Organizer, observer and participant

What role for social scientists in different pTA models?

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Abstract

Public participation has become an important issue in science and technology studies as well as in politics. Procedures creating such multi-actor spaces of public participation are usually discussed under the label "participatory technology assessment" (pTA). PTA is considered to be a possible and promising way to foster direct interaction between members of the general public (lay people), organized interest groups, scientific experts, and sometimes also policy makers. Over the last ten years pTA has been utilized in many European countries, but also elsewhere in the world. However, there are vast differences regarding participatory methods. Abels and Bora propose a typology differentiating among seven different types of procedures. These seven types adopt divergent approaches with regard to the participants involved (who), the ways and means of participation (how) and the supposed functions of public participation (what for). The paper investigates the role social scientists play in pTA. It argues that social scientists can act in three different roles: as organizers of pTA, as scientific observers and as participants. The last role can take two different directions. Social scientists can be involved in pTA as "regular" scientific experts, or they can serve as "translators" in the complicated communication among social groups. It is this role as translator that is considered to be most innovative and worth exploring in the theory and praxis of pTA.

1 Introduction

Policy-making today is heavily dependent on expertise. Scientific knowledge from various disciplines has become an important source for legitimizing political decisions. Scientists serve as policy-advisers in the field of research and innovation. At the same time, they also assess the implications of technologies for society, i.e., their impact on the economy, the legal system, on academia, education, etc. The traditional model of expert-based technology assessment (TA) certainly entails an established role for social scientists as experts. They employ social science methodologies and theories for predicting how scientific-technological innovations will effect social change and bring this policy-relevant knowledge into the TA process.

Practitioners have developed and experimented with different models (cf. Abels/Bora 2004; Abels 2008; Decker/Ladikas 2004; Joss 2003; Joss/Bellucci 2002; Joss/Durant1995; Joly/Assouline 2001; Healey 2005). The model of expert-based TA has been challenged since the early 1990s. Since then we have observed a burgeoning growth of what is called participatory technology assessment (in short: pTA).

"Public participation is seen as a way both of facilitating discussion among experts, policy-makers and citizens and of mediating between different social actors' conceptual and practical perspectives of scientific-technological developments and their wider ethical, legal and social repercussions." (Joss 2005: 197).

According to its advocates, pTA helps to counter the shortcomings of traditional TA. Major shortcomings include the inherent epistemological as well as local limits of expertise, the rise of counter-experts (expert dilemma), the specific problems of risk assessment, a strong focus on factual knowledge and, finally, the problem of normative assessments. Participatory TA claims to respond to these problems by looking at the way in which science, values, norms and interests are intertwined. According to

its advocates, this new approach – essentially rooted in a participatory, deliberative concept of democracy – is thought to be more "democratic" since the spectrum of legitimate participants and relevant knowledge is expanded. Integrating a variety of actors, especially lay people, should help to actively involve in policy-making more groups who are affected by socio-technological change. In addition, pTA confronts the traditional concept of expertise, i.e., as a specific form of objective, factual and professional knowledge, with other forms such as every-day knowledge, as well as with normative questions involved in expertise (cf. Bechmann 1993; Durant 1999; Andersen/Jæger 1999).

For many years a very enthusiastic euphoric, and normative assessment of pTA prevailed. Lately, more pragmatic and critical voices are being heard, as current social science research on participatory TA directs attention to its theoretical foundations as well as its practical ramifications (cf. Abels/Bora 2004; Bora/Hausendorf 2006; Bora et al. 2009; Hansen 2006). The procedural core of pTA entails deliberation among a plurality of societal actors, including the general public or lay people, organized interest groups, professional/scientific experts and sometimes even policy makers.

Recently, several typologies have been proposed that allow us to differentiate among various pTA models. The main differences concern the following formal and functional aspects:

1. Who can actually participate?
2. How does participation work?
3. What are the expected outcomes?

The typology proposed by Abels and Bora (2004) distinguishes among these different models according to the *form* and the heterogeneity of participating actor groups. Their typology demonstrates that in all but one model of pTA scientific experts do indeed partake, yet in different roles. Abels and Bora (2004) claim that the differences regarding roles have profound effects on the assumed *functions* of pTA.

This paper discusses the role of social scientists in pTA, their role in pTA, in general, and in different pTA models, in particular, in an effort to explain what social scientists actually do and what more they could contribute. My key argument is that social scientists can assume a *triple role* within pTA.

Organizers

Firstly, social scientists often serve as the organizers or facilitators of pTA events. As organizers they can help to improve the functioning of the process based on scientific research on pTA and on general social theory. This is, in fact, why we find such a strong influence of Habermasian discourse regarding ethics and deliberative reasoning in pTA. In this sense, social scientists work as reformists of pTA and help to improve the process per se. While setting the organizational framework is, of course, very important, it is not this specific social-scientist role, i.e., as an organizer that I want to shed light upon in this paper, but rather I want to focus on two other possible roles.

Observers

Secondly, social scientists can function as academic observers engaging in social science research on all kinds of TA and addressing the underlying question as to how modern societies deal with socio-technological challenges. This professional role is undisputed, and it is sometimes closely linked to the first role as facilitator. Since pTA is still in an experimental stage, there is a need for further academic research in order to develop an empirically and theoretically sound basis for improving the methodology.

Participants

Thirdly, social scientists can be participants in a pTA event in a dual sense. Social scientists bring a specific expertise to bear on these issues, meaning they can contribute as members of expert panels in a given pTA event. They can moreover act as *translators* between the different actor groups representing different social systems, such as the social, the political, regulatory and technical sphere involved in pTA. Social scientists are trained to understand the linkages and problems in communications arising between these actors and spheres. Thus, they can help to improve communication between these groups by "de-coding" communication specific to certain social systems and connecting it to kinds of reasoning in other social systems.

The study begins, first, by outlining the pTA typology developed by Abels and Bora (section 2), followed by a discussion of the specific role played by scientific experts in the different models. Then I examine the contributions social scientists can make as "translators" in the pTA process (section 3). Section 4 summarizes the main findings and draws some conclusions.

2 Linking forms to functions – a typology of pTA

Let us now examine our inductive and heuristic typology of pTA models, which is rooted in a critical review of the German and English pTA literature, focusing especially on pTA case studies conducted not only in Germany but in Europe and elsewhere (for details on the literature, cf. Abels/Bora 2004). While each pTA case is unique, given its specific context, it is nevertheless possible to draw up a typology based on certain key features of pTA. One such core feature is the participation of groups that are usually not involved in forms of traditional expert-based TA. While alternative classifications are possible, the major advantage of our typology is that it focuses on the structural, i.e., formal as well as functional dimension of pTA. The underlying assumption is that there are systematic links between the form (who participates and how) and the function (why and to which ends does s/he participate).[1] Based on this

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[1] Often involving social scientists, organizers are, of course, also important actors; organizational issues can have a great impact on the effectiveness of pTA on its social and political environment.

Table 1: Typology of participatory technology assessment procedures

| | **Number and heterogeneity of participants** (– → +) | | | | | | |
	Type 1 Dialogue procedure	**Type 2 pTA in a narrow sense**	**Type 3 legal public hearing**	**Type 4 consensus conference**	**Type 5 extended consensus conference**	**Type 6 voting conference**	**Type 7 scenario workshop**
Specific feature	Interest group oriented procedure	Expert –stakeholder procedure	Decision oriented procedure involving those concerned	Lay people – expert procedure	Lay people, interest groups and extperts	Voting-oriented procedure	Procedure involving those affected, experts and policy-makers
Participants							
Lay people			X	X	X	X	X
Scientific experts		X	X	X	X	X	X
Interest groups	X	X			X	(X)	X
Policy-maker						X	X
Criteria for selecting participants	Representative; partly affected groups	Representative	Everybody; those who feel affected	citizens: representative & lottery; experts: deliberate selection by lay people	citizens: representative & lottery; experts: deliberate selection by lay people; interest groups: co-optation	citizens: representative & lottery; experts & Policy-makers: representatives	Representative
Form of participation							
Social roles	Participants enjoy equal procedural rights	experts = key position	Decision-maker (administration) = key position; Citizens give arguments, experts deliberate	Lay people = key position; experts deliver knowledge	Lay people = key position; experts deliver knowledge (esp. for dialogue with interest groups)	Participating groups enjoy equal procedural rights	Participating groups enjoy equal procedural rights
Procedural rules	Dialogue/discourse between interest groups (sometimes experts are consulted); transparency regarding interests involved; understanding for different perspectives	Discourse between scientific experts and interest groups	Legal decision; affected persons have an advisory role	Questioning of experts by lay people	Participating groups often deliberate separately; interest groups deliver opinion, which is evaluated by lay people	Evaluation of different scenarios handed in by stakeholders; Voting on scenarios	Evaluation of different scenarios; participating groups deliberate separately as well as in joint sessions

Function of participation							
Major issue	Technology assessment and planning	Technology in general	Specific cases	Technology in general	Technology in general	Technology in general	Technology in general
Target group	Policy-makers; interest groups; general public	Policy-makers in general; general public	Public administration, decision-maker	Policy-makers; interest groups; general public	Policy-makers; interest groups; general public	Policy-makers; interest groups; general public	Policy-makers; interest groups; general public
Primary tasks and objectives	Initiate dialogue between opposing groups; interactive exploration of goals; identification of areas of consensus and lack of agreement	Resolving status of scientific knowledge by experts and counter-experts; in so doing, clarify political options; legitimize political decisions	Deliberation in a strict sense, i.e. influence decisions by good arguments	communication between lay people and experts; fostering and enlightening of public debate	fostering and enlightening of public debate	fostering and enlightening of public debate; reveal perspectives of different groups	Planning process; dialogue between all involved groups of actors; improve understanding for divergent perspectives
Attributed/expected achievement	Disclose divergent perspectives of concerned interest groups; overcome inertia; feed-back into interested associations; settling alternative options for policy-makers	Risk assessment based on technological state-of-the-art; identify uncontested knowledge as a basis for decisions	Inform citizens and of administration; representation and legal protection of citizen's interests; foster acceptance and legitimacy of administrative decision	Typical opinion of informed lay person; also agenda setting	Exploration of objectives; typical opinion of informed lay person	Filter for competing policy options	Disclose divergent perspectives of participating groups; agenda setting; political legitimation; overcome inertia
Underlying model of democracy	Pluralist, but with deliberative elements	Not specified, rather deliberative	Formally participatory, actually deliberative	deliberative	deliberative-pluralist	Deliberative with some pluralist elements	Participatory-deliberative with pluralist elements
Typical procedure	Mediation-oriented stakeholder discourse	Discursive pTA in a more narrow sense	Public hearing as part of administrative decision-making	Consensus conference, citizen's jury	Modified consensus conference, citizen's jury	Voting conference	Scenario workshop (Danish style)
Empirical examples	Dutch Gideon Project; German Discourse on Agro-biotechnology; Traffic forum in Salzburg	pTA on herbicide-resistant plants at the Science Centre Berlin (WZB)	German law on atomic energy as well as law on administrative procedures	UK Consensus Conference on Plant Biotechnology; Consensus Conference on GM Food, Australia	UK Citizen Foresight Project GM Food; Citizens Jury on GM Crops, India	Danish Voting Conference Drinking Water	Danish Szenario-Workshop Urban Ecology; Future Search Conference Traffic Copenhagen

Source: Abels/Bora 2004 (translation by the author)

formal criterion (heterogeneity of participants), our typology identifies seven different models (cf. table 1). We can specify four principal groups of participants:

1. lay people (often also called the general public);
2. interest groups, i.e., organized groups usually selected by the facilitators (and/or sometimes by the lay panel);
3. scientific or professional experts;
4. and identifiable policy-makers.

Under the simplest procedure, all participants belong to one and the same social group. At the other end of the spectrum, we find procedures involving participants from all four principal groups, such as the *voting conference* and the *scenario workshop.* Yet, most models include only two social groups: scientific or professional experts and lay-persons, or experts and interest groups. In the following I sketch out these models, then focus on important similarities and differences between them.

2.1 Dialogue procedure

The dialogue procedure involves only interest groups. Empirical examples include the German "Discourse green biotechnology", along with the Dutch Gideon project on sustainable plant protection of the Novo Nordisk dialogue.[2] According to this model, a variety of interest groups is selected either because the groups are deemed representative in terms of the issue to be discussed, or because they are directly affected by it (stakeholders). The "form" dimension is characterised by two factors: all participating interest groups are considered equal with regard to effective procedural rules, i.e., they are endowed with the same rights. The key objective is to set up a dialogue between or among competing interest groups, to explore the diversity of goals, as well as to identify consensus between the groups and to

"open up" thematic areas where there is lack of agreement.

In this sense, the major mode of communication is arguing; yet given that we are dealing with stakeholders there may be also be some element of bargaining involved. The assumed effect is to unravel competing perspectives, to serve as a clearing-house for competing interests, to function as a blockade-runner, as well as to filter policy-alternatives. The procedure is accompanied by more concrete planning processes (e.g., an authorisation of field release of genetically modified organisms, GMOs). The target group for the output to be achieved consists of policy makers, interest groups and the public in general. While this essentially entails a liberal-pluralist procedure, given the key role and plurality of interest groups, it clearly has deliberative elements insofar as interests have to be defended based on good reasons; they are further assumed to be open to change as a result of the deliberation.

Empirically, this procedure leaves hardly any room for social scientists; however, they sometimes serve as facilitators for this pTA model. Most of the communication between the partaking interest groups focuses on scientific, factual knowledge, the interpretation of uncertainty and its political implications. Admittedly could allow for a role for social scientists either as translators or as mediators between competing interest groups. The question is whether or not the involvement of social scientists, as translators or mediators between conflicting parties, could actually enhance the deliberative quality of communication and the social learning process. However, there is the risk that social scientists might be perceived as "interested" parties themselves, not as neutral mediators. This model is certainly of interest for social scientists as a subject of pTA research. At least three major questions arise: Does the procedural framing foster a mode of arguing over the usual bargaining style of interest group interaction? Under which political conditions does the model work or

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[2] A number of "typical" empirical case studies are documented in Joss/Bellucci 2002; for a more extensive description of empirical cases fitting into the different types see also Abels/Bora 2004.

fail to work? Finally, if and how are the results perceived by policy makers?

2.2 Narrow pTA model

Model 2 is a pTA type in a narrow sense of the term insofar as it is a "pure" expert-stakeholder discourse based on argumentative reasoning; furthermore, interest groups are selected according to representative criteria. The best example is the TA procedure regarding herbicide resistant plants, organised by the Berlin-based Science Centre, WZB. Participants are selected because they represent relevant scientific or social perspectives. While scientific experts occupy a key position, and stakeholders are forced into an arguing mode, the participants exercise strong control over the procedural rules via ongoing co-ordination between groups. The empirical objective here is to achieve a scientific consensus about areas of uncontested knowledge, brought about by arguing between experts and counter-experts.

The salient normative expectation regarding its function is to identify policy alternatives that help to increase the legitimacy of follow-up political decisions. The model is applicable to general debates about technologies; the target groups are policy makers and the general public. At first glance, this model seems to be very *expertocratic,* given the strong position of scientific reasoning that excludes modes of non-scientific communication and all alternative kinds of expertise. Actually, it entails rather deliberative communication insofar as political disputes are transformed into a scientific discourse, the results of which can then be appraised in political debates; all arguments are fed back into the deliberation. However, the communication is first and foremost limited to a deliberation over scientific, i.e., natural science knowledge.

Interestingly, this procedure was clearly dominated by social scientists as organizers, because the WZB discourse was also a social experiment, and social scientists were clearly the facilitators. This deliberative event has been well analysed, documented, and often strongly criticized in the literature (cf. Saretzki 1996; Joss 2005: 210). Empirically speaking, social scientists were engaged in two roles: as organizers and as academic observers. Yet, there need not be such a close linkage between organizer and observer – in fact, critics argue that it should be avoided. The WZB event has been accused of forging too close a linkage between these two different roles, implying that the organizers' role brought along a bias regarding the concurrent role as scientific observer. This critique highlights the need for independent and scientifically sound evaluation of pTA events. So far, such evaluation is still lacking. But as Simon Joss (1995) has already rightfully argued, evaluating participatory events is not a luxury, but a necessity.

2.3 Legal public hearing

A legal public hearing (in German: *Erörterungstermin*) is an essential part of an administrative authorisation process; it is commonly used, for instance, in urban or environmental planning. European Union regulations for the deliberate release of GMOs, for example, also require some form of public participation; for some time member states set up legal provisions for public hearings (cf. Bora/Hausendorf 2004). This is the only model closely linked to public administration and authoritative decision-making, while all other pTA models are purely advisory.

In the legal public hearing, law and politics are strongly intertwined. The participants are scientific experts and all those who feel affected by the issue at stake (often locals). This is the most open procedure in terms of access for the general public: everybody can participate. The administrator plays the pivotal role. A key feature of this model is that the procedural rules are severely restricted by the legal framing. Only those arguments considered valid with regard to legal standards are taken into account in the administrator's final decision. This entails a preference for arguments based on scien-

tific, factual knowledge privileging the natural sciences. Other kinds of objections are procedurally excluded, although they may, in fact, be highly relevant for those affected and participating (e.g., religious, ideological or economic reasons). A comparative European project has illustrated that this effect is linked to structural features, not to the specific national context (cf. Bora/Hausendorf 2004, 2006).[3]

Affected persons who join the public hearing have an advisory role and contribute their local or everyday expertise. Given the legal-administrative framing, the organizer and addressee of the hearing is the public administrator who has to take the final decision and who can be hold accountable for the decision.

The normative objective of this model is deliberation in a very Habermasian sense, that is, to influence policies by using good arguments. Given its strong legal basis, this model is most explicit about its five normative functions: informing the affected citizens; informing the administrator; representing stakes; legal protection of the applicants and those who feel affected; and increasing the legitimacy of the final administrative decision.

This model is highly participatory, because there are no legal or procedural limitations as to who can participate (access). Due to its open character, it can have a very mobilising function and affect the public discourse. This model is indeed very deliberative since only good arguments can prevail in the procedure. There are, however, limitations

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[3] In an application procedure dealing with the deliberate release of genetically modified plants which possess an enhanced capacity for soil remediation, local people were, for example, afraid of negative media reporting. They accused the scientists of having a kind of "colonial" demeanor (the scientists came from West Germany, the field experiment was to be conducted in East Germany); and they further claimed to have local knowledge and strategies of dealing with land contamination. In legal terms, these objections were completely irrelevant – but highly relevant for the locals.

regarding what counts as a "good" argument in the context of the legal framing, namely arguments rooted in sound (i.e. natural) sciences. This procedural limitation turns out to be the key normative problem for the legitimacy function of this type of pTA. At the same time, there may be a high degree of accountability given that the administrative unit in charge – at least in German administrative law – has to respond to all objections raised, whatever their nature or legal relevance, and to justify if and in which way they are being taken into account.

Empirically, there is only a limited role for social scientists in this model. Social scientists hardly participate as experts. In fact, social science knowledge is procedurally marginalised by the strong linkage between politics and (natural) science: The relevant standard against which all arguments are judged is "the state of the art in science and technology." This does not leave much room for social scientists as participants.

However, there is a strong role for social scientists acting as observers. The legal public hearing is actually the best researched pTA procedure (cf. Bora 1999; Bora/Hausendorf 2004, 2006). Social science research has illustrated that the strong linkage between science and the law comprises the major shortcoming of this procedure. The discrepancy between a complaint made by local people against, for example, the deliberate release of a particular GMO and the objections based on factual and legally recognized knowledge in the final administrative decision lead to a high degree of frustration among the lay people. Their objections are often grounded in different sources of knowledge and experience, as well as in strong normative arguments. Yet, anything but natural science knowledge is deemed not legally valid. Therefore, scholars propose further procedural differentiation (Bora/Hausendorf 2006). They argue that direct public participation in administrative decision-making proves counter-productive and suggest alternative ways of integrating participatory

models into public administration (e.g., in administrative rule-making).

2.4 Consensus conference

The most famous, and ubiquitous, pTA model is the Danish-style consensus conference. Given formal similarities, this model includes procedures such as a citizen jury, a citizen's forum, citizens' conferences, PublicForum (Switzerland) and the like (such as the "planning cell"). The consensus conference model has its roots in civil society engagement and the search for "the public interest". Its worldwide boom is built on perceptions of a failure of parliamentary democracy (cf. Joss 2003) and its inability to include moral, normative issues.

There are two principal groups of participants in this model: lay persons and experts. The lay persons sit in the driver's seat: supported by a facilitator, they set the agenda, they question the experts, and they write up the final citizen report. The lay panel usually consists of a random selection of citizens (in addition, other selection criteria such as sex, age, geography etc. are usually employed). The experts are selected by the lay people based on their area(s) of expertise; expertise is hence not limited to scientific expertise. The consensus conference requires a very time-consuming procedure. The major normative objective is to trigger communication between lay persons and experts. This communication is assumed to allow for mutual social learning and for normative evaluation of the specific technology up for debate. The outcome, the citizens report, offers a typical, yet informed lay person perspective on the debated issue. This report is intended to enlighten the public and enhance political debate; it may also have an agenda-setting function.

Even though the consensus conference model is often praised for its participatory approach, the participatory elements are very limited due to the selection of only a few citizens for the lay panel (usually 10-30 people). Furthermore, the public only has access to the hearing with experts but not to the internal debate conducted by the lay panel.

The theoretical foundations of consensus conferences have recently attracted some scholarly attention. It is clearly considered to be a model based on deliberative democracy (Einsiedel 2000; Smith/Wales 2000). However, there is a lack of research on the actual communication that takes place between the lay panel and the experts (as well as within the lay panel). We find some hints that there are, in fact, strong communicative limitations in place. The subjectivity of the lay people moreover seems to be neglected, which "may result in participants' alienation from the event, effectively undermining the endeavour's participatory promises" (Görsdorf 2006: 177; cf. also Görsdorf 2007a).

I would like to suggest that social scientists can engage in all three roles with regards to consensus conferences.

- First of all, they should observe and evaluate these pTA events.
- Secondly, they should participate in the expert panel of a consensus conference. Lay people are most interested in the social effects of contested technologies, and social scientists possess the professional expertise necessary for analysing and evaluating such effects. For lay people, social science findings may be more easily linked to their everyday experience and knowledge and, therefore, be more accessible than knowledge based on the natural sciences.
- I argue further that there is a third potential role to consider: Against the background of limitations in expert-lay people communication, social scientists might serve as *translators,* especially in consensus conferences, since it is this procedure where we witness the most direct encounter between lay people and scientific experts (cf. also Joss 2005).

The expert hearing is the procedural core of the consensus conference model. At the same time, it is the most

problematic part, since the communication requires forms of translation between lay-talk and expert-talk. Factual scientific knowledge has to be rendered "meaningful" to lay people and, correspondingly, natural scientists have to understand the concerns of lay people. Given the scarce evidence we have regarding expert-and-lay persons' communication, it is naive to assume that (a) each group can "translate" arguments from the other groups in its own language and schemes of relevance; and (b) that mutual social learning (whatever that is) will occur automatically just by talking to each other.

2.5 Extended consensus conference

The extended consensus conference adds co-opted interest groups to the procedure, yet lay persons predominate. The interests groups deliver a statement, which is then evaluated and "judged" by the lay persons with the help of experts. The output and main normative functions are the same as for model 4. It is expected that interest groups will become more responsive to public interests by being forced to defend their own stakes in an argumentative mode. Therefore, the procedure is assumed to be deliberative, but it also has some pluralist elements, due to the involvement of interest groups. A typical example is the UK Citizen Foresight Project GM Food.

Regarding the suggested roles of social scientists, they are the same as depicted in model 4. Yet, the role of translator becomes more complex, since the involvement of interest groups brings along a new dimension of strategic knowledge, which is used for achieving certain group preferences. Moreover, there may be competition between interest groups over winning support from the lay people. Again, this could affect the role of social scientists as translators and their procedural impartiality.

The following two models involve interest groups and policy-makers among the participants.

2.6 Voting conference

In a voting conference (e.g., the Danish Voting Conference Drinking Water; cf. Joss 2005: 213f.) a representative panel of up to 180 lay persons, experts and policy-makers is selected; all participants are endowed with the same procedural rights. The highlight of the procedure is a hearing in which interest groups present scenarios or action plans. Each has to argue in favour of its own scenario based on "good reasons". The general public is invited to attend this hearing but has no voting or other rights; this adds a participatory element. At the end, the participating groups vote in a secret ballot on the proposed action plans. The main normative aim is to evaluate perspectives from different interest groups and to find out, how they are being assessed by different social groups.

By combining voting with deliberation it is expected that the procedure will eliminate the knowledge gaps often encountered in pure voting systems (e.g., public referenda). Especially due to the voting aspect, the procedure can serve as a filter for competing policy options, since a vote amounts to a strong form of judgement, even a sanction. This is precisely why this model is more contested than purely deliberate procedures; there is only limited space for consensus-building. Voting on competing options inevitably creates winners and losers. The losers may question the procedural legitimacy. There is some evidence that such procedurally created partisanship is "turning up the heat" (Hendriks et al. 2007; cf. also Hendriks 2002) in pTA. Public interest groups may profit more than special interest groups; the last ones may fear that losing has negative repercussions for their traditional channels of pressure group politics (this would be a kind of informal sanction). Therefore, they may refrain from participating in a public participation event.

Here I would suggest that social scientists can be helpful in this model as "regular" pTA participants. They can partake in the group of experts and contribute their professional expertise on

the social effects of techno-scientific development. Yet, they do not hold a privileged position but rather function as normal "expert-citizens," adding a specific kind of relevant knowledge to the pTA event.

2.7 Scenario workshop

This model shares some similarities with the previous two. It was also developed by the Danish Board of Technology and then adopted by the European Commission for the "sustainable cities campaign"; significant examples are the "Scenario Workshop on Urban Ecology" and the "Future Search Conference on Traffic in Big Cities." In a scenario workshop, a total of 60-90 lay people, policy-makers, experts and interest groups deliberate in separate groups – in order to identify group-specific perspectives – as well as across groups – in order to identify commonalities. All participating groups enjoy the same procedural rights; participants are selected according to representative criteria. Participants either evaluate given cases, or they can collectively develop new scenarios.

The main normative objective is to influence the planning process and to initiate a dialogue among the various groups, helping to increase understanding for the different perspectives offered. There is some evidence that the model does have an agenda-setting function and can help to overcome procedural deadlock; the expected performance is to increase political legitimacy for the results. The participation of policy-makers may enhance the chance that the results will be taken into account in the actual policy-making process. At the same time, the participation of those directly affected brings along new tensions and conflicts.

Normatively speaking, this is a participatory-deliberative model, given that the local public and especially concerned groups have an opportunity to participate regarding local issues. The model also contains some pluralist elements, given the strong involvement of interest groups, and given that

consensus-building on the final action plan allows for some bargaining.

Social scientists can partake as scientific experts. The problem here is to trigger consensus-building within the diverse social groups. The group of experts can be very heterogeneous, with scientists coming from a variety of disciplines; the need for interdisciplinary dialogue and even consensus-building makes deliberation within this group even more complex than in the group consisting of lay-people or of policy-makers.

2.8 Comparison of pTA models

Comparing the various pTA models sheds lights on some striking similarities and differences in terms of formal and functional aspects (table 2).

Form

First and foremost, lay people constitute an important group of participants in all but two procedures (form dimension). It is striking that in most procedures one group holds a procedurally privileged position; yet, in two models (voting conference, scenario workshop), all participating groups are assigned equal rights (balanced models).

Function

It is likewise striking that most case studies found in the literature are rather vague and/or normative about the specific functions of pTA events (cf. in detail Abels/Bora 2004). Social learning and enlightened public debate, for instance, remain vaguely defined aims. The legal public hearing is an exception; its very explicit functions are derived from a long tradition and the strong legal framing of the procedure. In general, all procedures address the legislative and/or executive branch of government. Nevertheless, the actual link to political institutions and the impact on policy-making is not well documented in the literature. Beyond problems of timing, there are, of course, also methodological problems involved in measuring impact.

Table 2: Similarities and differences between pTA models

Similarities

- addressed to legislature and/or executive; institutional links rather weak
- foster and enlighten the general public debate
- communication between lay people and experts
- argumentative communication or discourse
- advisory character, not substitute for political decision-making
- based on theories of deliberative democracy, sometimes combined with additional participatory or pluralist elements
- many models wide-spread in the field of biomedical policy-making

Differences

- number and diversity of participants
- group that is in a key position; some models are more "balanced"
- general public does not widely participate, at best via the media
- expectations about the performance or effectiveness of the various models are often rather vague, especially when lay people dominate procedure
- involvement of social scientists

Yet, the problem goes deeper, extending to the very relationship between participation and representative democracy. Referring to Marten Hajer's work, one can speak of an "institutional void," meaning that there is a lack of linking pTA to institutions of representative government (Abels 2009). Joss (2005: 215) notes the "extra-institutional character" of deliberation, also highlighting the missing link between pTA and institutionalized processes of policy-making.

Interestingly, the *general* public and also the media are usually excluded, apart from the public hearing. Overall, pTA evaluations confirm that there is often a serious lack of media reporting; this thus limits its impact on public debate. Therefore, one radical conclusion could be to question whether the term "public" participation is really appropriate.

There is some empirical evidence that procedures ensuring a strong role for interest groups may function as a blockade runner, sometimes sign-posting a political route out of inertia and deadlock (cf. Bütschi/Nentwich 2002). Agenda-setting and filtering out policy-alternatives are further functions that some models contribute to the policy-making process (e.g., the voting conference or dialogue model). Methodologically this is hard to prove, however. Even if a policy-maker is inspired by the result of a pTA, for example, s/he may never refer to it explicitly.

Biomedicine

Especially regarding the field of biomedical policy-making, it is most striking that there is a clear preponderance of the consensus conference model, while other models have been widely neglected. The main reason for this may be the overtly normative dimension, usually referred to as bioethical issues, combined with a focus on societal impact as well as the common good. In the end, this may lead to a strong preference for lay-dominated procedures. At the same time, we see fewer organized interest groups in the field of biomedical policy-making who could serve as participants. Many of the issues involved in biomedical policy-making that could be opened up for participatory TA are not bioethical issues at all – or at least not purely bioethical issues. Consider, for example, reproductive technologies and their availability to couples. Or consider

genetic testing in the workplace. These topics also involve conflicts over the allocation of resources in the health system, about worker's rights and the interests of employers in keeping production costs low. From this perspective, interests groups certainly do have a say in the debate over biomedical issues. They may actually be included in the participatory TA procedures but usually only as non-scientific experts. Depending on the mode of pTA chosen, they could become "regular" participants.

Roles of social scientists

Social scientists participating in (biomedical) pTA assume different roles, for example, as facilitators and scientific observers. Yet, social scientific involvement can go beyond these two palpable and undisputed roles, especially if we consider procedural innovations to the models outlined above. First of all, social scientists can (and, indeed, often do) directly participate in different models as part of the group of professional and scientific experts. They can thereby provide their special expertise about the possible impacts of techno-science on society. If social scientists act as participants in the expert panel, they enjoy equal procedural rights with other social groups, and they do not enjoy a privileged position. Yet, this only works for those models which involve the participation of experts.

Lay people

A number of pTA models involve lay people who interact in different ways with other social groups, especially professional and scientific experts, but also with interest groups and with policymakers. The consensus conference model centred on the expert hearing is the classical example. This lay people-expert encounter amounts to very demanding social communication that has to be researched. Surprisingly, there is a noteworthy lack of empirical studies actually analysing what happens *inside* the blackbox of lay-expert communication. Nonetheless it is above all this kind of communication where social scientists

could assume a valuable role as translator. In the rest of the paper, I discuss why there is a need for social scientists to serve as translators and outline some ideas as to what this could mean in the practice of pTA.

3 Social scientists as translators in pTA

Advocates assume that pTA implies to "democratise expertise". The term democratisation refers to the representation of a plurality of social actors and voices. Expertise nonetheless stems from different sources, including non-scientific sources. *All* participants are expected to provide unique sources of knowledge depending on their specific social position. There are, however, differences between pTA models. In principle, there is not a privileged, authoritative position of scientific knowledge in pTA but different forms of knowledge are treated as equally relevant.[4] All models involving lay people aim at including everyday knowledge (*lebensweltliches Wissen*) as expertise in its own right; this expertise is necessary for analysing socio-technological developments in their entirety, including the normative implications of such. Thus, pTA aims at developing new modes of governing knowledge.

"Mode 2"

In this sense pTA can seen to offer an empirical case of what Michael Gibbons et al. (1994) have coined "mode 2 knowledge production", which is characterized as "socially distributed, application-oriented, trans-disciplinary, and subject to multiple accountabilities" (Nowotny 2003: 179). Mode 2 knowledge is "socially robust", dialogic and reflexive and undergoes social validation, i.e., it becomes robust against social claims and demands. Social science involvement in pTA has to be embedded in this structural context. It is

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[4] The legal public hearing is an exception, due to the close link between administrative decision-making and science; also the narrow pTA model sticks to a more traditional concept of factual knowledge.

just one out of many voices in a whole pTA choir. While traditionally scientific knowledge was thought to be superior to other forms of knowledge, under conditions denoting a politicisation of expertise scientists are confronted with the loss of their previous "natural" authority. Robust knowledge calls for new arrangements between politics, science and the public. Different actors do not just provide different kinds of knowledge, but they also provide different interpretations, assessments, and utilizations of knowledge based on diverse values, interests and norms. This complicates communication between different groups and requires "translation".

Even though communication is considered to lie at the very core of pTA, surprisingly this aspect thus far has been, by and large, "black-boxed" and under-researched. Studies analyzing communication within pTA (Bora 1999; Bora/Hausendorf 2004, 2006; Görsdorf 2006, 2007b; cf. also Joss 2005) draw attention to massive communicative problems that require "translation". They emphasize, for instance, the "troubled communication" between lay people and experts. When everyday knowledge and sense-making meets scientific expertise, this is prone to misunderstandings on both sides. In pTA, interests, values and arguments are deeply intertwined. For example, from studies on risk perception we know that there are systematic differences as to the ways in which experts and lay people perceive risks. This is highly relevant to pTA since many debates over techno-science are framed as risks debates.

Biotechnology

In the case of biotechnology, for example, natural scientists often complain about lay persons' irrational fears and arguments against GMOs, or they note that arguments brought forward are not specific to the GMO case but express wider concerns about the price of technical modernity. In much pTA, we can observe the tendency to polarise "science" and "the public": while the latter

engages in ethical debates, the scientific debate is left to (natural) scientists. In a pTA event, these differences in perceptions, along with the interlinkages between interests, values and arguments, have to be opened up and made "communicable" to the groups involved. It requires that the expert discourse be "translated" into a discourse accessible to a non-expert, general public. Simultaneously, public concerns have to be "translated" for an expert audience, if they have an impact on the research agenda and process.

Interest groups

In liberal democracies interest groups comprise an essential group in politics. Beyond the scientists, they are also important in most pTA models. Sometimes they rather play the role of handmaiden; in balanced models, they are equal to other social groups. While interest groups are used to bargaining; participatory TA tries to force interest groups into a deliberative mode. Interest groups thus play a dual role: they bring in expertise, and they lobby for their own special interests. Expertise is their major resource. However, their use of knowledge is always strategic: it has to serve their preferences. In their communicative interaction with lay people, interest groups have to defend their special interests based on "good" arguments that take public interests into account. This is a real challenge; it brings tensions into the pTA event and may shift the power balance among interest groups in their relation to their political environment (Hendriks 2002; Hendriks et al. 2007). Again, social scientists could serve as translators between different interest positions and lay people by improving their two-way communication.

Furthermore the quality question should not be neglected. Helga Nowotny (2005) calls this the Achilles' heel of the mode 2 model. When lay people dominate pTA, reports and recommendations often seem to be very general; frequently lay people may have very optimistic expectations about what should happen

with the policy recommendations they have developed.[5] This may affect the "usability" of citizens' reports for policy-makers who are the main addressees of and sometimes also participants in pTA.[6] Citizen concerns therefore have to be "translated" into policy-relevant language. The political system works on different relevance criteria; policy-makers are, first of all, strategic actors and party members, not knowledge recipients. Against this background, social scientists could assist in writing reports and recommendations by "translating" the logic of politics for the public, and vice versa. Recommendations could thereby become more policy-relevant.

Functional differentiation

I have briefly demonstrated that communication between the public in pTA and other involved social groups is complex and prone to "misinterpretation". Often facilitators and communication experts involved in pTA may function as "translators" – mixing up procedurally different roles. I propose a functional differentiation of roles in favour of social scientists as translators. Social scientists are trained to understand differences and interlinkages between social groups, between facts and norms, public and private interests. In the weakest form of involvement, advisory boards assist the facilitator in preparing and conducting the pTA process; in fact, a number of pTA events involve such boards. In a stronger form, social scientists might have a direct role in the pTA communication at different stages: for example, supporting lay people in the preparation of public hear-

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[5] This is an observation by the author based on attendance at a number of pTA events, especially involving presentation of reports to the public, and on reading many citizens' reports.

[6] It is only fair to mention that even high quality policy advice does not imply a guarantee that it will have an impact on policy-making. Policy-makers are strategic actors who evaluate the quality of policy advice not based on scientific criteria of quality control, but based on strategic political criteria if it serves their interests.

ings, conducting public hearings, providing support in writing up reports, preparing for the public presentation of final reports, disseminating results etc.

This is not be confused with the role of participating in the "regular" expert panel involved in most pTA; the possible roles of "regular" experts and translators should be kept apart. However, we have to acknowledge that the principal expert dilemma also pertains to social sciences; their "translational achievement" may be contested, and may become a matter of dispute just as any other kind of scientific knowledge.

4 Conclusions

The development of pTA represents a fairly new and fascinating trend in the governance of science and technology, which has resulted in different models. These can be distinguished based either on formal characteristics (heterogeneity of participants) or on their functions. They share a number of similarities, e.g., fostering (public) debate and social learning among participants, but they also evince major differences, e.g., in terms of procedural rules enjoyed by participating groups and the main functions they pursue.

Organizers

Social scientists can play various roles in pTA. First of all, they can be (and quite often are) organizers of pTA. The very idea of pTA and procedural innovations can actually be traced back to the strong involvement of social scientists.

Observers

Secondly, they are also scientific observers of pTA. They are the ones who research, analyze and theorize the contested field of science governance, a unique task for social scientist. This role is palpable and undisputed. In doing so, they can supply advice to improve the procedural and substantial quality of pTA.

Participants

The third role is to serve as participants in pTA in two different ways. They can be (and many are) regular members of the expert group, as seen in the consensus conference but also in the scenario workshop or voting conference model. In this role, they function, first of all, as providers of specific knowledge. In the balanced models (voting conference, scenario workshop), experts are endowed with the same procedural rights as the other participating groups. This allows social scientists to partake as "expert-citizens".

Translators

Finally, social scientists might also be involved as translators. They can interpret and decode communications between different social groups and spheres involved in pTA and in different stages in the process. They can connect different logics and systemic languages and, hence, help to improve pTA and its links to its diverse social environments.

This requires two things: first of all, there is a need for procedural innovations in current pTA models. Yet, since there has been much creativity in the pTA field in developing models and adopting them to different social contexts, this is not a structural problem. Secondly, recent developments and the effect of innovations have to be thoroughly analyzed. There is still a strong need for researching what is actually happening "inside" pTA. Yet, any assessment, if inserting extra roles into pTA events – such as the role of translator – actually makes a difference and improves the linkages of pTA to its environments, all of which requires additional empirical research.

It would be naive, however, to assume that the role of translator will be uncontested. Based on the logic of mode 2, social science knowledge brought into the process by social scientists acting as translators underlies the same mechanism of social robustness; it has to be socially validated, reflexive and robust. I consider the development of such a translator role to be one of the most innovative features of pTA – and therefore worth further exploration for the theory and praxis of pTA.

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