action.

In order to avoid a premature and rather arbitrary classification of cases it is important to follow an analytic approach in which the definition of the issues at stake, the relevant facts, the causes of controversy and the political and technological options are the outcome of complex national and transnational construction and negotiation processes rather than their explanation. In such processes there will most of the time be no single control centre directing events.

Having said all this we still hold that it might be fruitful to look at the various cases and how they develop and to ask ourselves how various definitions and interventions pull the situation towards - for example- more agonistic conceptions on what is to be done or more educational conceptions etc.

Section 5
Processes of convergence/divergence

The changing forms and stakes of governance in science and technology take place within general processes of change, which redefine the tasks and contexts of policy development and implementation. Changing governance conceptions and practices reflect, no doubt, a key domain for discerning the effects on society in general, and in the political economy in particular, of the increasing centrality of science and technology in knowledge societies. The attempts to create new forms of public participation in science and technology coincide with drastic economic, social and political changes in many countries inside and outside the EU. These links and impacts must be explicitly taken into account in the way the governance processes are analysed.

Such attempts to develop new forms of participation are an intrinsic part of major processes of politico-economic change driven by the dynamics of the globalized, knowledge-intensive *economy*, and the concomitant search for effective *innovation policies* for enhancing competitiveness within the 'new economy'. This has led to radical changes in, e.g., the state/market relations, by which power relations are being reconfigured, new social divisions redrawn, and new forms of in/exclusion debated and constructed.

The new policies with respect to public participation in S&T in particular, converge with, and is one particular instance of, more general issues of democratic governance, resulting in the need for new national and *transnational* spaces for governance - for deliberation, negotiation and organizing public accountability. Particular important within the STAGE framework is the EU debate about European governance and citizenship.

While these strong, general drivers of transnationalisation and globalisation may be seen as centripetal forces of homogenisation and convergence, they in fact give rise to complex processes in which convergent and divergent dynamics and responses become interlinked in unpredictable ways. This can be seen by considerable differences between various parts of the (future) EU in terms of the institutional development of science and technology policy instruments, organizations and traditions. This leads to differences in the articulation of public engagement with science across sectors of policy and differences in the receptivity to efforts at mobilisation of the public and motivating the public. The analyses should be sensitive to the complexity of these processes, stemming from the differences and interactions between all levels and arenas of governance - ranging from the global and national, to regional and local, taking into due account the key role played in these processes of processes of Europeanisation.

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Appendix A: Table of cases

	ICT	Biotechnology	Environment	Country specific dimensions	Other
Denmark	-	- Cloning in newspapers - **The Øresund Region**	-	[From COMPASS]	
Finland	- ICT policy frames	- Biotech policy frames		[From COMPASS]	
Greece	- ICT policy	- Biotech policy	- Environmental organizations	(Embedded in case studies)	
Netherland	- ICT policy	- **GM food debate**	- Nuclear energy		
Norway	-	- **Biotech patent directive** - GM salmon	- Energy/climate policy	[From COMPASS]	- Institutional structure
Portugal	-	- Human genetics debate	- **Waste management**	(Embedded in case studies)	- BSE
Sweden	-	- Stem cells - Zenotransplantation	- **Nuclear Waste**	- Liberal S&T policy	- Nanotechnology
United Kingdom	- Mobile phone safety	- **GM crops debate**	-		- Advisory guidelines

Notes.

Bold indicates 'anchoring study', otherwise 'ancillary study'

Appendix B: Checklist for case studies

Framing

Setting the agenda:

- Who called for regulatory action?
- The agenda setting role of economic/innovation policy, as well as of citizen groups (campaigning etc); the role of governmental ideology of economic policy

Framing issues:

- How are issues framed? By whom? What are the consequences as to the formats of participation/consultation, as to institutional responsibility and constraints, and as to definition of what concerned public/interest may be legitimately included/excluded? (e.g., ELSA)
- How do 'purely' technical issues become topics of broader public concern, and vice versa? What are the characteristics of the processes by which this is accomplished?
- To what extent and/or in what form are ethical and moral concerns integrated into the pragmatic/technical framework of regulatory action? How are ethical and technical aspects distinguished? Are they 'assigned' to different agencies or (contrary) deliberately kept together or re-united through public contestation?
- How - in what terms (inevitability, consequence, choice, ... etc) do different participants phrase options and solutions?

Framing expertise and publics

- Which scientific and technical specialties are involved in defining the issues? How and in what ways are the social sciences and humanities involved?
- To what extent are arguments and definitions presented as 'scientific' and 'technical' and on which specialties and disciplines do various participants draw in doing so?
- To what extent do the 'experts' constitute a separate category of actors in the process and to what extent are they arguing against one another and acting as part of (or on behalf of) other groups of participants?
- How do experts relate to non-experts in the process?
- What is the role/impact of 'public opinion', inter alia as constructed in public opinion polls, media, newspapers, websites etc?
- In what ways does the overall management of the process promote a clear separation between expertise and experts and non-experts or the opposite.

Forms and formats of participation

- (The mix of) forms/formats of participation (from formal consultation to protest action)?
- What forms of deliberation/policymaking are promoted/preferred by whom?
- 'Delimitation' of publics: the ways in which technologies of participation include and exclude certain actors/actants i.e. affect their participatory options.
- The formation of 'concerned publics' through framing and institutional appropriation of issues, and the organization of processes
- The consequences of forms/formats of participation, to enhance sensitivity to constraints and hegemony

- What actors/interests are included in/excluded from consultation and decision-making processes (at various stages)?
- What role/position for NGOs and other representatives of the public/civic stakeholder interests (exclusion/marginalization) (at various stages)?

Note:

The analytical distinction between frames and formats should not be taken to imply that the substantive content (issues and frames) and formal, procedural aspects of the policy process can and should be considered separately. They are often intertwined and should be analysed as co-extensive, regardless of whether this is explicitly intended by participants in the debates or not. The form and substance of the participation processes should be seen as closely linked to each other.

Outcomes - decisions and effects
- The extent and form of public /civic influence on final decisions
- How are inputs to the policy process translated into decisions?

Note:

Much debate about governance focus on ways to design participatory mechanisms by which more groups and interests may have a voice in the policy process. They may be biased in favor of advisory parts of the policy process, while neglecting how and to what extent such inputs and voices actually co-determine the decision outcomes of the process. Key issues that need to be addressed is, inter alia:

The temporality of issue and policy formation
- The overall sequential structure of policy process

Note:

In order to avoid a premature and rather arbitrary classification of cases it is important to follow an analytic approach in which the definition of the issues at stake, the relevant facts, the causes of controversy and the political and technological options are the outcome of complex national and transnational construction and negotiation processes rather than their explanation. In such processes there will most of the time be no single control centre directing events.