

EUROPTA

European Participatory Technology Assessment

Participatory Methods in Technology Assessment and Technology Decision -Making

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Abstract

From March 1998 to December 1999, the EUROPTA project "Participatory Methods in Technology Assessment and Technology Decision -Making" was carried out on the issue of participatory technology assessment (PTA). The project received funding from the European Commission (Directorate General XII), TSER Programme. It was co-ordinated by the Danish Board of Technology (Denmark) and included partners from Austria, Germany, Netherlands, United Kingdom, and an associated partner from Switzerland.

Technology assessment (TA) traditionally have an analytical approach with the aim to "speak truth to the power". Since the eighties, PTA has been established with the aim of "finding solutions together" or "generating dialogue". There has been an increasing call for PTA worldwide. In this situation, the project was prompted by a relative lack of relevant theoretical and empirical analysis.

The overall aim of the project was to advance the understanding of the role of PTA by critically assessing the experiences to date of different European national participatory initiatives, to identify criteria for the practical implementation of participatory methods, and to contribute to the development of participatory methods and practices in technology assessment.

The project pursued three key objectives:

- 1) develop a theoretical and analytical framework on the role and function of PTA, as a basis of normative-conceptual discussion and empirical analysis.
- 2) characterise and compare 16 participatory arrangements in the countries involved, allowing for the study of a broad range of methods, as well as of comparable projects.
- 3) make recommendations about the use of PTA at a national as well as a (European) transnational level.

The policy recommendations made by the EUROPTA project support the following tasks:

- 1) To understand and implement PTA as a necessary methodological complementary to traditional TA, when a need for knowledge on public attitudes, social learning, critical (public) discourse, mediation and/or policy support with processes and input is found.
- 2) To support independent national implementation of PTA, with remit and a position to build up expertise in and perform participation. To diffuse participation to other areas.
- 3) To ensure improvement and diffusion of PTA methodology, and the conservation of well functioning procedures. To make use of known expertise and experience.
- 4) To achieve optimal method selection by comprehensive problem situation analysis.

Further needed activities supporting the EUROPTA objectives are:

- 5) Establish further research concerning:
 - a) Quality criteria relating to the outcomes of participatory technology assessment;
 - b) Development of impact evaluation tools and characterisation of impacts of PTA;
 - c) Comparative analysis of aims, function and impacts of classical *versus* participatory TA.
- 6) Transnational (European) implementation of PTA:
 - a) Pan-European PTA. Modify existing methods with pan-European citizen/expert panels.
 - b) Simultaneous PTA among EU member states, aggregated at European level.
- 7) The EUROPTA project should be seen as a starting point for additional activities, including:
 - a) Running dissemination and training seminars on the EUROPTA research outcomes;
 - b) Developing a methodology handbook on participatory TA;
 - c) Setting up a participatory TA network.

I. EUROPTA executive summary

An increasing importance of participatory technology assessment methods in Europe and world-wide is observed as a consequence of critique and doubts to new developments on science and technology in general, as an answer to questions of uncertainty and inequality in the modern society, and as a new interactive development in policy analysis.

Participatory TA-Methods (PTA) are suggested to be a possible way for a direct, interactive inclusion in the TA process of affected social actors, such as interest groups, consumers and members of the general public, alongside professional experts and policy makers. An increasing number of TA organisations are experimenting and implementing participatory methods, allowing so for a better interaction between the public, stakeholders, experts and policy-makers.

The aim of the EUROPTA project (European Participatory Technology Assessment) has been to advance the understanding of the role of PTA, to help furthering the development in PTA practice, and to give guidance for the implementation of participatory methods as a support function for public discourse and decision-making. A comparative analysis of the practice and experiences of PTA of the involved countries (Denmark, Germany, Great Britain, Holland, Austria, Switzerland) was carried out. A minimum of two case studies were carried out in each country (16 altogether).

Two international workshops have been held as part of the EUROPTA project. The aim of the two international workshops was threefold, namely to make the findings of the research carried out under this project available to the wider research community, diffuse the idea of and debate about PTA and at the same time to get feedback about the team's work.

In order to set a common working-grid on the submitted case-studies, a research framework was established. This framework involves a theoretical framework, an analytical framework and a research protocol.

The function of the theoretical framework was to establish a more comprehensive and integral understanding on the role and function of participatory TA than is currently available. In this context the problem of how to deal with uncertainty and inequality is seen as an important motivation for setting up participatory processes, which is closely intertwined within the discussion of democratisation of science and technology.

The analytical framework serves as a background for the description of concrete PTA projects, and for the transversal analysis of the cases. The three dimensions "Social context", "Institutional context", "PTA arrangement" and the inter-relationship between these dimensions, represent the basic structure of the analytical framework. Inside each dimension, a set of aspects are presented, which all together makes up a pluralistic descriptive model.

The research protocol is a practical tool (a check-list) for the empirical analysis of the 16 case studies and for ensuring their compatibility. It treats the many variables that sets the constraints and opportunities of the various actors that are involved in defining and organising the PTA arrangements. The protocol has the same structure as the analytical framework.

The analysis of the project is outlined on five themes, each represented in the report as a thematic paper. In the five papers a transversal analysis of the case studies is made, and models for the understanding of the role, function and workings of participatory TA are presented.

The first paper is entitled *Implementing participatory technology assessment: From import to national innovation*. The 16 case studies show a wide range of first-time usage of participatory methods – in a country, at an institution, or in a certain topical area. Such first time use may be based on “import” of a method, on modification of a method in order to shape it to the new application, or on a method developed specifically for the purpose.

The analysis shows that generally PTA methods seem to be transferable between countries and institutions, though the new setting will give the method new connotations.

Main task for all countries is to find out what the role of public participation in policy analysis and technology assessment may be, taking national political culture into account, when trying to open up the traditional expert-oriented analysis by supplementing it with participatory processes. Of course there are still critical voices in regard to the introduction of PTA but acceptance has changed remarkably. Important for the success of PTA is the dedication and willingness of either individuals or institutions to try and believe in this, against whatever odds.

The second paper *Project Management: A matter of ethics and robust decision* states that good management should follow discourse ethical rules, because the credibility of a debate is closely related to the ethical quality of the debate, and the impact of TA is closely related to its credibility. Difficulties in PTA are often due to managerial problems that arise from poor ethical standards.

Looking at different aspects of PTA management, some conclusions and recommendations are given. Adoption of methods should be done with some humility to the original format. There is a need for more research regarding quality criteria for the outcomes of TA making up an important guideline and evaluation tool for project management in the end. A PTA cookbook would be helpful describing the qualities of the different methods but also the problems and pitfalls to be aware of.

The choice of participatory TA methods related to institutional and problem setting is the third thematic paper. In the paper it is shown that the choice and the aim of the method are linked to the addressed issue and the institutional motives – the “problem situation”.

Depending on the roles played by citizens, stakeholders and experts we distinguish two types of PTA. As a general rule it could be said that expert-stakeholder PTA is appropriate when technical-issues are placed in the forefront. Public-PTA is more appropriate when ethical-moral issues are discussed.

The next paper *The Role of PTA in the Policy-Making Process* explores the many possible different political roles PTA may play. The range of roles is as wide as from

- evaluating public attitudes towards, and expert opinions of, new technologies, over
- resolving conflicts, to
- carrying out strategic planning.

A large proportion of the cases only had a weak or moderate political role, at least when evaluated from the instant picture given by a case study. The delimited political role of participatory TA is mainly seen as a consequence of the overall consultative function of TA – and not, as might be suspected, as a sign of political irrelevancy of participation. Many factors, however, have an influence on the success on the political performance of a PTA arrangement.

The last paper is describing the *"Impacts of PTA on its societal environment"*. The issue at stake, the state of public and political debate are important factors for an impact of PTA in the societal and political context. It is relevant whether the procedure is carried out in a political setting with connection to an expressed political will to involve the public/lay -people. The procedure itself can also cause an impact on the media and produce a visibility of the TA-institution.

An important observation is that it is difficult to quantify and to come up with a conclusion on the impact of PTA arrangements, because of the difficulty to define such impact -criteria. On a long term perspective, PTA may have a good chance to change the political climate of debate in a constructive way in the field of technology policy, though on a short term perspective, the impact seems to be little.

The fact that there is a visible growing demand from different persons and institutions to run PTA in a way supports this hypothesis. However more research and long term studies to clarify the role of PTA in democratisation of science and technology are needed. It is not the main task of PTA to have a direct impact on the politician but to help the political decision -makers doing their work.

The *conclusions of the EUROPTA project* can be split into two levels:

- A) The issue-specific results and conclusions, connected to certain perspectives, methods, or analytical approaches, which can be found in the analytical framework and the five thematic papers, and which are not repeated in this summary.
- B) The results and conclusions of general character about the role, practice and implementation of participatory technology assessment, which are reflecting consensus among the EUROPTA team. Because of the general character, these outcomes do not embrace the considerable diversity of methods and related intellectual, cultural and institutional traditions that the EUROPTA project has met regarding European participatory technology assessment.

The following list of results and conclusions are of the second group only.

- 8) Participatory TA should not be seen as competing with classical expert TA, but rather as a necessary complementary element thereof. As classical TA has certain limitations regarding social functions and credibility in comparison with participatory TA, generally TA methodology ought to be complemented with participatory measures.
- 9) Where, in the course of identifying issues for treatment in TA, a need for social learning, critical (public) discourse and/or mediation is found to be a key characteristic of a given issue, the use of participatory methods seems appropriate and should thus be given due consideration.
- 10) Participatory TA should explicitly be established in order to improve public discourse on, and political opinion forming about, science and technology, with the aim of supporting po-

icy-making with relevant processes and inputs. Participants should not expect to get a decision-making power-base from participatory TA, unless the existing power structure is represented among the participants.

- 11) As the functional role of participatory technology assessment differs between countries due to variance in national political culture, and – paradoxically – because national politics have to consider the globalisation of science and technology, there is a need for national institutions performing participatory TA.
- 12) Independently functioning TA institutions should be established within the public domain, with the remit to build up expertise in participation. The institutions should be given permanent status, because of the required expertise and continuity, the time it takes to build up credibility, and the importance of experience with many different methods.
- 13) Initiators, practitioners and users of participatory TA should develop, communicate and maintain realistic expectations of the impacts of participatory activities. Further they should appreciate the multiple kinds of roles, outcomes and impacts that are characteristic of participation. In general, expectations should be in level with the given conditions of institutional status, experience, resources, and available time.
- 14) It is advisable to take a rather conservative approach to the modification of methods, unless a thorough analysis or existing experience with the method speak for adjustments. Especially, it is recommended to try to avoid changing the parameters that make up the specific qualities of the method (such as the search for “common ground” in the Future Search Conference, or the consensus element in the Consensus Conference). Despite the need for caution and experience, the experimentation with, and adaptation of, methods should be encouraged, since there still is a need for new methods and the introduction of participation into new arenas.
- 15) Development of new participatory tools might sometimes be the most feasible way of introducing participation in TA. If so, it must be recommended to involve experienced practitioners in the design phase.
- 16) In order to achieve an optimal method selection for the treatment of a given topic in participatory TA, the organiser ought to make use of a comprehensive problem situation analysis and choose the method according to the characteristics of the specific problem situation. It takes a certain insight into the nature of available methods to make such choices competently.
- 17) Due to the interest in the issue of stakeholder/citizen participation on the part of various organisations, public institutions and individuals working in the broad field of social/public policy, there is a need for developing the communication of the aims, structures, procedures and related “best practice” of existing methods of participatory TA.
- 18) There is a need for further research concerning:
 - a) Quality criteria relating to the outcomes of participatory technology assessment;
 - b) The characterisation of the various types of impacts resulting from participation, and the development of impact evaluation tools;

- c) The comparative analysis of the aims, function and impacts of classical *versus* participatory TA.
- 19) Transnational implementation of participatory TA is recommended in line with the transnational development in science and technology policy. The following actions are suggested:
- a) Pan-European participatory TA. Modified versions of existing methods (for example the consensus conference) could be developed to instigate pan-European citizen and expert panels.
 - b) Simultaneous national participatory activities among European Union member states. Existing methods could be used nationally, and the outcome of the national projects could be compared and/or aggregated at European level.
- 20) There is a need for the development of new participatory methods for the purpose of
- a) Involving decision-makers directly in the participatory process
 - b) Involving large groups of social actors
- 21) The EUROPTA project may best be seen as a starting point for additional support activities, for which a demand has been expressed in various quarters, including:
- a) Running dissemination and training seminars that build on the EUROPTA research outcomes;
 - b) Developing a methodology handbook on participatory TA;
 - c) Setting up a participatory TA network.

II. Background and objectives of the project

2.1 Introduction

In the period of March 1998 to December 1999, a European multinational research project was carried out on the issue of participatory technology assessment. The project "Participatory Methods in Technology Assessment and Technology Decision -Making" - short "EUROPTA" - received funding from the European Commission (Directorate General XII) under the Fourth Framework Programme, "Targeted Socio -Economic Research Work -programme II" - TSER.

It was co-ordinated by the Danish Board of Technology, Teknologirådet (Denmark) and included the Institute of Technology Assessment of the Austrian Academy of Sciences, ITA (Austria), the Institute of Technology Assessment and Systems Analysis of the Karlsruhe Research Centre, TAB (Germany), the Rathenau Institute (Netherlands) and the University of Westminster (United Kingdom). The Swiss TA -programme at the Swiss Science Council (Switzerland) participated in the project as associate partner.

The overall aim of the project was to advance, within a multinational context, the understanding of the role of participation in technology assessment by critically assessing the experiences to date of different European national participatory initiatives, to identify criteria for the practical implementation of participatory methods at relevant decision -making levels, and to contribute to the development of participatory methods and practices in technology assessment.

In so doing, the project pursued the following three key objectives: first, to develop a theoretical framework on the role and function of participatory technology assessment, as a basis of both normative-conceptual discussion and empirical analysis. Secondly, the aim was to characterise and compare a series of participatory arrangements in the countries involved. Finally, the third objective was to evaluate and compare the political and wider social contexts of the involved countries in respect of their conduciveness to participatory technology assessment, and to make recommendations about the use of participatory technology assessment, at a national as well as a (European) transnational level.

The background of the project was a new development in technology assessment through the last ten to fifteen years. Technology assessment traditionally – that is, since the establishing of OTA (Office of Technology Assessment) at the US Congress in the early seventies – has had an analytical approach based upon research activities. The aim of these activities has been to “speak truth to the power” by supporting decision -makers with knowledge and political options. Since the middle of the eighties, participatory technology assessment has been established, mainly in Europe, with the aim of “finding solutions together” or “generating dialogue” through participatory or interactive processes. These processes serve policy- and decision-makers with knowledge, options, as well as with fora for debate and mutual learning. And they facilitate a dialogue between politicians, experts, stakeholders and members of the public.

The EUROPTA project was initiated on the one hand because of increasing calls over the last decade or so – in Europe as well as other parts of the World - for more participation in science policy analysis and technology assessment on the part of politicians, civil servants, scientists and members of the wider public. On the other, the project was prompted by a relative lack of relevant theoretical and empirical analysis.

The partners of the EUROPTA project have all been involved in or closely related to technology assessment at the parliamentary level. Consequently, the scope of the project has been technology assessment and policy-making at the societal level. Participatory technology assessment at the enterprise or production level is not included in the EUROPTA project, which means that we have not been analysing for example so-called constructive technology assessment, but practitioners of technology assessment at enterprise/sector level will find that the project anyhow covers many of the relevant aspects of these practices.

The project was realised in five consecutive steps. In a first step, a research framework was developed. The aim of this framework was twofold: first, to seek to obtain a comprehensive conceptual basis for considering the issue of participation in relation to technology assessment and, more generally, science and technology policy; and secondly, to achieve a common basis, on which to carry out a comparative empirical analysis of existing participatory initiatives. A draft of this research framework was presented for discussion at a first international workshop in September 1998 in Copenhagen. Three external experts were invited to give formal responses to the framework document, which were then further discussed amongst the 60 workshop participants.

On the basis of this workshop, in a second step, the research framework was revised and subsequently a research protocol was designed. The protocol comprised some 30 questions corresponding to the content of the research framework. The purpose of this protocol was to provide a practical tool for the empirical analysis of the participatory initiatives under investigation. For this, a minimum of two case studies were selected in each country (16 altogether). One criterion of selection was to have a broad range of technology-related issues represented in the case studies, from biotechnology, urban transport to energy policy. Another was to include similar participatory methods, so as to allow for direct comparison across institutional and national contexts.

In a third step, field research concerning the 16 chosen participatory arrangements was carried out and case study reports were written. This part of the project commenced in autumn 1998, lasting until summer 1999. Some of the involved partner organisations chose to commission external academics to do the research, while others carried it out in-house.

In the following, fourth step, the project team engaged in transversal analysis, for which initially a series of working hypotheses and observations were formulated. These were subsequently reduced to five themes, including: the introduction of participatory technology assessment in new situations; the political role played by participatory arrangements in different contexts; the functional interrelationship between the objective of a participatory arrangement, the issue treated in the arrangement and the method chosen; the management of participatory arrangements; and the effects of participatory technology assessment on public debate and science and technology policy- and decision-making. The work on the thematic analysis, which was based on the 16 case studies, was done in sub-groups.

Together with the case studies, the thematic analysis (in the form of five papers) was presented at a second international workshop in The Hague in October 1999. The aim of this workshop was twofold, namely to make the findings of the research carried out under this project available to the wider research community, and at the same time to get some feedback about the team's work so far.

In the fifth and final step, the project team finalised its analysis, drew conclusions about the lessons learnt from the project, and made recommendations concerning the wider deployment of participatory technology assessment at different institutional, national and transnational levels.

This report comprises the various findings relating to the steps outlined above. Apart from serving as one of the main project deliverables (vis-à-vis the European Commission), the report was also written with a wider audience in mind. In particular, it was put together with a view to encouraging ongoing discussion of the issue of participation among science policy analysts and technology assessment specialists, and providing useful information for policy advisors and politicians with an interest in the subject area.

The EUROPTA project has yielded a considerable amount of research data and findings. Not least, it has achieved the most comprehensive comparative study of European participatory technology assessment available to date. As such, it is hoped that this report will serve as a source of both information, analytical inspiration, as well as practical and political considerations on the implementation of participatory technology assessment. However, the task of analysing the role of participation in relation to technology assessment is far from over.

In the course of facilitating further analysis, the EUROPTA team has made all research findings available on the Internet. The website www.tekno.dk/europta gives access to this report, and to the full versions of all case studies. Further, the website invites other researchers to use the EUROPTA research protocol for the description of other cases, and it provides the service of linking to such case study documents.

2.2 Research framework – project methodology

In the absence of a generally recognised, sufficiently broad conceptual framework, the first task facing the EUROPTA project was to define what in the course of the project came to be called the "research framework".

This section of the report brings a description of the theoretical part of the research framework. The research worktool – the Research Protocol – can be found as Annex 1 to this report.

The aim of the research framework was to advance the theoretical conceptualisation of participatory technology assessment and to prepare the groundwork for the empirical analysis undertaken in the EUROPTA project. It comprises a theoretical and an analytical framework. The theoretical framework sketches the major developments in modern societies which make up the political and social background for the establishment of technology assessment, and in particular participatory processes. The analytical framework is a pluralistic model of interdependencies between the participatory technology assessment project, the institutional settings and the societal surroundings.

The theoretical framework puts the issue of participatory technology assessment in a historical perspective and discusses it under the aspects of (normative, cognitive, practical) uncertainty and inequality relating to scientific-technological developments and policy-making. This is followed by the analytical framework, which is made of three structural levels, namely "societal context", "institutional setting" and the "participatory arrangement", and their multiple interdependence. The focus of the analytical framework, as of the EUROPTA project as a whole, was on the participatory arrangement.

This three-layered conceptualisation of participatory technology assessment and its environment is reflected in the Research Protocol (see Annex 1), which comprises a series of questions aimed at enabling an analysis of the functional role of a participatory arrangement within a given institutional and socio-political context.

The picture is not yet complete, and although it has been the intention to take a plural view, the EUROPTA team is fully aware that other relevant theoretical themes can be and at some point should be included into the picture. Hopefully, the theoretical framework reflects the initial approach of the EUROPTA project, that there is no such thing as the "right and ultimate" way of performing participatory technology assessment. There are many societal aspects to treat, and many purposes and aims that can be given priority, and the participatory processes might be varied according to this multitude of tasks.

2.3 Theoretical Framework

The objective of the proposed theoretical framework is to gain a more comprehensive and integral understanding of the function of PTA than is currently available. More specifically, the aim is to:

- identify the different values and normative claims at work in PTA
- understand the different theoretical arguments used
- understand the variety of practice (structures, processes, outcomes)
- clarify the (subject-specific, institutional and cultural) contexts of application
- identify factors conducive to PTA
- discuss the function of PTA in modern societies

The framework does not aim to provide guidance in how to determine what a better technology might be in a societal context. Rather, it aims to describe the conditions under which PTA is called upon, and under which it operates.

The theoretical framework is based on an overall understanding of the issue of participation which is defined in terms of neither a particular single theory, nor a particular set of normative claims, nor a particular mode of practice, but in terms of a complex, multi-faceted social issue. Participation is recognised as having various defining dimensions and contextual settings that characterise and condition it in various ways.

Theoretical Background

The issues of both participation and TA are conceptually and practically so far reaching that it proves rather difficult to consider them on the basis of just one kind of theory. In fact, looking at the rich literature on TA and PTA, it is clear that a range of different schools of thought – including systems analysis, policy science, democratic theory, sociology of scientific knowledge, communication theory – can claim to have substantially contributed to the development in this field, even if they at times have arrived at contradictory claims. Therefore, a theoretical framework should consider, as far as possible, various schools of thought concurrently.

Essentially, there are two main argumentation lines: under the premise of a plurality of views, pragmatic arguments consider the function of PTA as improving and facilitating decision-making, whereas normative arguments stress the intended function of rendering decision-making democratic. In a first approach, these lines of thought are linked to two perspectives: uncertainty and inequality. However, as we will see, they are closely intertwined.

The issue of uncertainty is widely seen as a key characteristic of modern science and technology and the underlying cause for the emergence of "movements" and instruments such as TA. Thus, the theme of uncertainty is an essential element forming the boundaries within which (p)TA acts.

Beyond uncertainty, resources and opportunities to influence the decision-making process are not the same for everyone. Additionally, those who take decisions may or may not be those who in the end become affected. For example, risks and benefits from a new technology may be un-

evenly distributed. The issue of inequality has been at the centre of social scientific and political debate for a long time, and there is a long tradition of reflection on this issue with respect to participation.

Therefore, the theoretical background of the discussion of PTA in this research project centres around the issues of how to deal with uncertainty and inequality, respectively, in science and technology policy.

The state's dual role and the problem of expertise

As a part of the system of innovation as well as the public sphere the political system's engagement in technology policy is twofold and it is confronted with contradictory demands:

- It is a promoter of science and technology in order to exploit the benefits of new technologies. Actors of the system of innovation expect support in the implementation of new technologies. The political system is expected to support a positive public climate/acceptance.
- It is responsible for the regulation of the application of technologies to avoid unintended negative consequences for the citizenry. Citizens are expecting the risks to be under control and regulation to ensure their interests. As they see themselves affected by technologies they do not have a chance to decide on they often expect influence on decision making processes.

In order to reconcile these different tasks, the State depends on external expertise. But what science is supposed to provide politicians with, namely factual knowledge as a basis for decision-making in situations of uncertainty, is precisely what science cannot provide. The question "how safe is safe enough" in the case of risky technologies cannot be answered factually by science.

The political system lacks the management facilities and the opportunities to reconcile diverging interests as a basis for decisions on technology policy acceptable to all or even most of the actors. This is due to

- a lack of uncontested factual expertise (problem of knowledge, cognitive dimension);
- a lack in societal consensus in issues of modern technologies (problem of legitimisation, normative dimension);
- restricted capacities of the political system to steer technology development (problem of management, pragmatic dimension).

Inequality

Analytically, we can distinguish three dimensions of inequality:

- a cognitive dimension, which reflects different actors' perspectives on matters scientific and technological, including the technologies' influence on their living conditions.

- a normative dimension, reflecting the plurality of (possibly conflicting) norms and values that get mixed up with interests – even more so as generally binding norms in society have been challenged or abolished;
- a pragmatic dimension, reflecting the unequal distribution of institutionalised or informal influence on decision-making processes shaping technology, as well as the unequal distribution of resources that enable actors to take part in such processes.

Uncertainty

A cognitive, normative and pragmatic dimension is also suitable to distinguish important aspects of uncertainty.

- With knowledge production accelerating, cognitive uncertainty is generated as the understanding of a phenomenon becomes ever more complex, and, at the same time, principal limits of cognition emerge;
- normative uncertainty arises from new questions and problems generated by scientific-technological developments, for which traditional ethical principles, norms and standards are not instructive or adequate anymore and new ones are not (yet) in sight;
- pragmatic uncertainty results from the difficulties of political and social systems and institutions to reach conclusions and, under conditions of cognitive and normative uncertainty, to implement decisions in a turbulent social environment; not only the consequences of developments, but also the reactions of other social actors become more and more uncertain.

How to deal with inequality and uncertainty

Tasks for a policy tool

The state's management problems when pursuing its different tasks in technology policy making cannot be seen detached from those of the legitimisation of this policy. In the public, diverging evaluative and normative claims vis-à-vis technology policy collide, jeopardising the legitimisation of any policy decision. A tool that aims to be of any help within technology policy making has to address these two sides of the coin. In order to deal with uncertainty and inequality at the interface between state decision making action and public debate, we can identify several tasks:

- In order to deal with cognitive uncertainty when preparing decisions, a comprehensive cognitive basis has to be built up, taking into account findings from all relevant disciplines as well as collecting the „tacit knowledge“, especially of those possibly affected.
- In order to deal with normative uncertainty, the full spectrum of points of view has to be represented. This includes also those world views that often get marginalised during technology policy decision making.
- In order to deal with pragmatic uncertainty, a most complete set of options has to be established, taking into account the interests of all actors and all persons affected. Areas of possible overlaps have to be found in order to prepare for further consensus-building.

- In order to deal with cognitive inequality, no implicit nor explicit ad hoc decision must be taken with respect to the inclusion or exclusion of a particular scientific discipline and its findings or perspectives. That is, knowledge about uneven distribution of benefits, risks or influence must be produced and taken into account.
- In order to deal with normative inequality, the plurality of views and values must be taken into account and not selected against. No particular set of norms or standards must be set out to be more significant than others from beforehand.
- In order to deal with pragmatic inequality, procedural measures must be taken to ensure, for all participants, equal access to resources and the equal possibilities to make their voices heard.

The cognitive, normative and pragmatic dimension demand different measures to cope with inequality and uncertainty. In order to cover such a variety of tasks, any policy tool has to fulfil different functions:

- With respect to the cognitive dimension, it should enhance the decision-making process, i.e. make it better informed or, as a more modest aim, support decision-making in a way to ensure that decisions are taken on the basis of the best available knowledge. It should enable different disciplines and perspectives to contribute to broadening the scope of a problem and to inform the relevant actors and institutions of alternative points of view and different solutions possible, as well as enable actors to gain insights from and about each other.
- With respect to the normative dimension, it should broaden the legitimisation of decision-making by providing a voice also to those affected and/or to those previously marginalised, and thus democratise the decision-making process.
- With respect to the pragmatic dimension, it should contribute to the basis for future consensus-building, or for the clarification of dissense. It should do this by providing fora where common search for solutions to inequality or uncertainty problems can be made. It should aim at improving the conditions for such search.

Contexts of justification for PTA

TA as a hybrid scientific-political method is both a part of, and an answer to, these problems of political decision-making. In general TA has always had a two-track mandate:

- to provide scientific advice on policy with a view to solving the political management crisis (addressing decision-making), and
- to integrate diverging evaluative and normative claims vis-à-vis technology policy with a view to handling the legitimative and communicative crisis (addressing the public).

This dual task has played an outstanding role in the conceptual debate on TA ever since its inception. The "traditional" concept of TA views TA essentially as a process of communication between scientists and decision-makers. It has revealed its weaknesses in the course of the obvious disappearance of a value base, or the attempt to adopt a science/economy derived value basis

only, for assessing scientific and technological development, and in the course of the growing appreciation of the fundamental uncertainty attached to the forecasts of the consequences of technologies. The quest to tie in with public controversies over technology has become an essential challenge for TA and has led to the integration of participatory methods in TA processes. Participation is seen to provide a cognitive, normative and pragmatic basis for socially legitimate decisions under the conditions of a dynamic process of technological development, the uncertainty of knowledge and contested values. It should open up possibilities for social learning, which is not considered to necessarily lead to new consensus among actors holding different views and interests but to explore the horizon of possible alternatives and the room where future consensus and dissensus may evolve.

In conceptual debates about TA the requirement for and justification of participation has been argued three-fold:

- Firstly, TA requires the knowledge input from those affected, in order to support political decision-making which is well-informed and which takes into account the whole spectrum of a problem.
- Secondly, the interests and values of those affected as well as the inequality in everyday life to make their view heard must be taken into account if political decision-making is to be considered legitimate and, consequently, stand a chance of gaining social "acceptance".
- Thirdly, participation creates an arena where conflicting claims can be reconciled, and a playground where new solutions can be developed and deliberated upon.

Cognitive enhancement of decision-making

With a focus on cognitive and pragmatic uncertainty, the first context of justification views participation in TA as a functional requirement, and concentrates primarily on functions of (cognitive) preparation for decision-making. In this case, TA can be seen as an intermediary between science/technology and politics, supposed to raise performance in decision-making.

The reference points for a functional rationale for participation are similar to those of the classic TA concept. Participation aims to contribute towards completeness and balance in analysis; informing the public aims to help giving opinions a factual basis; information from the public may contribute to providing knowledge on the claims of the citizens, and the involvement in the TA processes of those affected may provide room for exchange of rationales and by that lead to decisions that have an increased chance of acceptance from the involved actors.

Democratisation

With a focus on normative uncertainty and inequality, especially with respect to power, the second context of justification views participation in TA as a requirement of democratic politics, corresponding to a view of TA processes as arenas for social (technology) policy-making. Here, TA is an intermediary between the public and politics respectively, supposed to raise the democratic basis of decision-making. Under the perspective of inequality, participation aims at temporarily changing the role of somebody affected into the role of a policy-maker.

The democratic political rationale for participation is based on the normative premises and political preferences of a particular TA process. The aim is to identify, from a normative point of view, legitimate needs and to implement appropriate processes of social decision-making. Participation in TA should ensure that alternatives in technology and social policy are generated. Secondly, the democratic involvement of those previously excluded from decision-making should be enhanced.

Social learning processes

With a focus on pragmatic uncertainty and inequality, and aiming at social integration, the third context of justification views participation in TA as an element in the discursive processing of controversial cognitive and normative claims. Here, TA is a model of social learning and an intermediary between science and the public. It is supposed to raise procedural legitimacy with respect to cognitive, normative and pragmatic aspects. It does not aim to directly determine policy processes, nor to replace political decision-making. However, it is not a-political, since the questions at stake are usually highly politicised.

TA in general aims to enhance socio-cultural capabilities to deal with social and technological changes, with an emphasis on shaping the conditions under which technology is implemented. Discursive TA processes in particular aim at building up, or restoring, social integration as a basis for democratic decision making rather than addressing the latter directly. This is done by procedures creating arenas where conflicting claims can be reconciled, and where arguments are generated that meet criteria of social justice, political legitimacy and scientific competence.

PTA, Democracy and Social Learning

Technology controversies may be defined as „problems“ in a public arena, along new or re-emerging lines of conflict. Such controversies put the state into a double role: on the one hand, state authorities are actors themselves, on the other hand, they act as moderators between stakeholders. As already pointed out, this ambiguity is a major reason for the eroding credibility of the state.

This double role is, in a way, mirrored by the dual role of PTA. On the one hand, PTA aims at improving (and thus, implicitly, influencing) decision making in a cognitive, normative and pragmatic dimension. On the other hand, PTA sees its role in providing a playground for deliberation and exploration and as a means of social learning.

There are also practical difficulties in the binding implementation of any result of PTA. Even if a consensus among participants was reached, it would not necessarily survive in the debate during the democratic procedures necessary to implement its content. In fact, a consensus attained in a discursive framework may be seen as sidelining democratic decision-making by rendering it redundant.

Whatever model of democracy we want to consult, the question remains the same: what is the legitimacy of a PTA procedure, and what is the legitimacy of its results? Democracy builds upon the possible consultation of all members of a group, and even corporatist approaches refer to the participation of all relevant actors in power of making binding decisions. The participants of

PTA procedures, irrespective of the method applied, are of course no representatives for the entire populace, nor even for all relevant actors.

However, in the context of a discursive TA such completeness is not necessary at all. A discursive participation rationale aiming at social learning is basically compatible with different concepts of democracy. Such procedures build upon the communicative feedback to the discourse going on in society at large, being a part of it.

2.4 Analytical Framework

The following outline of an analytical framework serves as a common grid for the description of projects of PTA. It ensures a common structure for the outline of case studies and delivers structured materials that makes tentative conclusions on functions and constrains possible.

The framework is made up of three so-called "dimensions" and the "inter-relationships" between these dimensions. By "dimension", we mean the societal background PTA acts in (Dimension 1), the institutional context it is implemented in (Dimension 2) and the broad defining aspects of the participatory arrangement (Dimension 3), including the set-up and process of the PTA arrangement, values, assumptions and goals and its outcomes and impacts. By "inter-relationships", the dependencies between factors from within different dimensions are meant. In other words, a factor in one dimension, for example the problem definition (Dimension 3B), may be understood as a function of a factor in another dimension, for example the institutional setting (Dimension 2). Vice-versa, the latter may be seen as a function of the former.

The three dimensions encompass both the micro and macro levels of participation, from individual aspects, organisational issues, to wider societal perspectives. The focus of interest in this project is the level of individual PTA methods and the TA institutions which instrumentals them (Dimensions 2-3). The level of overall society is treated as a background dimension ("contextual boundaries") within which PTA operates.

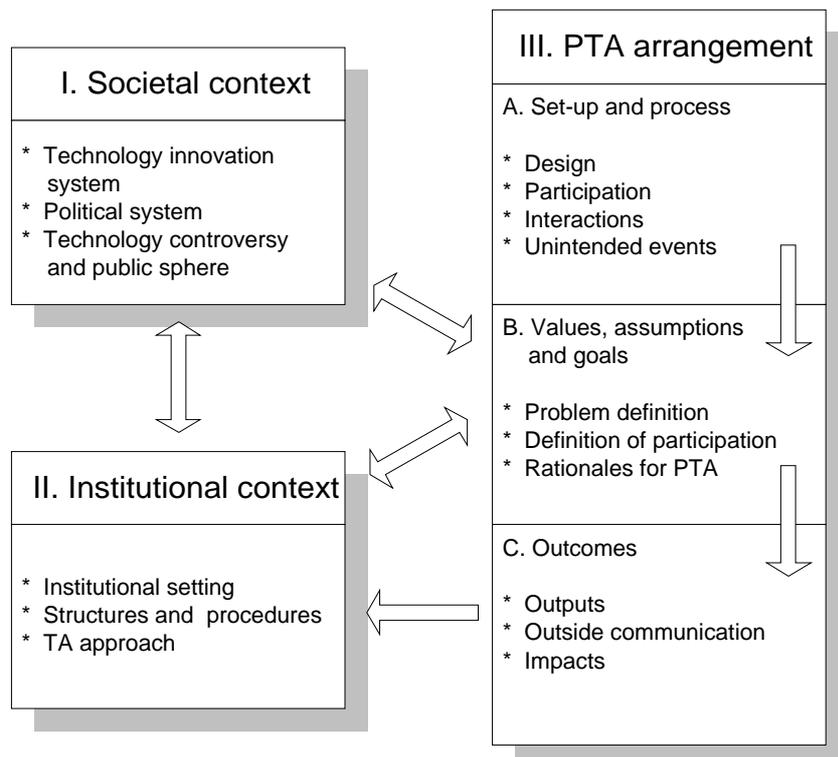


Figure 1: Structure of the analytical framework

Figure 1 presents a general overview of the analytical framework. On the left side are two sets of variables that affect the constraints and opportunities of the various actors that are involved in defining and organising the PTA arrangement: societal and institutional context. Within each of these dimensions several important aspects have been distinguished.

On the right side the focus of the EUROPTA project – the PTA arrangement – is depicted. The PTA arrangement box consists of three parts. Part A “Set-up and process” describes why certain choices were made with respect to the design of the PTA arrangement and how the PTA arrangement actually worked out. Part B “Values, assumptions and goals” describes how various actors perceived the societal problem at stake, how the organisers translated this into a PTA-research problem, and what role and function participation had within the PTA arrangement for the various actors. Finally, Part C “Outcomes” describes the results of the PTA arrangement in terms of its products, its media coverage and the impacts it had.

In the following we give a description of the models, theories, definitions and perspectives of the many factors and variables relevant in order to describe the content of the three dimensions. The Analytical Framework makes use of a separate numbering of the sections. This finds its reason in establishing a parallel numbering to the Research Protocol (Annex 1), so that the theoretical discussion of the Analytical Framework directly relates to the questions of the protocol.

I Societal Context

Considering the above tentative outline of the inter-relationship between science and society and the role PTA plays in it, several aspects of contextual boundaries seem relevant for an international comparison of the features, functions, constraints and benefits of PTA in modern societies. Here, the questions of interest include: what are the particular features of the problem of decision-making in particular countries with particular political cultures and traditions; and, what consequences does this have in terms of the definition, implementation and outcomes of PTA methods?

A distinction may be made between the following three aspects: technology innovation system, political system and technology controversy and public sphere.

Technology innovation system¹

Innovation has long been modelled as a linear process going through a number of successive phases (research, development, demonstration, diffusion, and utilisation). The initiation could either come from the engineers (technology push) or from demand (market pull).

The gap between these two extreme theses has progressively narrowed. Nowadays there is a general consensus that innovation is born of a narrow coupling between science and technology on the one side and the market on the other. Case study research has underlined that innovation involves a lot of backing and forthgoing between demand and supply side considerations. Consequently, the linear model of innovation has been replaced by an interactive network perspective.

¹ This text is based on Van Est 1999: § 7.1.

To include and study the iterative dimension of the innovation process, Callon et al. (1992) introduced the concept of *techno-economic network*. A TEN is defined as "a co-ordinated set of heterogeneous actors – public laboratories, technical research centres, industrial companies, financial organisations, users, and public authorities – which participate collectively in the development and diffusion of innovations, and which via many interactions organise the relationship between scientific and technical research and the marketplace."

Techno-economic networks are organised around five major poles, three of which are the supporting pillars: a scientific, a technical, and a market pole. Within the *scientific pole* (S) certified scientific knowledge is produced by scientists, who work within universities and public or private research centres. The main actors within the *technical pole* (T) are engineers and technicians working in technical laboratories in companies, co-operative research centres, or pilot plants, where they conceive of, develop or transform artefacts destined to serve specific purposes. Within the *business pole* (B), general managers either try to anticipate new consumer demands or translate demands expressed by users into products. The *consumption pole* (C) corresponds to the universe of the consumer, who buys, uses, and thus economically values the artefact.

To emphasise the role of politics, Van Est (1999) proposes to add a fifth *political pole*. The political pole is almost similar to a regulation pole. It is however a somewhat broader concept which refers to the whole policy subsystem (as part of the innovation network).

Pole	Science	Technicians	Business	Consumption	Politics
Actor	Scientist, Researcher	Engineer, Technician	Manager	Consumer	Policy maker
Role	Production of scientific knowledge	Design and development of an artefact	Production and marketing of a product	Consumption and economic valuing of the artefact	Stimulation and regulation of innovation

Figure 2: The structure of the innovation network (Source Van Est 1999: Fig. 7.1).

The notion of innovation network involves the idea that innovation can come into being at any point along the network. It would be too simple a model to see the process of innovation – from "invention" to "diffusion" – as mainly driven by science and technology themselves and an inherent (socially independent) dynamic of technological rationalisation (technology -push). Social demands as formulated by users, consumers and the state as well are driving the process of innovation (demand-pull). Technology development is a social process of shaping technology in which different social groups with different interests and values are included.

Technology definitions and characteristics

The technology definition may be determining the way the actors approach a technological problem. Further, the state of the technology makes up a boundary for the processes that may go on between the actors. The characteristics of technology can be described from many viewpoints. One viewpoint is time. Another complexity.

The technology development phase: Restrictions and opportunities of PTA procedures might depend on the stage of technology development (maturity of technology) PTA comes in. Opportunities to influence technology development according to the so called "Collingridge-Dilemma" can be seen as high at an early stage of development - but knowledge about possible impacts is

little - and low when technology is applied though we know more about impacts. From this perspective TA can be seen as "too early" or "too late" with regard to for example decisions about "stop" or "go" for technology development or implementation. With regard to shaping and regulation chances to intervene in technology development and technology application are to a high degree given at any stage of the trajectory. Whether it is "too early" or "too late" is not determined by objective technological features but depends on interests, power and willingness of social and political actors. Nevertheless the "maturity" of technology – the stage of development – can influence the subject and function of PTA -procedures, because the decisions needed may be different at different phases of the development. For example one can initiate a social process of defining goals of technology -development at an early stage, or strive for consensus on regulation for application of a more or less fixed technology in later stages.

"The Substitution Ladder": The Substitution Ladder characterises technology as hierarchically organised. Technology decisions and the assessments behind them can be seen as a matter of substituting one solution with another. An organisational solution (meeting and talking at the pub) can be substituted by a technological solution (talking by telephone). A technological solution (flying domestic flights) can be substituted by another technological solution (riding high - speed trains). Or a technological solution (the use of conception) can be substituted by an organisational solution (building up anti -sexuality morals).

Moreover, technology can be seen as organised in different complexity levels. Substitution of technology can take place inside these levels, or can be imposed by changes on another level. The examples and text below are cited from the SIESTA Report (Svenson *et al.* 1988).

<i>The process level</i>	This is the normal level in which the production process is rearranged in order to provide a more environmentally sound technique, e.g. in terms of increased restriction of waste to outside recipients as water and air.
<i>The materials level</i>	This is the case in which you substitute one element in the product for another of hopefully more "benign" character. The substitute of e.g. mercury in batteries for other substances is such an example.
<i>The component level</i>	A new technical design could provide a new plug in function without changing the overall feature of the "old" technical solution. The use of catalytic emission control of automobile exhaust could fall in this category.
<i>The subsystem level</i>	If the "car" is the system then the varying engine solutions could be seen as subsystems. The substitution of the old gas -motor to an electric one could serve as an example.
<i>The system level</i>	Given the strategy (e.g. that people in a big city setting shall be able to move everyday between their homes and workplaces, wherever these might be situated) the substitution (or shift of emphasis) between a private car solution as systems design and that of mass-transportation exemplifies this level.
<i>The strategy level</i>	The manipulation of the structural design in town planning in considering closer affiliation between homes and workplaces provides a substitution from a solution built more on a random distribution. Such a change could result in reduced transport loads overall and in certain energy reductions of benefit for the urban environment. Still the goal of getting people between point A and B is valid at this level.
<i>The value level</i>	This level could be exemplified by totally questioning the need for physical transport as a part of societies goal structure. At the value level different basic demands as they have been conceived are under scrutiny. At a more modest level of change already emphasising more local or regional production of agriculture products connecting production and consumption geographically belong to this realm."

It is the idea of the authors of the SIIESTA report that at these different levels specific “analytical tools” are needed in order to find proper substitutions for known technologies. It is therefore needed to consider with which level(s), the issue of a TA case works.

The Technological Order: Another way of looking at technological complexity, that includes the social activity of using and organising technology, is presented by Richard E. Sclove in “Democracy and Technology” (1995). Sclove presents the “hierarchical relationship among basic technological concepts” as seen in the figure below. This approach differs from the Substitution Ladder in its system approach. Sclove sees the artefact and its use as two sides of the same hierarchical level. The result is a picture that can be compared to Chinese boxes.

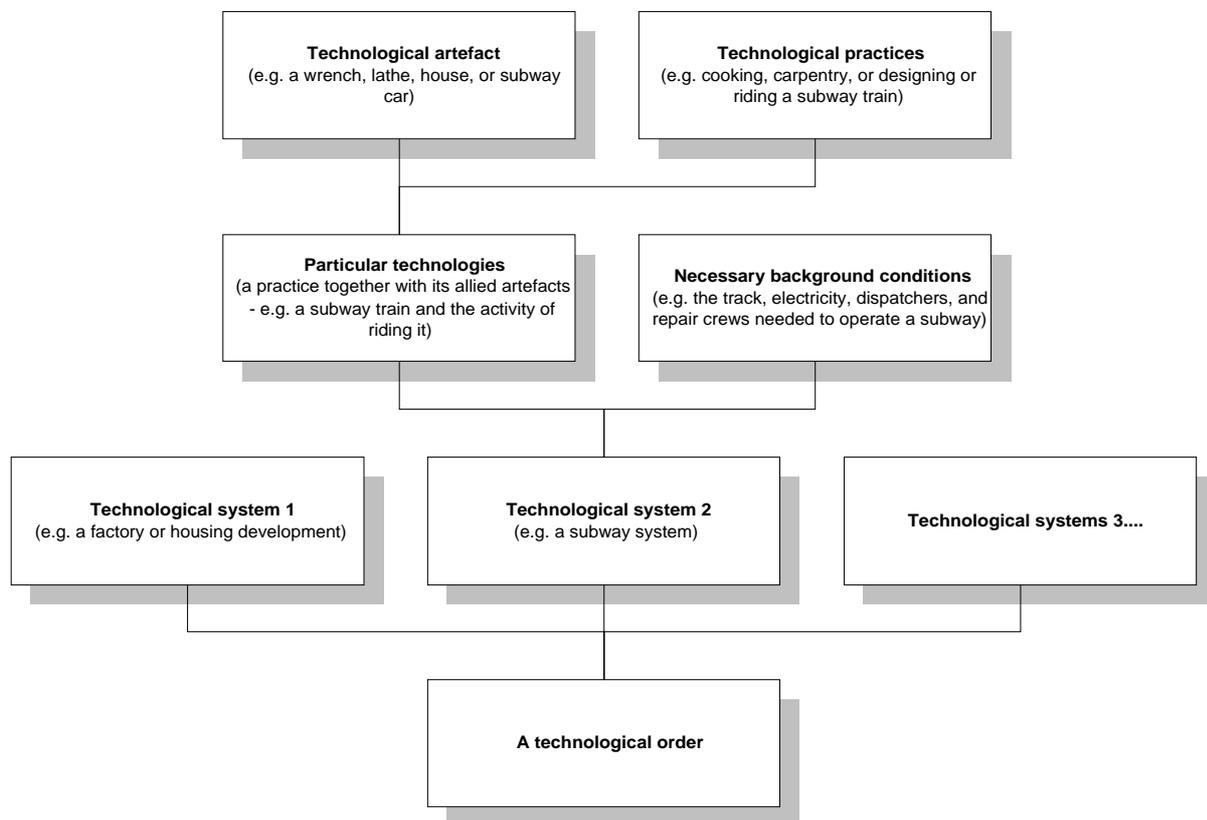


Figure3: Hierarchic relationship among basic technological concepts (Sclove 1995)

Organisational Complexity: It follows from the models of complexity above, that technology might be surrounded by different organisational systems, depending on the complexity or development of technology. The technology can in other words be seen as more or less embedded into organisational structures.

The development of a fuel cell may serve as an example, which at the same time shows that the level to which a certain technology is embedded in the social organisation is to a large extent a function of time:

An energy producing machine (e.g. the fuel cell) may at the development of its basic technologies be outside direct influence from society and politics as such.
When it begins to be developed into a product, politics comes nearer, defining standards that makes it possible to integrate the fuel cell into existing energy systems.
At the time, when the fuel cell is ready for marketing, and the first products are introduced, the introduction will be hindered by producers of competing technologies (e.g. combined heat/power turbines).
And at a time, when the fuel cell has been introduced and is a standard technology, it will be so embedded into society, that changing it will be hard, because big organisations are build upon the existence of a well-known widespread fuel cell technology. The fuel cell has become strongly institutionalised, and thus harder to change.

Political system

For the State, the problem of uncertainty manifests itself as a crisis of management and as a crisis of legitimisation of technology policy. How the State deals with these crises and what role PTA plays in it depends on several factors.

All Western democracies are mainly liberal and representative democracies –the principle political role of the citizenry is to elect representatives to carry out decision-making on their behalf. This restricts the role of participation mainly to deliberation or lobbying, and excludes direct participation in decision-making. The liberal model of democracy competes with a republican view of democracy according to which the citizenry is given the opportunity to decide directly on issues of their own concern. The role and power of the public sphere, or civil society, regarding the political system may differ between countries according to political traditions. Such differences may be about how strong elements of this republican model are included in the political system (such as referenda, or initiatives), or about pressure (like a social movement) to include such elements. In the context of the EUROPTA project, it plays an important role if there is a tradition of involving citizens in deliberation processes (participatory culture).

The role of the political system in relation to science and technology is two-fold: to promote science and technology and to regulate their risks and possible social impacts. Of relevance to analysing a technological issue are therefore institutions and customary procedures of co-operation to fulfil these tasks, and the role of the public, the expert society, the industry etc. in this. The attitudes towards public participation in technology policy, and the role of PTA institutions in the two-fold function of policy may be characteristic for national technology policy culture.

What is a "Social Debate"?

Social debate is not a clearly defined concept. Like any type of debate a social debate implies an exchange of ideas and viewpoints between actors. However, this exchange does neither have to take place face-to-face nor simultaneously. The distinguishing characteristic of social debate is that it goes beyond private interest and is concerned with the public interest at large.

A social debate is to a large extent an elusive phenomenon. It cannot fully be institutionalised, and is in principle unlimited in time, space and content. Also the number and range of actors involved within social debate may vary widely. People may be involved who are directly involved in the technology issue at stake, but also people not directly involved may join the social debate. While social debate is often dominated by specialists and has elitist features, also interested ordinary citizens may be involved. Finally, the nature of social debate may take on many forms. On the one extreme, the social debate may evolve into a "public debate" including discus-

sions in media etc, which may result in a national public controversy leading to mass demonstrations. On the other extreme, it may also be contained within small academic circles.

Technology controversy and public sphere

Technology is a contested issue in all modern societies, but there may be differences between them in terms of public attentiveness and the intensity level, and nature, of public controversies. These differences may be an important factor determining the conduciveness of PTA. Take, for example, the issue of genetic engineering which is a highly controversial topic of public debate in Germany, but less so in Britain. A highly controversial style of public debate on technology with well organised interest groups and intransigent positions and stakes may prove to be a less favourable environment for PTA than a more open and disinterested style of debate, or vice versa. This may vary not only from country to country, but also from issue to issue within a country. There may also be different traditions of protest in different countries. The United States, for example, are known for their quite adversarial style of technology controversies, which nevertheless does not lead to militant forms of protest, but instead to judicial forms of conflict resolution.

Considering the preceding theoretical reflection, the most decisive variable here might be public trust in experts and the political system of regulation. Trust is dependent on different interdependent variables, including: previous experiences with experts and the political system; the traditions of involving affected people in decision-making; the role of new social movements in public debate; the role of the media; the accessibility of the media for all stakeholders in a controversy; the role of alternative scientific institutions outside the traditional establishment.

Timing

The point of time, relating to the maturity of a technology or public debate, at which PTA is deployed, may be crucial for the design as well as possible impact of the PTA arrangement. Participation may take effect at an early stage of technological development so that social needs and demands can be built into the development process pro-actively, and at an early stage of public debate so that discussion is not yet marred by too much heated confrontation. Participation may occur in the regulatory process of introducing a technology onto the market, or it may occur at an even later stage, when the repercussions of a technology are under discussion. The expectations regarding the function of participation may vary considerably in this respect.

II Institutional Context

The way PTA arrangements are embedded institutionally is likely to determine decisively their meanings, structures and performances. Thus, in order to assess PTA arrangements, their institutional contexts have to be looked at. Attention may be paid to both internal and external factors defining the institutional context and conditioning PTA arrangements. Internal factors include the structures and procedures of TA institutions, such as the available financial and human resources, the understanding of TA at work and the processes of selecting issues for a project. External factors include the role of the TA institution in relation to science and technology development, public debate, and public policy and decision-making.

For the purpose of the proposed analytical framework, a distinction is made between three related aspects which characterise Dimension 2: institutional setting, organisational structures and procedures and TA approach.

Institutional setting

In current social science the important role of institutions and institutionalisation is broadly acknowledged. A large body of literature exists on the importance of institutions, institutional settings and of institutional development in building a capacity for performing certain functions (e.g. Powell and DiMaggio, 1991 and March and Olsen, 1989). Norman Vig performed a study of practices in five parliamentary TA organisations in Europe (Denmark, France, Germany, Netherlands, UK), which was mainly an institutional analysis (Vig and Paschen 2000). Following Hibbing (1988) he defined institutionalisation as the process by which a body acquires a definite way of performing its functions – a way that sets it apart from its environment and that is independent of the membership and the issues of the moment. This is likely to occur over a period of time as the institution adapts to or modifies its environment. According to Vig and Paschen (2000) this implies a number of things: institutions must gain recognition of their functions and boundaries from others in order to operate according to their own rules; they must develop political support from other elite groups and often from broader constituencies to establish legitimacy; and they must establish clients for their products by serving their interests. This requires building both diffuse support (reputation for credibility, objectivity, fairness, effectiveness, etc.) and specific support (personal relationship with key actors).

Vig and Paschen's main question with respect to institutionalisation was primarily to understand the difference it makes how a parliamentary TA institution is organised. They therefore wanted to know:

- to what extent parliamentary TA institutions embody cultural biases or policy preferences reflecting their political founding and organisational environment that determine how they define problems, what policy discourses and methodological procedures are legitimate, and thus what the likely range of policy options will be;
- how do different institutional arrangements affect their "capabilities" and "effectiveness" in carrying out their functions. How different institutional structures and methods result in different kinds of products and impacts.

Following the results of Vig and Paschen, there are strong reasons to expect that the use of a certain PTA arrangement, its operationalisation and the outcome will depend on the institutional context of the organisation/institution that performed or co-ordinated the project, the relationship it had with the broader societal context, its history (past performance and experience) and its brief (formal and informal).

More specifically, the choice of a PTA arrangement, the criteria it has to fulfil as well as the legitimacy of the results are likely to be related to the institutional context in a number of ways, particularly to

- the wider institutional context, formal and informal, dependencies and relationships to academia, parliament and social groups
- the history of the institution and the related process of trust-building (does the institution have a straight history or is it erratic in its conduct, is the organising institution ad hoc or is it a long standing organisation)

- the formal brief and the informal connotations of the brief (e.g. does the formal brief hint at / demand participation, does this brief specify the type of participation of e.g. social groups, wider public)
- the issue related institutional context, e.g. the discourse coalitions around a certain issue and the role of the TA institutions amidst it.

Institutional analysis should take into account the context in which the institution operates in the sense of institutional dependencies of a TA organisation, embedded in a larger framework of a political regime.

The institutional setting of TA is likely to shape PTA in two ways.

- Firstly, the type of institutionalisation may directly determine the role of PTA. If a TA institution is linked to the policy and decision-making processes, then the results of its PTA arrangements are more likely to be used in these processes than if a TA institution is detached from them. In the latter case, PTA may then take on a different role, such as informing public debate. It follows from this that one and the same PTA arrangement could take on different roles, depending on the institutional settings.
- Secondly, the type of institutionalisation may also determine the role of PTA in terms of perception of the TA institution by various social actor groups. If a TA institution enjoys widespread credibility and legitimacy, then PTA is more likely to be taken seriously than if the institutional setting is questioned, or even rejected, by some social actor groups.

TA organisations are relatively young and therefore may still be in the phase of institutionalisation in the sense of Hibbing (1988), in this study we do not refrain from including ad hoc institutions that are not standing organisations.

Organisational structures and procedures

PTA is also shaped by practical aspects of how TA institutions operate. Sometimes, the discussion of PTA stays at a rather abstract level where little notice is taken of the practical conditions under which TA institutions have to carry out their projects. In reality, however, it is usually these conditions which shape PTA arrangements. These conditions include the amount of financial and human resources available, the pressure of time for completing projects, the imposition of certain restrictions on the choice of subject.

PTA arrangement may reflect the internal organisational culture, such as the way projects are selected, organised and analysed, which may be more or less conducive to the use of participatory methods. One example of such cultural shaping of the work of the TA institution may be found in the way that TA institutions make use of the “TA toolbox”. Timing-needs may be coped with at an institutional level by the use of a set of TA methods, some of which may give a response to a problem in a few weeks, others in a year or more. If the institution has a set of methods, many timing-need can be fulfilled, and priority between timing and for example comprehensive comprehensiveness becomes visible. The toolbox in this respect reflects how the institution judges the importance of for example timing versus other qualities of a project.

TA approach; TA definitions and classifications

Over the years TA has been defined in many different ways, reflecting the broad range of meanings given to this policy tool. For a long time the former US Congressional Office of Technology

Assessment (OTA) was the hallmark for TA. TA was seen as "the type of activity conducted by OTA", but other TA organisations which were inspired by OTA typically refined the definition of TA in the course of the developments to suit their particular institutional and cultural requirements (see e.g. Van Eijndhoven, 1997).

Several attempts have been made to typify TA by classifying forms of TA. Smits classified TA according to its function relative to specific clients (policy makers, parliament, short term, long term) (Smits, 1990), but paid no specific attention to participation. Van Eijndhoven (1997) categorised existing TA practices in four so-called "TA-paradigms": classical TA, the OTA paradigm, public TA and constructive TA. Apart from the classical TA, which in its original form was based on a classical view of scientific knowledge and its use in politics, the other types of TA all include some form of participation at one stage or another. The OTA type of TA comes closest to the classical view of TA as a science based study. In the typical OTA context such an analysis was started up interactively by strong stakeholder involvement in the problem-seeking or agenda-setting phase and by an extensive external reviewing process. Many of the TA activities in Europe are adaptations of the type of TA conducted by OTA. Public TA and constructive TA both spring from the idea that the basis for decision-making about technology should be broadened and share the conviction that interaction among actors is important in conducting assessments. Constructive TA is directed at influencing technological choice by broadening the design process of new technology. Public TA, of which the Danish type of consensus conference is the typical example emerges from a specific ideal of participatory democracy.

Bechmann (1996) typified TA from various views of democracy. He categorised TA into "instrumental", "elitist" and "democratic" models on the basis of different models of the functioning of democracy. Consequently, the meaning of participation may change significantly depending upon the underlying model. In the instrumental model, participation may play the role of a consultative instrument in support of the representative decision-making mechanisms. In the elitist model, participation may have the function of disseminating information from scientific institutions to both politics and the general public. Finally, in the democratic model, participation takes on a key function by giving the public at large a constitutional role in assessing science and technology.

III PTA arrangement

The *arrangement character of PTA* relates to three interrelated features. First, the term arrangement implies that a certain participatory TA method is normally embedded within a project management structure, of which it only represents a certain phase (see below). Second, the arrangement character of PTA points at the possibility that it constitutes several interrelated consecutive or simultaneous participatory and/or non-participatory events. A PTA arrangement may both be a single event as well as a trajectory of events which might involve different actors and possess distinct participatory features. Third, it relates to the political and institutional setting in which the PTA process takes place (see above). This means that the PTA arrangement will likely reflect the political and institutional conditions under which it is set up. A PTA arrangement may be part of a larger project but may as well be identical with it.

Other terms often used together with arrangement are: project, method and technique. Within the EUROPTA project we define "project" as an ad-hoc, and by time often changing, organisation that is set out to reach a certain goal. The project may be loosely defined, shaped during its time-span, for example finding its methods and budget/financing as it proceeds. Or it may be very

precisely defined from the off-set, by a project description including analysis of the problem situation, methodology, project organisation, time plan, budget etc. A project can make use of one or more methods. “Method” is a procedure for interaction between people. The method can characterise the whole procedure of the project (the consensus conference is a method that to a high degree describes all procedures in the project) or it may only characterise a procedure that is suited for parts of a project. Finally the “technique” is a trick that makes it possible to produce certain results inside a method. This may for example aim at establishing certain group dynamics, at making use of the participant's creativeness, or at making the participants prioritise their findings. Like a method can be dominating a project, a certain technique may fill much of the landscape in a method (vision making may serve as an example).

Stages of PTA arrangements: A PTA arrangement consists of a series of activities structured in time. In principle, numerous ways exist to phase such a process. With respect to the consensus conference, one might, for example, distinguish between a phase in which the members of the lay panel are recruited, a phase in which the lay panel is being informed, a phase in which the lay panel publicly interrogates experts, etc. However, the concept of PTA arrangement does not only relate to the set of events that constitute the methodological set-up. The term also implies that a certain participatory method is part of a project management structure, of which it only presents one element. In project management literature phases are characterised by a specific task, and consequently the phasing of a project is determined by the nature of the project. For example, technical projects often get phased in a different way than research projects. Based on Groote et al. (1995: 20-21) we may distinguish the following six phases with respect to PTA arrangements:

- The *initiation phase*, in which the still vague ideas around a project are being crystallised and a first rough picture is described. It is also decided what is not going to be dealt with in the project. This decision is often made at the management level of the TA institute, and there might be a large gap in time between this decision and the actual start of the project.
- The *definition phase*, in which a thorough analysis of the problem and/or the goals of the project is started. In this phase the quality criteria for the end result are being formulated and the work structure of the project is set up. Sometimes preliminary studies are initiated, experts interviewed or workshops organised in order to get the focus right and examine what kind of answers can be expected from the TA.
- The *design phase*, in which on basis of the demands formulated in the former phase alternative solutions are being developed and prepared in order to come up with the best approach. Based on the structure and delimitation of the problem, a certain (p)TA approach is chosen, the design of the (p)TA arrangement is made, and the various activities within this arrangement are planned.
- The *preparation phase*, in which the realisation is being prepared. For example, in case a workshop is part of the PTA, an appropriate place to organise the workshop is arranged during this phase, selected participants are invited and a workshop leader is hired.
- The *realisation phase*, in which the project result is indeed being realised. Now, the various activities (studies, workshops, conferences etc.) within the PTA arrangement are carried out and reports are written. It is often in this phase, participants become involved in the PTA. Besides the project management activities within the realisation phase of the PTA arrangement

ment, this phase also contains the “Interpretation” and “Option Formulation” – the making of politically relevant outcomes of any PTA arrangement.

- The *follow-up phase*, in which the result is being used and maintained: The results of the PTA arrangement are published and disseminated by the TA organisation. Dissemination can be done in several ways, for example, by means of sending out reports, organising a conference around the theme of the PTA, giving lectures, briefing politicians, etc. Keyword here is: “Communication”.
- The *impact phase*, in which the results of the PTA are being used either inside the TA organisation, for example, in order to improve its methodology, or outside the TA organisation, in particular, in the political sphere. In principle, the PTA arrangement is finished when the results of the PTA are produced and disseminated by the TA organisation. However, from now on the products delivered by the TA organisation will largely live their own life and have an impact on the "outside world." This can still be supported by the TA institution or the PTA participants, and a keyword here is: “Action”.

Note that there are different “meta-phases” within each PTA-arrangement: the first three phases are “strategically” relevant because the direction of the PTA arrangement is structured there. Phase 4 is organisational work, phase 5 is the “core element” of the PTA arrangement and phases 6-7 are “politically” relevant.

III.A. Set-up and process

The following part is concerned with the "physical" side of PTA arrangements, that is in particular their structure and procedure and the mode of communication encouraged between participants. The properties of PTA are relevant, because they signify the "meeting point" between PTA theory and PTA practice. An analysis of PTA properties may look at the following aspects: at the *design*, i.e. the structural and procedural characteristics, and in particular at the *participants*; at the *interactions*, i.e. the type of participation and communication within the PTA arrangement; and finally at the *unintended events* that make up practical constraints that management have to face during a participatory arrangement.

Design

There are a number of variables defining the *structure* of a PTA arrangement, including the number and range of people involved; the duration of the project; the methods used; the degree of public access; and the link to policy-making. Following the variables used by Nentwich (1996 and 1998), it is suggested here to describe the overall design by the following dimensions:

- The *aims* of the PTA arrangement may be twofold: firstly externally targeting towards the outside world. This may be achieved by directly addressing the policy making process or indirectly aiming at it by influencing societal processes. The second kind of aims may be called “strategic”. They are internally oriented and are related to the organising institution. Of course an arrangement may actually have one or a combination of these aims. To illustrate the different possible aims of PTA arrangements the figure 4 includes some examples.

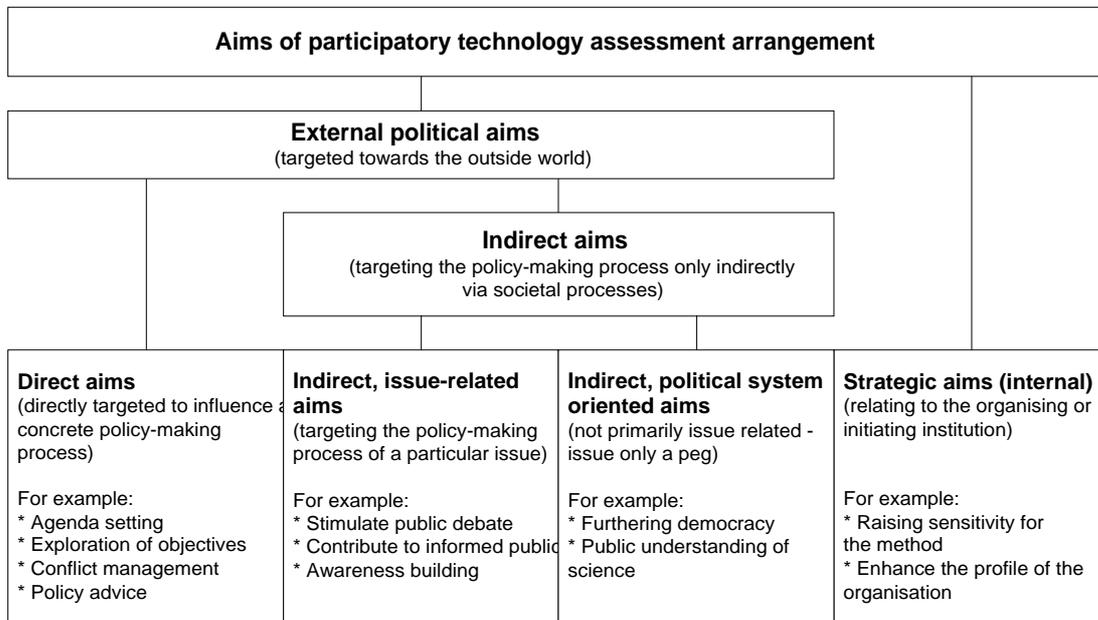


Figure 4: Aims of PTA arrangements

- There may be a direct link between the citizen's input and the possible policy outcome. We may say that an *indirect* PTA arrangement needs some form of mediator within the political system – generally a (group of) politician(s) – before the input can be translated into political action. By contrast, a *direct* PTA arrangement has a non-mediated effect on the political system (this seems a rather theoretical option and will be the case only in very rare cases).
- A PTA arrangement would be *active* if the main initiative comes from the citizens (grass-root PTA), and *passive* if citizens are used as a source of information or of support or rejection rather than being agents themselves, i.e. if PTA is "imposed".
- PTA arrangement may be *formal* or *informal*. While the first would have procedural rules and, thus, are rooted in the legal sphere (they are "verfaßt") and could be invoked in the courts if the citizens have not been consulted properly or if a specific rule has not been applied lawfully. By contrast, *informal* PTA would be practised without a legal basis and therefore is not to be litigated. The distinction "formal"/ "informal" does not (always) correlate with the legal value of an input channelled by the PTA arrangement: although "informal" PTA cannot be *binding* in legal terms (because of the lack of a legal basis providing for this consequence), "formal" ones might be either "binding" or not.

Beside the structural aspects there is most notably the *procedural dimension* of any PTA arrangement. They differ in various procedural aspects, such as the processes by which a participatory project is launched, how participants are selected, what kind of information inputs the organisers collected or generated to feed into the PTA process and when. This leads to the question what concept of expertise and of knowledge dominates the proceedings? For instance, there are differences in the types of testimonies involved (system experts, counter-expertise, expertise based upon a broader concept of "informal" knowledge).

Another procedural aspect is the *connection to the external world*. How open or closed are the proceedings? This relates e.g. to the degree of media involvement (internal/external), presence in the internet etc.

Finally, timing is always crucial in TA projects, and this is particularly true for PTA arrangements within them. Based on the procedural characteristics of a PTA method, we may address the question what kinds of timing demands the method can live up to: here we may ask whether it is flexible enough, fast enough etc.

Participants

The *range, number and types* of participants is a key characteristic of any PTA arrangement. Different types of participants are for example: knowledge carriers (experts), interest/stakeholder groups, decision-makers, people affected by the technology, general (non-affected) public. In some arrangements, the composition of participants may change over time.

The question of how the participants were selected is an important characteristic of an arrangement: the two main principles used can be "representativity" – i.e. that participants should reflect the relative weight of interests, views, arguments and groups in society – versus "balance" – i.e. the attempt to involve people from all "relevant" groups (arguments, viewpoints, interests and other background variables) regardless of their relative strength in society. Apart from characteristics related to viewpoints in a wider sense, "balance" and "representativity" may also refer to gender, provinces, urban/rural areas, education, etc. (demographic parameters). The participants are carriers of values, and while it seems generally acknowledged that including the more values the better, it is a tricky question to decide what values are relevant in the context. In other words, the *diversity* of key players involved in the proceedings is a distinctive characteristic.

On a more detailed level, there are various selection methods such as random selection, volunteering, categorical self-selection, selection through networking, co-nomination (assignment of representatives from societal groups – which need to be organised interests for this purpose). Here, a crucial aspect is how biases are avoided or taken account for in the selection process.

Another important aspect in this context relates to the *role* of the participants during the PTA arrangement. Different groups of participants may be involved in *different stages* of the arrangement. Who is involved in the early stages of the procedure and in the implementation phase are distinctive features, because of the possible impact on procedures and scope of the arrangement. Participants may have different influence on the procedures, e.g. on agenda-setting, on information gathering (access to external knowledge), selection of expert witnesses, bringing in new participants etc. Their role may be consultative only (giving advice, sharing knowledge) or, at least to some degree, decisive or assessing. The purpose of involving participants may also be to let them learn from the process. Finally, the role of the participants differs according to the timing of the arrangement. If the PTA follows from a general public debate on that subject, both the role in the framing and the mobilisation of the participants to participate may be different from a case in which the PTA does not base itself on an existing public controversy.

Interactions

The interaction between the various participants is another distinctive procedural aspect of any PTA arrangement. For example, the kind of communication that is encouraged to take place be-

tween participants in the arrangement, what is expected of the various participants and how they engage in the participatory process all are aspects of the procedure that define s the level of discourse in the process? An ideal -typical consensus conference, for example, encourages dialogue between lay people and experts with a view to considering expert knowledge (cognitive claims) in the context of wider social expectations and needs (normative claim). Emphasis is on the clarification of different perspectives and a common frame of discussion. An ideal -typical scenario workshop, in contrast, encourages co -operation between different types of experts where common action is required to tackle a problem area. Emphasis is on the accommodation of different perspectives as a way forward for future action.

The *rules of communication* (who is allowed to speak when; who could address whom; (un)equal opportunities to express themselves and to access information etc.) may differ considerably from PTA arrangement to PTA arrangement. The rules may be open for revision throughout the proceedings or, by contrast, may be preconceived before the proceedings take place and therefore rigid. Furthermore, apart from the formal rules, the process of communication may develop in distinct directions according to the strategies pursued by the participants and the prevailing negotiation culture. One important aspect of communication in this respect is the issue of *text transformation*, i.e. the way the various texts and meanings produced during the PTA are processed from one phase to the next, or in other words, how is the knowledge generated at one stage carried over to the next. The question is who is responsible for the text transformation, what difficulties are encountered, how are they resolved and how does this process of transformation influence the reliability of the end results.

Unintended events

When discussing the properties of PTA arrangements, we also need to keep in mind events which may occur during a PTA initiative and which may influence the outcome. A PTA arrangement may envisage a kind of communication between participants that eventually turns out to be little fruitful. This may reveal useful information about the nature of the PTA arrangement.

A comparison of different case studies, therefore, requires a description of events during these PTA arrangements. Although the distinction is not absolutely precise (in particular if inside actors become outside actors), we may, on a principal level, distinguish between *external* and *internal* unintended events: the former may include change of government, press campaigns by non-involved stakeholders, related TV programmes, new technological development, etc., whereas examples of the latter may be that some participants left the PTA, that parallel campaigns by actors are raised, or that some interest groups boycott the PTA – which may trigger the need for an emergency design to “save” the arrangement.

The influence of such events may be of crucial importance to the success or failure of a PTA arrangement. Hence, the ability of an arrangement to cope and deal with such events is of interest. This question may be addressed by asking how “robust” against outside influence the arrangement may be, but also by looking at the possibly positive or constructive inputs to the arrangement brought about by the event.

III.B. Values, assumptions and goals

The use of PTA may vary from case to case because of different underlying values, assumptions and goals. These may result from the kind of conception of TA and of participation at work,

from the democratic traditions/systems in place, and from the role played by science and technology (see dimensions 1 and 2). As a result, they may vary from institution to institution and from country to country and develop over time. They may also vary within institutions, or within countries, as the various social actors engaged in PTA arrangements may have different, and at times contrary, outlooks on the issue of PTA, and thus engage in or abstain from it for different reasons.

For the purpose of investigating the values, assumptions and goals brought to bear on PTA, it may be useful to distinguish between the following three related aspects: problem definition; definition of participation; rationale for PTA.

Problem definition

For long it has been assumed that actors' interests provide a self-evident starting point for understanding purposive behaviour. Such an approach, however, fails to address the question of origin of interest. Recent approaches use frames of meaning, rather than interests, as their focus, since these are more inclusive and more verifiable. Grin and van de Graaf (1996) distinguish between four types of elements within the action theory of an actor. The action theory of an actor being "the whole of the beliefs of that actor, both the more generic ones and those pertaining to a specific case." (Grin et. al 1997: 33)

"Specific notions regarding a given situation (*first order beliefs*):

- How does the actor assess the costs, effects and side effects of various solutions to the problem as he or she sees it?
- What exactly does the actor see as the problem in a given situation (the challenge, the opportunity)? This problem definition indicates what is going on in the eyes of the actor.

Underlying, more generic notions (*second order beliefs*):

- What background theories (ways of thinking and acting) does the actor employ?
- What deeper preferences does the actor eventually want to satisfy?"

Friend and Hickling (1997) are discussing collaborative decision making in conditions of uncertainty. They present five broad dimensions in which difficult choices of balance tend to arise in the management of a continuing process of strategic choice. According to Friend and Hickling (1997: 8) there is a choice between:

- A more *focused* and a more *synoptic* treatment of *problem scope*;
- A more *simplifying* and a more *elaborating* treatment of *complexity*;
- A more *reactive* and a more *interactive* treatment of *conflict*;
- A more *reducing* and a more *accommodating* treatment of *uncertainty*;
- And a more *exploratory* and a more *decisive* treatment of *progress* through time.

The values, assumptions and goals of a PTA arrangement are also manifest in the way the problems to be tackled, or issues to be considered are defined. There are different categories of problems that PTA is expected to address.

- One type of problem is the perceived lack of public understanding of the issue at stake. The public may be thought of as lacking factual knowledge relevant to the issue at stake in the societal debate. In order to enhance the ability of the citizens to assess the issue themselves,

the TA activity may be seen as or established in order to disseminating information and a s-
assessment capabilities to the wider public. This type of problem may call for public enlight-
enment and wider debate activities.

- A comparable type of problem is the perceived lack of scientific rationale of political dec i-
sion-making. Political institutions ma y be thought of as having a - maybe by themselves not
realised - need for knowledge. The reason may be that knowledge simply has not diffused
into the political processes, or that it is kept away from the process as part of the power
game. Here, TA may be seen as helping decision-making by bringing in a relevant knowl-
edge background.
- A perceived lack of democratic debate, and following a deficit of trust and legitimacy, makes
up a third type of problem. Here, PTA (as compared to more expert -oriented TA) may be
seen as lending the political sphere credibility by surrounding it with debate and by opening
up political issues to the general public. A precious side -effect may be the information about
standpoints and opinions that the process brings into the pol itical debate.
- The innovation system might have its own dynamics, separated from the public debate, and
maybe even embedded in long and lasting traditions for corporatism. This may end up with
conflicts about attitudes, values and opinions between the gen eral public and the innovation
system. Such situations may be perceived as a lack of "Sciences" understanding of the pu b-
lic" (in contrast to the dominating concept of "public understanding of science"). This may
call for consultative processes in which rep resentatives of the public give their assessment on
the issue.
- Technology may be seen as embedded in institutional structures, and accordingly the r eshap-
ing of technology depends upon the openness of the same structures (industry, retail, public
service institutions...). The TA organiser may perceive it as a problem, if a need for new d e-
velopments is expressed in the public debate, but the involved institutions for some reason is
not able or willing to open up for a development process. With these kinds of problems the
PTA answer often would be to set up mediation processes in order to open up for change.
- A need for comprehensiveness and co -ordinated strategies may be perceived by the PTA
organiser. Maybe a lack of co -ordination or communication between re levant scientific dis-
ciplines, governmental sectors or important actors is evident. A cross -disciplinary strategic
analysis cutting across traditional communicative barriers might be necessary, and a PTA a r-
rangement might be the right tool to use.

In a more general sense, the problem setting may be perceived as the need for bridge -building in
or between four important communities in society - citizens, politicians, experts and stak e-
holders. (See figure 5)

Each of the four groups may be thought of as havin g their specific qualities (values, objectives,
capabilities, limitations, cultures, etc). A problem may be seen as a conflict and/or need for
communication between/ inside these groups, stemming from the specific qualities, and the pa r-
ticipatory procedure may be seen as a specific answer to the conflict.

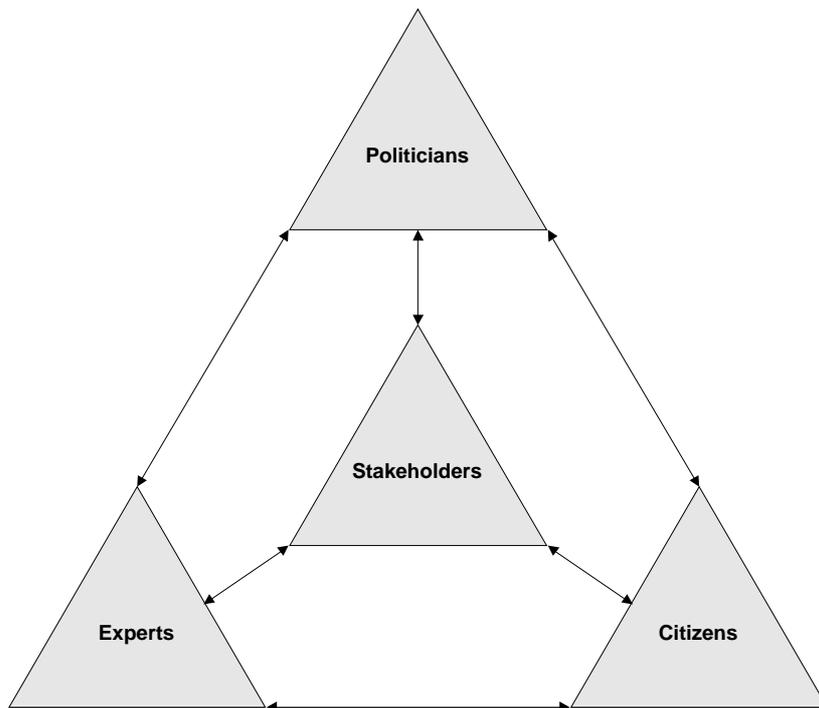


Figure 5: Bridge -building in society

Definition of participation

The answer to the question of what participation is has obviously important implications for the way PTA is viewed. This question, simple as it may look at first, goes far beyond the practical aspects of how participatory methods are arranged and extends to the fundamental discussion of how individuals interact with one another, how people are organised in communities, institutions and societies, and what the value of participation is. Therefore, in order to be able to analyse the meaning of participation within a particular PTA arrangement, one has to ask questions about the wider understanding of participation at work. It may be that participation is discussed, for example, within a direct democratic framework, or within a representative democratic framework, each of which attach different values and expectations to this issue. It is clear, then, that by investigating this aspect and the other aspects of dimension 3, an important link to dimensions 1 and 2 is established.

The definition of participation may be discussed in terms of who gets to participate in a PTA arrangement, what role participants play and what outcome is expected from participation.

It seems essential to distinguish between the values, assumptions and goals of the implementers of PTA arrangements and those participating in them. It may turn out that some social actor groups (representatives of special interest groups, for example) may not share the implementers' conception of participation, which could have repercussions for the course and outcome of a PTA arrangement. It can be assumed that as participants have a variety of reasons for wishing to discuss the issues under consideration in TA, they may also have differing values, assumptions and goals vis-à-vis the issue of participation. One could imagine a situation where potential participants abstain from a PTA arrangement because they cannot identify themselves within the

implementers' aims and goals, thus putting in question the very aim of the arrangement. One possible criteria for discussing the definition of participation could be the degree to which a PTA arrangement is based on a pluralistic conception of participation, that is a conception that recognises the different meanings attached to participation by various social actor groups.

Rationale for PTA

What kind of problems are suited for treatment through PTA? And what determines the choice of method in PTA? When is it necessary or valuable to set up a PTA arrangement?

Depending on the understanding of participation at work and the type of problem identified, the issue under consideration may be delimited to various degrees. It may be limited to a particular aspect, such as whether genetically modified food stuffs should be labelled or not; or, it may be defined in a broad way, allowing the consideration of different alternatives, such as what kind of plant breeding methods should be promoted to ensure environmental sustainability.

A further distinction may be made between issues which aim at setting goals for future development and policy-making, such as the way in which human genetics should be advanced in the long term, and issues which aim at encouraging action to move from critical attitudes amongst participants vis-à-vis concrete issues, to constructive co-operation, such as in the case of the quest for sustainable urban living.

TA institutions or other TA organisers may have more or less explicit criteria for the evaluation of the need for and feasibility of PTA studies. Such criteria may for example touch upon questions on the problem setting such as ²:

- Is there a *problem* that needs to be solved? Are there actors that have a need for a public intervention?
- Is it *important*? Economically, ecologically or in other specific viewpoints. Very important to few people or of a certain importance to many people?
- Is there a *technology* content? Is technology involved in the problem, or in problem solution?
- Is the *timing* right? Is it too early or too late to take up the problem? Is it possible to manage the timing by setting up PTA and thereby put the issue on the debate agenda?
- Is there an *addressee* for the outcomes of an activity? Someone who - with or against his will - needs to know?
- Is it a specific *task for TA* to make an activity? Because others avoid taking up the problem? Because the problem is cross-sectoral? Because a certain method is needed?

Likewise, it is possible that the implementers of PTA have a more or less explicit way of selection of PTA methods. Parameters in the selection may for example be:

- *Timing*. When will a project have to be finished? Is there a time pressure that determines the choice of method?
- *Target/resource groups*. Who are the actors that has a need for a PTA process, or who are the resource-persons needed to take into the process? Are there persons or groups that have to be involved, and does that determine the choice of method?

² The presented criteria for problem analysis and choice of method is used by the Danish Board of Technology in evaluation of topics and choice of methods for the yearly work plan of the Board (Klüver, 2000).

- *State of public debate*. Are the relevant communities (stakeholders; politicians; experts; the citizens) having a debate? Is debate enlightened, or does it suffer from lack of knowledge?
- *State of technology*. Is the technology infant (in its vision phase) or mature (strongly institutionally embedded and controlled)? What kind of technological problem has to be solved (vision-making; goal-setting; regulation; re-shaping;...). Does the state of technology in society call for a reactive or a proactive approach?
- *Credibility*. What kind of credibility is needed in order to serve the addressees with input they have confidence in. What method may deliver that credibility?
- *Problem*. What kind of problem is at stake. What sharpening of the scope is necessary - or what kind of comprehensiveness is necessary?

No matter what kind of criteria or parameters are involved in the selection of topics and methods in PTA, they are an expression of the values, assumptions and goals of the PTA organiser and the society that surrounds him. It may serve as a hypothesis, that the consciousness with the PTA arranger about the criteria at work - the rationality - in initiating PTA, and the selection/shaping of problem and method will play an important role for the outcomes and in the end for the impacts of a PTA arrangement.

III.C. Impact

Put simply, the impact dimension is a function of the other dimensions combined. To assess the "results" or "impact" of a certain PTA -arrangement it seems to be useful to distinguish between the outcome of a PTA -arrangement and the results of it .

Outcome

By outcome can be understood both the process of participation, that is the discussion, deliberation and assessment that occurs in the course of the PTA arrangement, and the public recognition of that process measured e.g. through the media coverage. An important part of the outcome is the "physical" output. Regarding the output, the following characteristics seem important: firstly, the type of product; whether it is a written report, or an action -plan, whether it is a vision, a recommendation, or a decision. Secondly, the "authorship" of the product; whether it represents the assessment of the participants themselves, or the analysis and interpretation of the proceedings by the TA institution. Thirdly, the audience for which the product has been written; whether it is the participant groups (and their wider representations) themselves, politicians, the expert communities, the media, or the public at large.

Results

The results of a PTA -arrangement, that are the effects of its output, may be direct or mediated through the relevant actors in the political system. For example, a report may be discussed widely in public debate and influence the course of this debate, or its recommendations may move a government agency to issue new guidelines with regard s the issue discussed. At the same time, the resonance to that arrangement may well also be immeasurable. For example, a laboratory scientist may gain a better insight into the social dimension of his specialist area and thus engage more constructively in public debate. Clearly, these indirect and immeasurable impacts are difficult to evaluate. However, they may be as important as the measurable ones. For exam

ple, the long-term impacts of PTA on public debate and decision -making could be seen as the most important one.
 For details see figure 6:

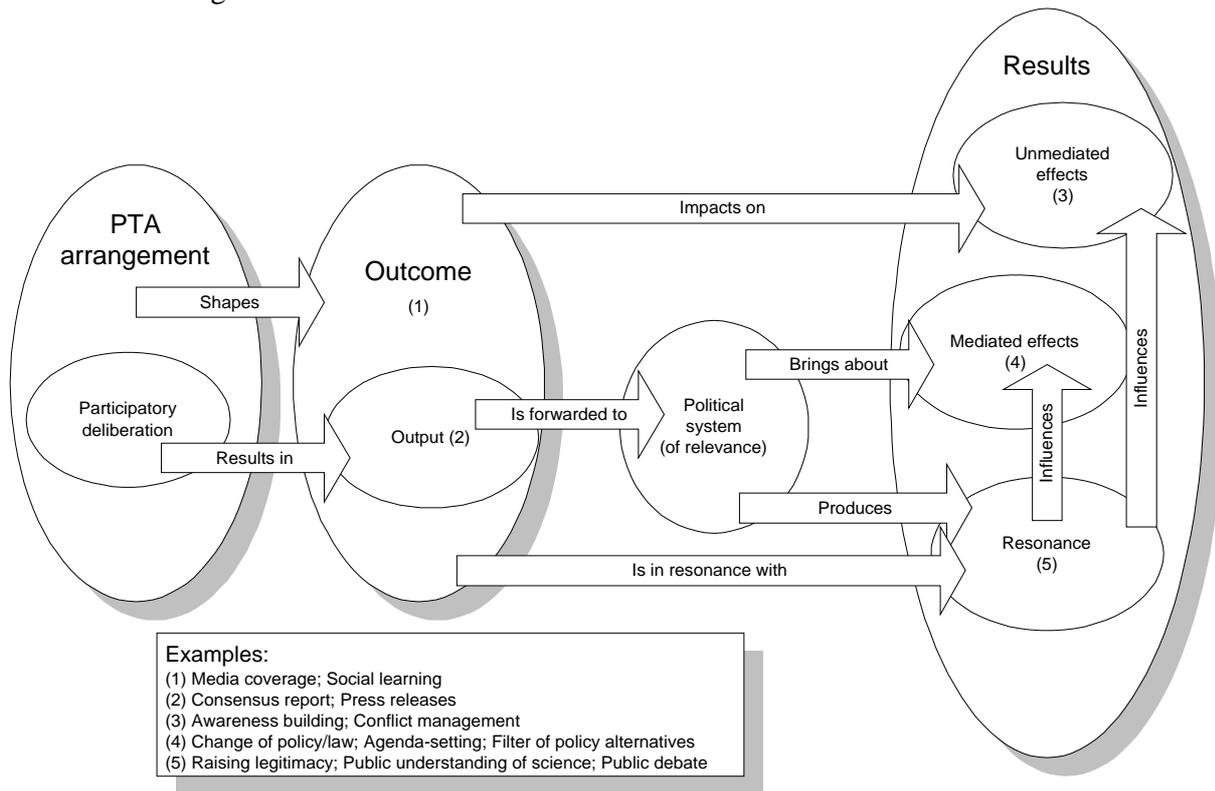


Figure 6: Model on the impacts of participatory TA

III. Project results

3.1 Introduction to case studies

At the centre of the EUROPTA research was a comparative evaluation of the experience to date of European (national) participatory technology assessment. To this end, in each country a minimum of two participatory arrangements were selected for in-depth analysis. The arrangements were chosen with a view to being representative, as far as possible, of the development, and status quo, of the issue of participation in technology assessment and science policy in the six countries involved. Altogether, the 16 arrangements may, therefore, be said to give a good picture of the diversity of participatory innovation in European technology assessment over the last ten years or so.

By selecting the 16 arrangements, the EUROPTA team was careful to achieve a good balance in respect of the issues dealt with in PTA (range of technologies, variety of socio-political issues), the type of participation (citizen and stakeholder participation) and the institutional settings (established technology assessment institutions and *ad hoc* organisational set-ups). As the Danish model of consensus conference has over the years been adopted by several European countries, it seemed to make sense to include them in the analysis, as this allowed for direct comparison, especially in respect of the relationship between the consensus conference arrangements and their respective institutional and wider social environments.

The case study analyses were carried out using the EUROPTA Research Protocol (see Annex 1). For compiling the necessary information, the authors of the case studies used a mixture of interviews with organisers, participants and observers, and literature study. The case studies were discussed on several occasions among the EUROPTA team, prompting more or less substantial revisions.

The case study material arguably has some limitations regarding consistency and comprehensiveness. First, some case studies were written by the involved project managers, others by external researchers, giving rise to possible differences in on the one hand biases, on the other hand in-depth knowledge about the case. Second, the resources available for the project did not allow for enough interviews to be made and the necessary research into written material, potentially leaving important aspects of the cases uncovered. Third, the Research Protocol has – though very comprehensive indeed – shown to lack important questions about mainly management problems and experiences, and different kinds of impact; a problem that mainly stems from the fact that the EUROPTA project time span did not allow for test case studies to refine the protocol.

Despite these deficiencies the case studies have made up a valuable knowledge base for our research, and by publishing the full text of the case studies on the Internet, we encourage that they will be used for further research by other teams.

Full title of EUROPTA case studies		Abbreviation
<i>Austria</i>	Austrian Technology Delphi	Delphi AU
	Ozone Consensus Conference	Ozone AU
	Traffic Forum Salzburg	Traffic Forum AU
<i>Denmark</i>	Future Search Conference on Traffic in Big Cities	Copenhagen Traffic DK
	Voting Conference on Drinking Water	Drinking Water DK
	Scenario Workshop on Urban Ecology	Urban Ecology DK
<i>Germany</i>	Citizens' Forum on Biotechnology	Biotech Baden-W. GE
	Genetically Modified Plant Discourse	Discourse GMP GE
<i>United Kingdom</i>	National Consensus Conference on Plant Biotechnology	Plant Biotech UK
	Citizen Foresight	Citizen GMO UK
<i>The Netherlands</i>	Public Debate on Genetic Modification of Animals	GM Animals NL
	The Sustainable Menu	Sustainable Menu NL
	Crop Protection & Environmental Concern: Gideon Project	Gideon NL
	Consumers' Aspects of Novel Protein Foods	Novel Food NL
<i>Switzerland</i>	PubliForum on Electricity and Society	Electricity CH
	Dialogue on Genetic Testing	Gene Dialogue CH

Titles and abbreviations of the EUROPTA cases. The abbreviations are used throughout the report as references to the cases.

Below, we give a one page summary of each of the 16 case studies. Full length version of the case studies can be found at the EUROPTA web -site www.tekno.dk/europta.

3.2 Austria

3.2.1 Delphi AU- Summary

Technological Delphi

Helge Torgersen
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Institute of Technology Assessment
of the Austrian Academy of Sciences

This case study deals with the recent Austrian Foresight exercise, called Technology Delphi. In order to meet Austria's special needs as a small economy a specific approach towards foresight was chosen. It was not the emerging technologies that were looked for much more it was the aim to gain insight into niches where Austria may achieve international leadership within 15 years. In order to meet these requirements an innovative approach of foresight was chosen. It tried to combine a classical Delphi-survey with a more bottom-up approach. Participatory parts were included on different stages with different levels of participation. Even the Delphi-survey with enough space left for further comments and a second round in which the answers of the first round were given back to the participants may be quoted participatory in some way, but the core PTA element was the work done by the panels which designed the questionnaires of the Delphi survey. It was looked for technical as well as social science experts and user representatives. The questions were supposed to be problem-oriented. Out of the 128 members of the seven panels³ were 42 from academia (universities and research institutions; technical experts as well as social scientists), 53 from firms (mostly technical experts), 21 from administration (federal and regional level) and 12 from interest groups (user representatives). The panels achieved the set goal and created 55% technical innovations, 35% organisational innovations and 10% mixed ones for the questionnaire.

The members of the panels did a great job and – as an intended side effect – networking within the communities was strengthened, or even started by this exercise. As formal impacts we can see that the Delphi Report is cited in several official documents and its findings are integrated into political statements and documents.

³ Organic food, New forms of housing and environment-oriented construction, Lifelong learning, Medical technology and support for elderly people, Clean and sustainable production, Physical Mobility, and Characteristics-defined materials.

3.2.2 Ozone AU- Summary

The Ozone Consensus Conference

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The problem of troposphere ozone accumulation in summer lead to regulatory activity in Austria in the early Nineties. However, it soon became clear that significant reductions of ozone precursor substances can only be achieved by severe cuts in domestic traffic and energy production. Additionally, much of the precursor load in Austria gets there from abroad.

In order to be able to initiate regulatory action, an Ozone Abatement Plan was devised in 1996, but the plan did not give rise to significant governmental activity. As a measure to force the competent (but hesitating) federal ministry to act, the public environment agencies of three eastern Austrian Länder Wien, Niederösterreich and Burgenland initiated a consensus conference on tropospheric ozone in spring 1997. The aim was to investigate feasible reduction aims and strategies that could find acceptance in the general public. Politicians from the three Länder were comparatively favourable to the conference from the beginning on, indicating that they would consider the advice seriously.

After only short time for the preparations, the conference took place in Baden near Vienna. The lay panel consisted of young people aged 18 -26. The panellists were instructed by written material and during two preparatory weekends with several weeks interval. During the weekends, no experts were heard. At the conference, the one -day expert hearing was considered disappointing by the attendants. Then the panel tried to arrive at unanimous conclusions over the following two days. This turned out to be rather difficult due to unfavourable internal group dynamics. Although a common report could be agreed upon, the paper produced was considered rather scanty. The main message was a fundamental distrust in politicians and experts with respect to their problem solving capacity, as well as to their willingness to seriously tackle the problems.

Not the least due to the perceived shortcomings of the report, and a disappointment as to the performance of the lay panel, politicians saw themselves unable to make much use of the results of the conference, except for general reactions to the obvious and rather alarming distrust in their abilities as problem solvers.

3.2.3 Traffic Forum AU - Summary

Traffic Forum Salzburg

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Institute of Political Science/University of Salzburg

Massive problems had arisen from traffic load within the city of Salzburg and from the periphery to the city, due to the rising numbers of commuters. There was a complete deadlock in traffic policy since 1992, but in the mid -90s there was a massive political conflict and social debate, high public awareness and significant media coverage.

In order to re-establish dialogue and re-gain space for political manoeuvring, the municipal politician responsible for traffic policy (the vice -mayor and leader of the local green party) and the Department of Traffic planning commissioned the so -called Traffic Forum as a means of citizen's participation quite unusual to the traditional political patterns. A German town -planner and municipal consultant, who had already realised a similar forum in Heidelberg, adapted his model to the Salzburg needs. However , manpower and financial resources were restricted.

The Traffic Forum was designed as a mediated discussion process. The method aimed at participation and integration of all relevant interests, whereas expertise played a minor role. Ideally, the initial establishment of a climate of dialogue should allow for factual and fair discussions. In a second step, a process of information and agreement should be developed in order to remove prejudices and misunderstandings between the actors. Finally, hitherto undisputed goals – oriented on some „public interest“ - should be elaborated and summarised in a new traffic model. These results were to be presented to the municipal council which would then agree on them and take the political responsibility for their realisation.

The Forum consisted of an Inner and Outer Circle: in the Inner Circle, around 20 citizens (plus a deputy for each) participated as representatives of all relevant interest groups in a broader sense. The Inner Circle was supposed to be the agent of work. In contrast, the Outer Circle served as the representation platform for politicians, civil servants and external experts. They were not supposed to engage in substantial discussions but to observe, and to give input upon request. Starting in February 1995, 12 sessions were scheduled until March 1996.

Already the first session showed that the design was not fully accepted: the idea of interest representation neglecting Austrian political patterns as well as the neutrality of the moderator was doubted. Civil servants and the vice -mayor played a much bigger role than originally conceived, which laid ground to conflicts. Consequently, significant changes from the agreed procedures were made. After significant delays, the traffic model finally elaborated was not adopted by the municipal council as a new strategy for traffic policy. The Traffic Forum was successful with respect to an improvement of the discussion climate but not in terms of practical outputs.

3.3 Denmark

3.3.1 Copenhagen Traffic DK - Summary

Future Search - Traffic in Copenhagen

Søren Gram

Lars Klüver

The Danish Board of Technology - Teknologirådet

During the last decade, Copenhagen has been exposed to increasing traffic. Big infra-structural decisions have been made which will influence the development of traffic. Examples are mini-metro, new motorways and railways to the airport. New big infra-structural decisions are under way in the nearby future. But these decisions are not co-ordinated or part of an overall plan for the future traffics of Copenhagen.

In the same decade the environmental problems related to urban traffic in Copenhagen has been increasing regarding air pollution and noise. In contrast to many other capitals in Europe, traffic logistics are reasonable. But this situation can very well change in the future.

The stakeholder groups all have their own view of the situation and the debate is somehow frozen at the usual standpoints. There seems to be a need of radical new ideas in relation to traffic planning in the Copenhagen region.

To start a constructive debate among all stakeholders The Danish Board of Technology launched a method developed in America - a Future Search Conference. This method is described as suitable to find common goals and ways of action, in a situation of standstill and mutual counteraction. Instead of facilitating a debate about the controversies and interests, this method focuses upon finding some visions that the actor groups can all accept, and from this "common ground" to develop action plans.

The conference was held in March 1998. It concluded that there was a serious lack of a co-ordinating body in Copenhagen. Since then, it has been decided by the Danish government to establish "the Development Council of Copenhagen" that will have as one of its responsibilities to co-ordinate traffic planning of the city.

3.3.2 Drinking Water DK - Summary

Voting Conference on Drinking Water

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The Danish Board of Technology – Teknologirådet

In November 1996 The Danish Board of Technology launched a new method - a voting conference. The subject of the conference was the pollution of drinking water from agriculture.

99% of the Danish water supply is drawn from groundwater and a very simple water treatment has been adopted in Denmark up till now. In several places in Denmark, however, the groundwater is so polluted that it is unfit for drinking. The agricultural sector of Denmark occupies two-thirds of the total area, and this area hides the bulk of drinking water. The agricultural sector therefore is a critical factor to the quality of groundwater. The conference focussed on the extensive surface load and the increasing groundwater problems, caused by the use of pesticides and fertilisers.

The voting conference put drinking water to the vote among the 180 participants - 60 citizens (randomly selected), 60 experts (from a broad range of disciplines, institutions and organisations) and 60 politicians (from the Parliament, and regional/local Governments). At the voting conference, the 180 participants were supposed to choose between five action plans for ensuring clean drinking water. These plans all answered the question: How do we ensure clean drinking water in the future?

The plans were presented by five actors: The agricultural organisation, the Danish Agrochemical Association, the Danish Association of County Councils, the Watershed Information Centre for the Protection of Groundwater within Agriculture (NGO) and the Danish Water Supply Association. These five actors are all significant players with direct or indirect influence on the quality of drinking water.

After the five presentations and deliberation each of the participants should fill in their ballot by placing a cross against that action plan that they found would be the best to ensure clean drinking water. The individual participants remained anonymous - but were registered as either citizen, expert or politician.

The action plans from the Water Supply Association and the groundwater NGO gained great support from all participant groups. Both action plans focussed on changes in agricultural practice as the main means.

3.3.3 Urban Ecology DK - Summary

Scenario Workshops on Urban Ecology

Ida E. Andersen

The Danish Board of Technology - Teknologirådet

A scenario workshop is a local meeting among four groups of actors. Scenarios are used to stimulate vision making and dialogue between policy makers, experts, business and concerned citizens. It is a method of technology assessment in which workshop participants carry out the assessments and develop visions and proposals for technological needs and possibilities.

In this case the scenarios describe alternative ways of performing the urban ecology tasks. In the workshop the scenarios are used as an inspiration in the process. The participants are asked to criticise and comment on them in order to be able to develop visions of their own.

The technology involved in this project was urban ecology, defined as : *the interaction between people and nature in urban areas, including the relationship between the flow of natural and man-made energy and raw materials*". To think and act in an ecological way implies saving resources, recirculating and reusing products and materials and returning used materials in a clean form. This means that not one but several technologies are involved, and that technology has to be understood in its broad sense including social, political and institutional organisation.

The main task of the project was to identify barriers to urban ecology and to point to ways to overcome these barriers. Participation was by definition a fundamental part of the whole project, as local dialogue and exchange of knowledge and experience is crucial for getting the wanted results.

The scenario workshops were concluded with a national public conference in January 1993. At this conference the outcome of the scenario workshops was presented and discussed. The project developed a National Action Plan for Urban Ecology which was later integrated into the work of a new governmental committee on Urban Ecology. The methodology has been widely used and further developed by the European Commission. Material and do-it-yourself-kit is available in several languages at www.cordis.lu/easw.hoke.html.

3.4 Germany

3.4.1 Biotech Baden-W. GE - Summary

Citizens' Forum on Biotechnology/Genetic Engineering - Summary

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The Office of Technology Assessment of the German Bundestag – TAB

The Citizens' Forum was organised in 1995 within the framework of a comprehensive project on the prospects of biotechnological industries in Baden -Württemberg. It was arranged by the Academy for Technology Assessment in Baden-Württemberg.

During the first phase, 15 expert opinions were gathered in order to define the state of research and the potential of modern biological technologies. A second series of expert opinions was concerned with legal and economic aspects, and with the question of social acceptability. These statements had been discussed by experts at a workshop, to delineate areas of consensus or dissent.

The second phase of the project, known as the "societal discourse", included two workshops with representatives of interest groups, in which results of the first phase on the subjects of "novel food" and "renewable resources" were discussed.

The third phase – the Citizens' Forum - was supposed to explore the pros and cons of biotechnology as seen by non-experts. It consisted in a number of meetings based on the model of the Planning Cell. In the summer of 1995, a total of 8 Citizens' Forums in three cities of Baden Württemberg with, in sum, 194 participants were held. The lay audience was informed by lectures held by experts about subjects determined by the implementers: "Gene Technology and Agriculture" and "Novel Food". The use of genetic engineering for medical and pharmaceutical purposes was said to be relatively less controversial in the public discussion. These lectures included an introduction to the scientific and technical basics, the aspect of dealing with unknown risks during implementation of genetic engineering, the economic importance of genetic engineering in the various fields of application, and the question of the state's role by the development and regulation of genetic engineering.

The Citizens' Assessment was seen by the Academy as a decision support to supplement the experts' statements on the opportunities for Baden -Württemberg.

The project leader reports that one result might be that the state government and its representatives in the Advisory Council are now better aware of this model, and have a more positive attitude toward it. The state government has expressed its interest in organising more Citizens' Forums. The founding of a "Biotechnology Agency" for Baden -Württemberg can – at least partially – be seen as a reaction to the results of the project's first phase; its purpose is to concern itself with increased support for founding new businesses, improved research and development co-operation, and promoting the establishment of information - and advice-centres. For the Citizens' Forums, no comparable effect on politics could be ascertained.

3.4.2 Discourse GMP GE - Summary

Genetically Modified Plant Discourse - Summary

Fritz Gloede

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Between 1991 and 1993 the TA project “Discursive Procedure for the Technology Assessment of Crop Plants with Genetically Engineered Herbicide Resistance” was undertaken. It was organised by the Wissenschaftszentrum Berlin (WZB) (Prof. Dr. van den Daele) in co-operation with Institute for Genetics; University of Bielefeld and Institute for Ecology; Technical University of Berlin, and supported financially by the German Ministry for Research and Technology.

The approach taken was based on the assumption that TA should not merely be a forum of experts at which the state of knowledge on the consequences of technology is presented and evaluated. In addition, this TA process should be a discourse „arena“ in which the social conflicts related to a new technology could be discussed in an exemplary manner. Interest, political commitment and competence of organised actors (industry, environmental associations, regulatory authorities) were the decisive selection criteria for participants. All areas of investigation were covered by experts from the relevant disciplines. So the total number of discourse participants varied between 48 and 60 during a 3-year-period.

The basic principles of the WZB approach satisfied discursive requirements, as the participants in the HR project were themselves able to bear influence on how the issues and the rules for tackling them were formulated. Primarily this was achieved by setting up a co-ordinating committee, including three people from each of the „sides“. Besides holding the discourse on HR technology itself, an accompanying impact study on the project was made by WZB. The accompanying research was guided by the hypothesis that objective rationality in dealing with HR plants was best reached through the social dimension. Scientific ambivalence would have to be bridged socially.

At the final conference in June 1993, the environmental associations announced their withdrawal. This needs not be interpreted as a failure of „gains in rationality“ of the process. But it can be seen as a failure of „infusion“ into the initial social conflicts. The WZB-working group concluded that these associations tried to avoid their argumentative defeat. Instead, it could be claimed that the project was characterised by the conflict between a *strategic TA concept* and a *democratic one*, which coincides with the fronts in the conflict over genetic engineering itself.

Although the final result, according to which there are no specific risks when GMO plants are released, was well communicated by prominent administrative and scientific speakers, the societal resonance remained rather small. Media coverage of project results seemed to be sparse. This might be due to the complex proceedings of the project. Besides, it could reflect that the HR-discourse was not related to any actual political decision.

3.5 United Kingdom

3.5.1 Plant Biotech UK - Summary

UK National Consensus Conference on Plant Biotechnology (1994) - Summary

Simon Joss

Centre for the Study of Democracy; University of Westminster

The 1994 UK National Consensus Conference on Plant Biotechnology (UKNCC) was the first ever Danish-style consensus conference – and in fact the first participatory technology assessment initiative – held in Britain. It was organised by the Science Museum in London and funded by the Biotechnology and Biological Sciences Research Council (BBSRC), one of six national research agencies. At the centre of the UKNCC was a deliberative process between a 16 -strong lay panel and a 21 -strong expert panel, resulting in an evaluation report written entirely by the lay panel.

The PTA arrangement essentially consisted of four stages: firstly, following their recruitment on the basis of newspaper and radio advertisements, the lay panel members were provided with a preliminary information pack for initial preparation; secondly, the panel met at a first preparatory weekend (in September 1994) to familiarise itself with the issue of plant biotechnology and start a process of identifying relevant questions to be addressed in the course of assessment; thirdly, a second preparatory weekend followed, the aim of which was to finalise the lay panel's questions and select an expert panel from a list of names provided by the organisers; fourthly, the centrepiece of the UKNCC was a three -day public conference, in the course of which the selected experts answered the lay panel's questions, followed by the panel's deliberation (behind closed doors) and the subsequent publication of their findings in the form of a conference report.

The UKNCC attracted considerable interest at the time in terms of both the issue at stake and the participatory nature of the arrangement. The conference did not, however, wield any visible impact on either public, or private, policy -making on plant biotechnology. There were no relevant policy-making processes under way at the time. Also, the idea of holding a consensus conference was not taken up by other institutions, although here and there some interest was shown (neither the BBSRC, nor the Science Museum decided to hold another conference). Having said this, the UKNCC seems to have somewhat moved the debate on within the public understanding of science movement, under the banner of which it had been organised. A second consensus conference, on radioactive waste management, was in the process of being organised at the time of writing (for May 1999).

3.5.2 Citizen GMO UK - Summary

CITIZEN FORESIGHT

Simon Joss

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In spring 1998, a participatory technology assessment arrangement called "Citizen Foresight" was held in Brighton (England) on the future of food and agriculture. Described by its organisers as a "tool to enhance democratic policy-making", the Citizen Foresight initiative had at its centre a 12-strong Citizens Panel, whose task was to form an opinion about the issue on the basis of expert hearings and subsequent deliberations amongst itself, and then to write up its conclusions in a report. Following ten evening meetings over a period of some two months, the Citizens Panel's report was published at a media event in London in June 1998.

The Citizen Foresight initiative was designed by Dr Tom Wakeford (University of East London) on the basis of the model of citizens' jury, as used in Britain. As a deliberate modification, the number of Citizens Panel sessions were extended from four to ten, in order to allow the panelists to fit their participation in with their everyday (working) life; the Citizens Panel was free to call extra expert witnesses; and an additional Expert Panel was appointed to evaluate the options and criteria generated by the Citizens Panel, using a specially designed multi-factor analysis.

The Citizen Foresight initiative was commissioned by the Genetics Forum, a gene technology-critical NGO, and organised by the University of East London's Centre for Governance Innovation and Science. The project manager was supported by a Stakeholder Panel, consisting of seven organisations. The Stakeholder Panel was responsible for selecting the Expert Panel and the principal witnesses. At the end of the initiative, five Stakeholder Panel members each issued a written statement in response to the Citizens Panel report.

While the Genetics Forum and the Stakeholder Panel were predominantly interested in assessing public opinion on GM foods, The project manager's aim was broader: he insisted on allowing the Citizens Panel to explore various options of food production, and not just gene technology, and he aimed to explore this participatory initiative as an improvement of conventional policy-making relating to technology, and not just as a means of measuring public opinion. However, no formal link to relevant policy-making could be established, although the Minister of State for the Environment retrospectively invited the Citizens Panel to an informal meeting. Furthermore, as the Citizens Panel's proceedings took place behind closed doors, there was no link to wider public debate, apart from the final press conference.

There were reportedly no direct, visible impacts on food/agricultural policy-making, although the Office of Science and Technology and the Department of the Environment showed some interest in the Citizens Panel report. No formal evaluation of the Citizen Foresight initiative was carried out. There are no concrete plans to date for a second initiative.

3.6. The Netherlands

3.6.1 GM Animals - Summary

A Dutch Public Debate on Genetic Modification of Animals

Wilma Aarts
SWOKA

In 1993, the first "consensus conference" was organised in the Netherlands. This Public Debate as it was called, was a novelty in the country. The subject was the genetic modification of animals. The Public Debate took place just a few years after the birth of the first transgenic bull Herman in 1990, and a few months after the Parliament agreed on the continuation of breeding with Herman. Three institutes were involved in the organisation of the Public Debate: the national TA institute (the later Rathenau Institute), a research institute in consumer affairs (SWOKA) and the Foundation on Public Information about Science and Technique.

A key element in the set up of the Public Debate was the involvement of citizens in the discussions. The lay people debated with all kinds of experts, such as scientists, representatives of pressure groups and industry and members from advisory bodies and governmental bodies.

The citizens had been recruited through advertisements in Dutch newspapers. From the applications, the organisers had selected a panel of 16 citizens. In two weekends, this panel had been prepared for their role in the debate. These preparatory meetings produced a list of questions the panel wanted to ask to the experts during the Public Debate. The panel selected which experts should answer which question. By acting this way, the panel of citizens took the lead in the discussion.

The Public Debate "Genetic modification of animals should it be allowed?" itself took place in a weekend. The Debate was an encompassing exchange of ideas and view points on the possibilities of genetically modified animals, and of the idea's, risks, problems and choices to be made. At the end of the second day, the panel of citizens wrote a final declaration. It showed that there was no consensus; the declaration included two standpoints. A majority of the panel suggested a temporary suspension of genetic modification on animals. A minority of the panel found that genetic modification of animals should be allowed under certain conditions. The Dutch TAI institute sent the final declaration of the Public Debate, together with their own "Message", to the Dutch Parliament, but it had no political implications. However this Public Debate demarcated the beginning of a shift in Dutch Technology Assessment practice since 1993, although it is perhaps too much to say that this Public Debate itself was the cause of the change. Since 1993 there have been organised more Public Debates (=consensus conferences) and since then lay participation in technology assessment has become more prominent.

3.6.2 Sustainable Menu NL - Summary

The Sustainable Menu. One of the Dutch sustainability debates -

Wilma Aarts
SWOKA

Since 1994 a series of so called National Sustainability Debates have been organised annually in the Netherlands. This paper describes the debate on "sustainable food" in 1996 as an example of these. The description of this debate sheds a light on the Netherlands Sustainability debates in general. Moreover it shows what has been learned from this kind of debate through the years.

The sustainability debates are meant to stimulate and spread the debate on sustainable development in society. The organiser, the Netherlands Committee on Sustainable Development (NCDO) is both related to the Government and to non-governmental organisations (NGO's). In global UNCED discussions NCDO deputed NGO's in the fields of the environment and of development co-operation. On behalf of the Government NCDO carries out Agenda 21 and organises the sustainability debates.

In a sustainability debate two members of Parliament publicly discuss with experts during 1.5 hours. These experts may be representatives of pressure groups, business or science. Both politicians present their own political statement in reaction to propositions that have been formulated in a preparatory workshop. The audience of lay, interested people also have the opportunity to ask questions or express their opinion.

Opportunities and obstacles for sustainable developments are subject of the sustainability debates. Technological aspects may play a minor or major role in the discussion. In the debate on sustainable food technology played a significant role.

Politicians take part in the debate both to make the debates attractive and to enlarge the opportunities for political action. During the years the debates have always provoked some publicity, but the political and other consequences of the debates have not been clear. That is why, through the years the debates have become less satisfactory to the organiser. Since recently, NCDO has more intensively connected the sustainability debates to the policy developing process. The format of the public debate is being changed in order to enlarge its political relevance. The sustainability debates are being made part of policy development (the development of environmental measures).

Because participative policy development is an essential feature of Agenda 21, activities in this framework, such as the Dutch sustainability debates are important for the study of PTA practice. These activities also take place in other European countries. The sustainability debates are interesting for the EUROPTA project, as they show a different kind of public debate compared to the consensus conference format. Moreover, there are attempts to optimise the format in order to improve political relevance and the attraction of the debate.

3.6.3 Gideon NL - Summary

Crop protection and environmental concern

Anne Loeber
SWOKA

Despite the rather adverse conditions for crop production, agriculture in the Netherlands has become very successful in the post second World War years. A major factor for this success was crop protection agents. However, in the course of time, the negative implications of regular pesticide use came to the fore. Change in practice however appeared a complex task, because of its embeddedness within the institutional and cultural context of the agricultural system.

In 1990 the Dutch government made a 10 Year Plan for Crop Protection in order to deal with the problems. The Plan's objectives were to reduce the quantities of agents used, to decrease emissions to the environment and to reduce the dependence on chemical pesticides. Halfway, an evaluation was planned, which was to be extensively discussed in parliament. In order to provide the parliament with background information on crop protection from the perspective of a sustainable development, the Rathenau Institute launched a project on sustainable crop protection.

This project, dubbed Gideon –a Dutch acronym for Crop Protection Suitable for Sustainable Use and Healthy Economic Development in the Netherlands —did not limit its scope to the subject of component substitution or to the technical aspects of pesticide application and emission reduction. Because of the coherence between various aspects of the agricultural production system, of which pesticides are but one, albeit central, element, the Gideon project took a more comprehensive approach. Starting from the issue of crop protection, it focused on the production methods and organisational and institutional aspects of the Dutch agricultural practice as a whole.

The project's objective was to provide an overview of the various existing views on (future) sustainable crop protection, and to thus provide parliament with insight in the opportunities, concrete measures and threats for realising it. In order to achieve this objective, the project was set up as an "interactive" Technology Assessment which involved a large variety of actors.

The project consisted of various research activities: a phase of preliminary exploratory research, two rounds of interviewing, a workshop, a work conference and in conclusion an "open day" at which a draft of the final report was presented to a wide audience. In all these activities, the perspectives of the participants served as a starting point for information gathering and analysis. Not only solution strategies and policy options were discussed, but also the problem definition itself.

The project started in February 1995 and ended in the Summer of 1996. It was carried out by a group of researchers from various disciplinary backgrounds. In total, about a hundred people participated.

The project resulted in the formulation of two views on sustainable crop protection, which were endorsed by the participants, and in an overview of (policy) options by which they thought these could be brought about. These results were compiled in the form of a final report which formed the basis for the Rathenau Institute's advise to Parliament.

3.6.4 Novel Food NL - Summary

Consumers' aspects of Novel Protein Foods - Summary

Anne Loeber
SWOKA

In 1993, the Dutch government installed the Interdepartmental Research Bureau on Sustainable Technological Development (STD) to explore the opportunities for sustainable technological development. The objective was not to influence technology development as a whole, but to set examples to illustrate the feasibility of sustainable technological development paths.

One of the program's projects was an analysis of the possibilities for developing food products on the basis of non-animal protein. The project, called an Illustrative Process (IP), lasted from 1993 to 1996. It involved research into the technical and the environmental as well as the economic and societal (consumers') aspects of so-called Novel Protein Foods (NPFs). The project's main objective was to "illustrate" the feasibility of NPF development in such a way that third parties (industry, research institutes, policy makers, consumers and environmental organisations) would continue to stimulate the development after the Illustrative Process had come to an end.

The NPF project was organised as an interactive TA, involving in the analysis process a multitude of actors in various ways. The analysis activities regarding NPF were contracted out to several research institutes. The research on consumers' aspects of NPFs was assigned to a research institute on consumer aspects, SWOKA. In their contribution to the NPF project, the researchers employed a procedure developed by this institute dubbed "Future Visions of Consumers" (in Dutch: TvC). This method is participatory in character and focuses on integrating (future) consumers' aspects in the decision making on technological development paths. The NPF project offered the first opportunity for the TvC -procedure to be carried out.

The TvC-procedure consisted of desk research, in-depth interviews, a survey, and participatory analysis sessions. The sessions -in total three- formed the central element in which a heterogeneous group of actors met to discuss consumers' aspects of NPFs in a structured way. Both the output of the other research activities in the NPF -project, and the findings from the preliminary desk research, the interviews and the survey in the consumer research formed an input in the meetings. The objective of the sessions was for the participants to develop a joint vision on consumer's aspects of NPFs based on the perceptions they held of the "future consumer".

A major impact of the consumers research was that the NPF -project focused on meat substitutes in the form of an ingredient (for instance in pizza) rather than on foodstuffs consisting entirely of novel proteins (such as an imitation beef steak). Further, the research indicated that the sensory aspects of NPFs deserve the foremost attention of further technological development toward meat replacements. These findings are reflected in the R&D activities regarding NPF -development that are being displayed in various companies and research institutes in the aftermath of the NPF -project.

3.7 Switzerland

3.7.1 Electricity CH - Summary

PubliForum “Electricity and Society” (1998)

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Danielle Bütschi
Swiss Science Council – TA Programme

The Swiss TA Programme of the Swiss Science Council organised, in spring 1998, a „PubliForum“ on the theme of electricity production and consumption. 27 citizens from all linguistic parts of Switzerland was invited to be part of this participatory arrangement, based on the model of the Danish consensus conferences. It was the first conference of this kind in Switzerland at national level and also the first participatory arrangement conceived by the Swiss TA Programme.

This first experiment addressed the question of electricity, an issue that was at the forefront of the Swiss political debate. In 1990, a 10 year moratorium on new nuclear installations had been declared in order to reflect on the future of electricity production. This pause had been positively used to unfreeze some conflicts, but some eight years later, the nuclear future of Switzerland remained hot and controversial and no compromise was in sight. The issue of energy and electricity was also gaining importance at the eve of the new millennium, as major decisions were in preparation or in discussion (law on nuclear energy, market liberalisation, energy law).

In this context of intense political debates the Swiss TA Programme organised the PubliForum, with the aim of bringing the views of citizens into the relatively closed debate. At that time, no initiative or referendum had been called, so the dialogue that the TA Programme strove for could be constructive, with the issue at the core, and not a voting campaign.

For this PubliForum, the Swiss TA Programme appointed a group of 27 citizens to form a lay panel, which met at two preparatory weekends, during which it defined themes and questions to be discussed with experts. It then selected 19 experts for these discussions, which were held in public during two days. On the following day (and night), the lay panel wrote a report, in which it summarised the experts' answers and gave its views and recommendations about the issue.

Newspaper and radio largely covered the PubliForum and the report of the lay panel, but it was more difficult to gain the television's interest. Politicians and administration were, at the beginning at least, rather sceptical towards the PubliForum. Nevertheless, at the end of the procedure, this scepticism had been replaced by interest in the exercise. Impacts of this PubliForum, however, cannot be precisely stated; it can only be observed that some political decisions went in a similar direction as the conclusions of the lay panel, but no reference to it was made. More substantially, this first participatory arrangement gave some visibility and legitimacy to the Swiss TA Programme.

3.7.2 Gene Dialogue CH - Summary

Dialogue on Genetic Testing; Lay People and Experts in Discussion

(“Dialog zur Gendiagnostik; Laien und Fachleute im Gespräch”)

Simon Joss

Centre for the Study of Democracy; University of Westminster

"Dialogue on Genetic Testing; Lay People and Experts in Discussion" was the name given to a technology assessment project that took place in 1998 in Switzerland. Similar to the methods of consensus conference and citizens' jury, the Dialogue on Genetic Testing involved lay people, experts and stakeholders. A 24-strong Citizens Panel (including people from the Swiss-German, French and Italian regions) was charged with drawing up an agenda for discussion at a public meeting, for which it met on two occasions. The task of the Stakeholder Panel was to enter into discussion with the citizen panel and give responses to the questions raised at a third, one-day public meeting. Following the meeting, both panels wrote evaluative statements regarding the issue of genetic testing and the experience of participating in the Dialogue initiative. The statements were included in a final report to be distributed to the media and the wider (interested) public, and debated in connection with scheduled Parliamentary proceedings on proposed new legislation on genetic testing (in 1999).

The Dialogue on Genetic Testing project was carried out in co-operation with 17 different organisations and institutions that are involved, in one way or another, in the discussion of genetic testing. The project was supervised by a Support Committee, made up of prominent figures from the scientific and political community, including the federal government's Secretary of State for Science and Technology. The chairman of the committee, a member of the Upper House of the Federal Parliament, was the initiator and principal "shaker" behind the project. Around 80 per cent of funding came from the members of the stakeholder panel which included a large industry association, insurance companies, scientific institutions, the Church and patients' organisations. The remaining funding came from several foundations with no direct link to the project. The project was implemented by a private organisation with a track record in technology assessment and public engagement initiatives.

It is premature to draw final conclusions about the impact of the Dialogue on Genetic Testing arrangement, as the results of the proceedings were still being considered at the time of writing, and decision-making in the subject area was expected in the near future. Media coverage has been moderate. As far as the various participants themselves are concerned, however, the overall evaluation was positive. In particular, the Stakeholder Panel reached a preliminary decision to continue the process and hold a second Dialogue arrangement, probably on a related topic. The Citizens Panel, too, gave an affirmative verdict, while at the same time suggesting certain methodological improvements.

IV. Analysis & conclusions

4.1 Introduction

On the basis of the empirical case study research, the EUROPTA team engaged in a comparative analysis of existing European participatory technology assessment experience. The aim was to identify factors both within participatory arrangements and in their institutional and socio-political contexts that play a role in determining the overall function of participatory technology assessment. This should not only help gain an improved theoretical understanding of the role of participation, but also achieve more effective practice .

The analysis comprised in this part of the EUROPTA report, was carried out in several phases. To begin with, each partner organisation was asked to come up with working hypothesis and observations relating to findings of the various case studies. These were further refined and grouped into thematic fields. Five sub-groups each dealt with one theme. The five resulting papers were later presented at the second EUROPTA workshop in The Hague in October 1999. Following the feedback from workshop participants, the analyses were further refined and adjusted against each other. The five sections presented here are written by the individual authors and, therefore, do not necessarily represent the viewpoints of the whole EUROPTA team. However, all five sections have been discussed at the second international workshop and internally among the EUROPTA partners at two project meetings, and in that respect the five sections as a whole represent the common analysis of the team.

Chapter 4.2 discusses the significance of the introduction or implementation of participatory technology assessment in relation to both the working of individual arrangements and, more generally, the role played by technology assessment vis-à-vis public debate and public policy-making on science and technology. Chapter 4.3 evaluates the various cases studies from the point of view of management – that is, what factors are more or less conducive to the effective and efficient management of participatory arrangements. Chapter 4.4 discusses the relationship between the problem issue a participatory arrangement is supposed to tackle, the institutional context, in which the arrangement is placed, and the methodological rationale underlying the arrangement. It further considers how "fine-tuning" can best be achieved in this relationship. Chapter 4.5 investigates the political role of participatory technology assessment in different socio-political contexts, thus allowing to develop a more fine-grained picture of what function participatory arrangements can have in a variety of social and political contexts. Chapter 4.6 considers the effects of participatory initiatives in relation to science and technology policy analysis, policy-making and societal debate.

Chapter 4.7 "Conclusions and recommendations" refer to the outcome of the EUROPTA project. Conclusions are drawn from the research framework, the case studies and the transversal analysis. The conclusions presented in this chapter are of rather general nature, and the more detailed, issue-specific results and conclusions are to be found in individual parts of this report, notably the research framework and the five analytical papers. The conclusions, recommendations and policy implications in this chapter were reached collectively, thus reflecting on what the EUROPTA research team managed to agree as a whole.

4.2 Implementing participatory TA

– from import to national innovation

Simon Joss* and Helge Torgersen**

4.2.1 The spread of a concept

One feature of European participatory technology assessment is its relative novelty. Only as recently as ten years ago, there was hardly much discussion, let alone practice, of public involvement in policy analysis and technology assessment. Denmark, and to a lesser extent the Netherlands, were arguably the only countries at the time that had seriously started conceptualising, and putting into practice, the issue of public participation vis-à-vis science and technology. (In the case of Denmark, this initially took the form of consensus conferences, as institutionalised by the Danish Board of Technology in 1987; in the Netherlands, it took the form of science shops and early versions of what became known there as "constructive" technology assessment.) Elsewhere in Europe, it was not until well into the 1990s that this issue was taken up. Following the introduction of the consensus conference in the Netherlands in 1993, other countries followed suit and started trying this particular form of public participation, including Britain (1994), Norway (1996), Austria (1997), France (1998) and Switzerland (1998). Further afield, the consensus conference was used by a variety of institutions in New Zealand (1996), the USA (1997), Japan (1998), South Korea (1998) and Australia (1999).

In parallel to the proliferation of the consensus conference throughout the 1990s, an increasing number of new methods of (public) participation were developed and tried in the European context, such as *Bürgerforen* (citizens' panels) in Germany, citizens' juries in the United Kingdom, scenario workshops and voting conferences in Denmark and various forms of "interactive" technology assessment in the Netherlands. The conceptual discussion of (public) participatory technology assessment, too, has taken off in the last ten years or so, with an increasing number of academics, policy analysts and social commentators pondering the issue.

Overall, then, the European experience of participatory technology assessment has to date been characterised by a great deal of both theoretical and practical exploration, innovation and diversification. The initiatives analysed in the EUROPTA case studies mirror this development. Most of them represent "introductions" in the sense that they were instigated by institutions wishing to find out what the role of public participation in policy analysis and technology assessment may be, try particular methods and/or carry out social assessment of technological issues. In some cases, participatory methods successfully used in certain countries were transferred to other

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countries. In other cases, institutions developed new methods in-house, or modified existing ones to suit the particularities of the institutional and national contexts. Several of the involved institutions did not have any previous experience of participation. Some made use of participatory methods as a routine matter.

The issue of introduction merits the attention of those interested in the development of participatory technology assessment and policy analysis for two broad reasons: firstly, it raises a number of relevant questions concerning the practical implementation of participatory methods. For example, can a method successfully used in one institutional and/or national context be transferred to another context without having to undergo significant adaptations, or do the changed circumstances require special modifications? And are there certain procedures that ease the introduction in situations where the issue of public participation evokes ambivalence or scepticism?

The European experience shows that in each country concerned, these and other questions were part of the discussion prior to the introduction of participatory methods in technology assessment. It often took several years before an institution was sufficiently satisfied and confident that a participatory method should be tried. And as the various established technology assessment institutions have gained more experience over the years, they have often revisited the question of introduction in connection with the development and adoption of new methods.

The second reason why the issue of introduction deserves our attention lies in its significance as an indicator of the conceptual and practical changes taking place in policy analysis and institutionalised technology assessment. Some observers have likened the emergence of a participatory agenda, and thus the opening up of traditionally expert-oriented analyses to wider social assessment, to a "paradigm shift", while others remain less convinced, putting the current interest in public participation down to a temporary fashion.

While this chapter does not aspire to provide comprehensive and conclusive answers to all these questions and issues, it nevertheless tries to shed some light on the significance of the introduction of participatory technology assessment in the European context, both in respect of individual methods and initiatives and in respect of wider institutional and socio-political developments. This is done by analysing relevant observations made in the 16 EUROPTA case studies, and in particular by addressing the following three sets of questions: (i) what are the implications of introduction for the individual participatory initiatives? What, if any, proactive steering measures seem advisable, in order to render a new participatory initiative effective? (ii) what are the implications of introduction for the development of participation in technology assessment, in particular where introduction signifies the first-ever use of participation? (iii) what are the implications of introduction for the development of public policy - and decision-making in science and technology?

Import and national innovation

The 16 participatory initiatives investigated in the EUROPTA case studies vary greatly in terms of methodology, institutional setting, issues considered and socio-political context. This complicates their comparative, transversal analysis. What is needed, therefore, is a relative reduction of complexity, albeit at the cost of losing some contextual depth. For the purpose of the analysis offered here, the 16 case studies are categorised according to whether they represent an "import" – signifying the transfer of an existing participatory method into a new national context – or a

"national innovation" – signifying the in-house design of a new method, or the new combination of elements of different existing participatory methods. Within these categories, a distinction is made between those institutions, for which participation represents a novelty, and those which have previously made use of participatory methods. Table 1 lists the case studies according to this categorisation.

Table 1. Categorisation of EUROPTA case studies according to type of introduction. (For further explanation of categories, see text in this section; + = category applies; - = category does not apply.)

	Import	national innovation	new institutional use
Delphi AU	-	+	+
Ozone AU	+	-	+
Traffic Forum AU	+	-	+
Copenhagen Traffic DK	+	-	-
Drinking Water DK	-	+	-
Urban Ecology DK	-	+	-
Biotech Baden-W. GE	-	-	-
Discourse GMP GE	-	+	+
GM Animals L	+	-	+
Sustainable Menu NL	-	-	-
Gideon NL	-	+	-
Novel Food NL	-	+	-
Electricity CH	+	-	+
Gene Dialogue CH	-	+	+
Plant Biotech UK	+	-	+
Citizen GMO UK	-	-	+

Two of the case studies, the German citizens' panel on biotechnology [Biotech Baden-W] and the Dutch initiative on "sustainable menu", represent neither an import nor a national innovation, as defined above. The English citizen foresight initiative [Citizen GMO] does not represent an import or national innovation either, as the method of citizens' jury had previously been used several times in Britain, but it was set in a new institutional context.

A quick look at Table 1 shows that there is a balance between those arrangements that were based on imported methods (six out of 13 cases) and those that were based on new methodological innovation (seven out of 13 cases). In other words, the introduction of participatory techno-

ogy assessment in the European context has not just been about transferring well -established methods into new national contexts, but as much about experimenting with new forms. What the relationship between these two categories is in terms of the evolution of participatory technology assessment is discussed further below. Table 1 also shows that in five out of six "import" cases, the organisations responsible had no previous experience of participation, whereas there was a more even balance among the cases representing "national innovation". Again, the significance of this is considered further below.

The arrangement and its context

Before delving into the case study analysis, it is worth reconsidering briefly the interrelationship between a participatory TA arrangement and its institutional and wider socio -political context. Figure 1 (below) schematically illustrates that relationship. In line with the EUROPTA analytical framework, the focus is on the participatory arrangement which is characterised by the multiple interdependence between the issue treated within the arrangement, the method used and the assessment resulting from the participatory process. The arrangement is set within a certain institutional context which, in turn, is embedded in a socio -political environment of one kind or another.

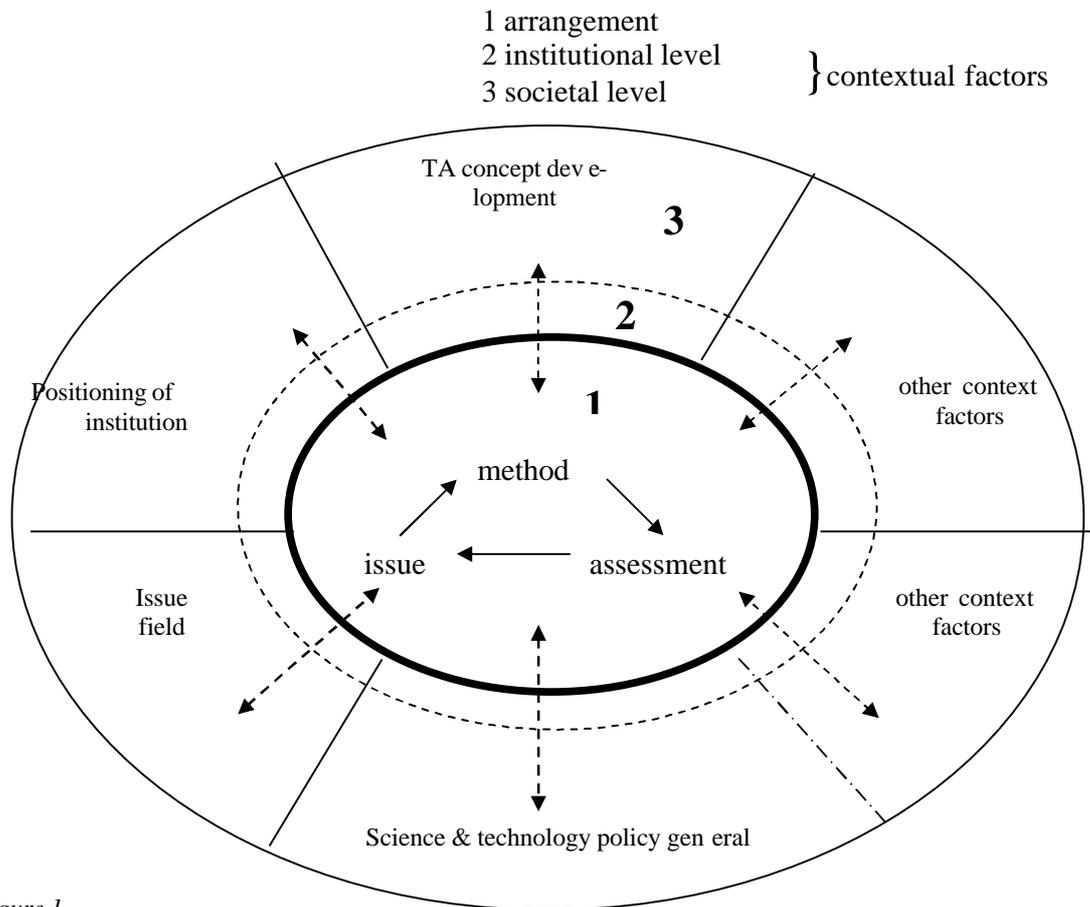


Figure 1

The (institutional and wider social) context of the arrangement can be characterised in terms of various factors that have a bearing on the actual role of a participatory arrangement and, vice-versa, are themselves influenced by the arrangement (indicated in Figure 1 in the form of arrows). These include, for example, the position of the institution responsible for the participatory TA arrangement relative to other institutions and the policy - and decision-making processes; the conceptual development, and standing, of technology assessment within the wider socio-political setting; and the nature of debate and policy-making concerning the issue treated in the participatory arrangement. Depending on the situation in which a participatory arrangement is placed, these or other factors may play a more or less influencing role. In one situation, for example, a participatory arrangement may be primarily shaped by the issue-related debate, whereas in another situation intra-institutional motives unrelated to the issue at stake may chiefly influence the role of the arrangement. In again another situation, it may be a combination of various factors that determines what a participatory arrangement effectively stands for.

By introducing and implementing participatory technology assessment – whether in the form of "import", or "national innovation" – the organisations concerned pursue certain goals. Inquiring about the motives of these organisations should help identify the relevant contextual factors prompting the participatory arrangement and analyse the functional relationship between these factors and the arrangements. In turn, this should help discuss the actual role played by the participatory TA methods and, thus, the significance of introduction.

"Import"

Among the six case studies falling under the category of "import", four are consensus conferences, one is a future search conference and one a citizens' panel (see Table 2, below). Apart from the future search conference, these arrangements were all held by institutions with no previous experience of participatory technology assessment. In several cases, two or more institutions teamed up for the organisation of the arrangements. The Austrian tropospheric ozone consensus conference (1997) was organised by the City of Vienna Environment Agency in collaboration with the public authorities of two neighbouring regions. The Dutch public debate on transgenic animals (1993) was carried out jointly by the Dutch national technology assessment institution (NOTA; now the Rathenau Institute), the Foundation for Public Information on Science, Technology and the Humanities (PWT) and the consumer research organisation SWOKA. The organisation of the British plant biotechnology consensus conference (1994) was shared between London's Science Museum and one of the national research councils, the Biotechnology and Biological Science Research Council (BBSRC).

The four consensus conferences were the first ones held in the four countries concerned (and in fact the first public participatory technology assessment arrangements altogether). They were all based on the Danish model of consensus conference. It is appropriate in this context to refer to the Danish consensus conference method as a "model", as by the early 1990s, when the method began to be used outside Denmark, it had acquired paradigmatic status – that is, it was discussed internationally as a model of what public participatory technology assessment may look like.

As it happened, this model character was a decisive factor driving the introduction of the consensus conferences discussed here. In all four cases, the consensus conference was not just chosen because the method as such had over the years proven to work well in Denmark and thus yielded

valuable practical experience that could be passed on to organisations in question. Equally (if not more) important, it was chosen because it represented new innovation driving the conceptualisation of (participatory) technology assessment. In other words, one of the aims of importing the consensus conference was to emulate the Danish experience and induce a process of developing a participatory agenda in (national) technology assessment.

case study	imported method	organisation	institutional characteristics	New institutional use of PTA
Ozone AU	Danish consensus conference	Vienna Environment Agency	public inter-organisational	X
GM Animals NL	Danish consensus conference	NOTA; PWT; SWOKA	public/private inter-organisational	X
Electricity CH	Danish consensus conference	Swiss Science Council	public national TA organisation	X
Plant Biotech UK	Danish consensus conference	BBSRC Science Museum	public inter-organisational	X
Traffic Forum AU	German citizens' panel	City of Salzburg	public Local government	X
Copenhagen Traffic DK	US future search conference	Danish Board of Technology	public national TA organisation	0

Table 2. "Import" case studies (+ = previous PTA experience; - = no previous PTA experience; NOTA = Dutch national TA institution, now Rathenau Institute; PWT = Foundation for Public Information on Science, Technology and the Humanities; SWOKA = Dutch consumer research organisation; BBSRC = Biotechnology and Biological Science Research Council; TA = technology assessment; PTA = participatory technology assessment. Public/private = public/private sector organisation)

This can be seen, for example, in the Dutch conference on transgenic animals, which NOTA's staff saw as a vehicle to try out public participation in an attempt to re-orientate its technology assessment activities. Again, it can be seen in the Swiss PubliForum, which was inspired by the Danish (and to a lesser extent the other European and overseas) experience, and which sought to conceptualise Swiss technology assessment away from exclusively expert-oriented, and towards wider social, assessment. It can also be seen in the British plant biotechnology conference, although here the motivation was to bring about conceptual innovation in the "public understanding of science" movement, rather than in technology assessment itself.

As a feature of "import", the novel use of a participatory method (such as the consensus conference) to induce conceptual and methodological innovation means that that method takes on something of a different functional role in its new setting than the one inherent in the method itself. A comparison of the use of consensus conferences in Denmark with the "import" cases discussed here explains why.

Denmark: issue-driven use

At the Danish Board of Technology, the consensus conferences are used instrumentally as a method to carry out certain types of assessment. The decision to make use of the consensus conference method typically follows an elaborate, annual procedure of identifying issues to be assessed, characterising the main aspects of these issues ("the problem"), and deciding who the main "customers", or "target groups", of the assessment are. In other words, the consensus conference method (as any other method used) is chosen if and when it is deemed suitable for dealing with a specific issue that is up for assessment. This we may call "issue-driven" use. Other contextual factors, such as the furthering of the institutional standing or conceptual development, may also influence the choice of method, but they are more peripheral. Figure 2 illustrates this issue-driven use of consensus conferences in Denmark.

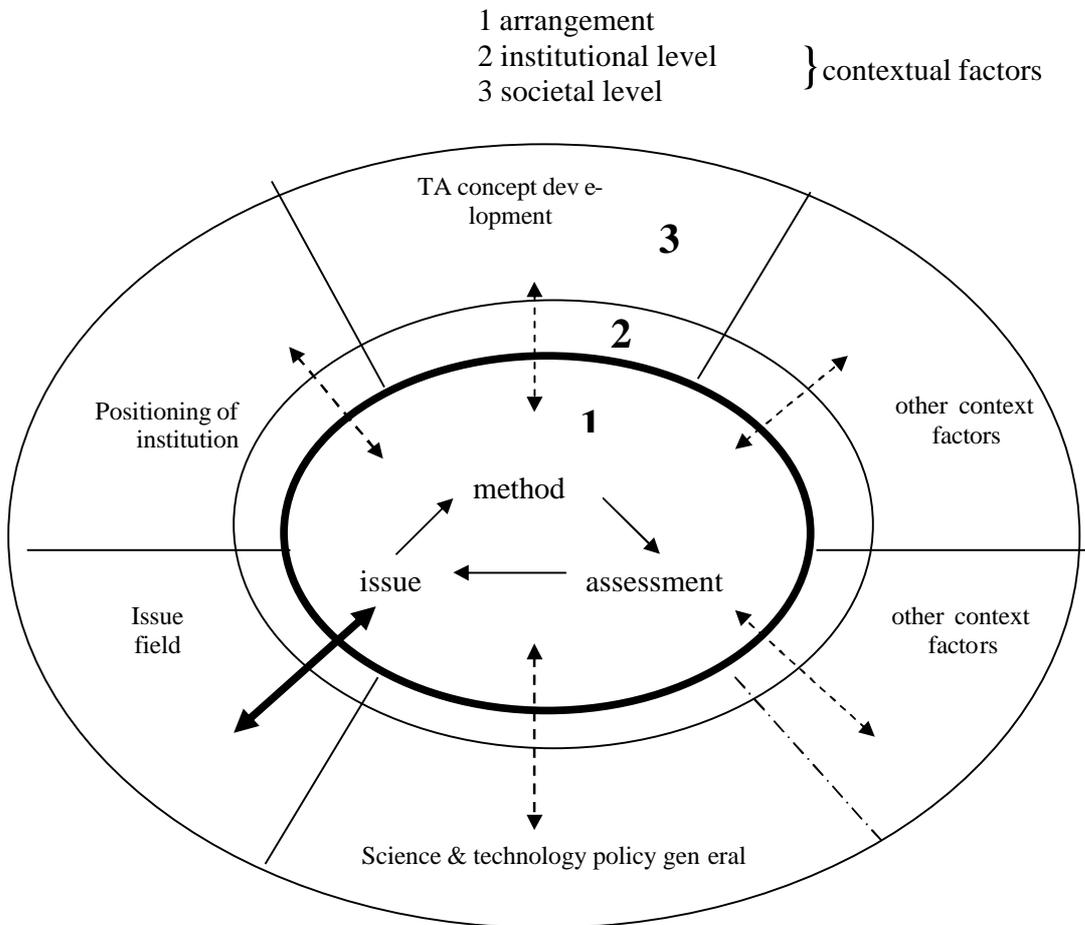


Figure 2: Issue-driven use of the consensus and future search conference in Danish context

The reason for this kind of instrumental use lies in the fact that the consensus conference method is a well-established, accepted working method of the Danish Board of Technology. The method's aims – namely to carry out social assessment, further public debate and give input into public policy- and decision-making – reflects the remit of the Board of Technology, and more generally, the Danish understanding of institutionalised technology assessment. There is, therefore, a close correspondence between the consensus conference as a particular method of assess -

ment, the working of the Board of Technology and the Danish conceptualisation of technology assessment. Because of this correspondence, the use of a consensus conference has less to do with the conceptual development of technology assessment, and more with issue -focused assessment.

It should be mentioned that in the mid 1980s, when the consensus conference method was used for the first couple of times by the Danish Board of Technology, it also had a conceptual function of developing technology assessment, beyond the issue -specific role. There was considerable uncertainty about the appropriate use of this method in more than one quarter (see, for example, Joss, 1998). As, however, the Board of Technology managed to consolidate its position in the late 1980s and early 1990s, the method became more and more seen as something "normal", a part of Danish technology assessment.

It is worth noting that the Board of Technology's import of the future search conference method was also largely issue -driven. The Board had decided to carry out a project on the issue of urban traffic (relating to Copenhagen). A main characteristic of the issue was perceived to be the "blocked" situation in the debate about how best to tackle the problem of increasing private motorism in large cities. The various social actors involved appeared intransigent in their perspectives and positions, with little substantive progress made on relevant policy. The future search conference, which aims to overcome intransigent relationships amongst different social actors, was judged to be the right method for this issue. To be sure, the Board of Technology was also interested in trying this new method, but it only did so following careful analysis of its compatibility with the issue at stake.

Britain, Netherlands, Switzerland: concept-/method-/institution-driven use

In comparison to the Danish Board of Technology's use of consensus conferences and the imported future search conference, the British, Dutch and Swiss consensus conference imports were not primarily issue -driven, but a mixture of what may be referred to here as "concept -driven", "method -driven" and "institution -driven". While in Denmark, the type of issue is central to the choice of method, in these cases first the principled decision was taken to hold a consensus conference, and only then was an issue identified for treatment in the conference. The reason, for example, for choosing transgenic animals as a theme in the Dutch public debate was said to have been the fact that NOTA had already carried out several expert assessments on this and related issues, thus providing background information that would come in handy in the conference organisation. In Britain plant biotechnology was chosen – once the decision had been made to hold a consensus conference – on the grounds that it was not as controversial as animal biotechnology. (Since the conference was sponsored by the BBSRC, the issue had to do something with modern biotechnology.) The BBSRC argued that, in order to see whether the method would work in the British context, an issue should be chosen which was not too problematic and "hot", as far as public debate was concerned.

What, then, was primarily at the centre of the decision to import the consensus conference model, was the motivation to induce the further conceptual development of technology assessment (or, in the British case, the public understanding of science) and to try a new method (see discussion, above). This motivation was enhanced by the concurrent aim to improve the standing of the organisations responsible for holding the conferences ("institutional profiling"). In Britain, for example, the BBSRC had been asked, alongside the five other research councils, to start up public understanding of science (PUSET) activities, as a result of a governmental decision in

1993 to make Puset part of official research policy. The Science Museum, on its part, was interested to develop Puset further, in response to criticism that the movement was too elitist and expert-driven. In the case of the Dutch conference, NOTA was hoping to get more widely known, as it was perceived to be known only to a relatively small community of policy analysts. Equally, PWT saw the conference as a good opportunity to translate its remit into practice. In Switzerland, the national technology assessment programme at the Swiss Science Council was still relatively new when the decision was taken to hold a consensus conference, and one of the aims of the PubliForum was to make the programme better known to a wider audience both in politics and the wider public.

This concept-, method- and institution-driven use does not mean that the choice of issue did not matter. Selecting an appropriate theme for treatment in a consensus conference is obviously important, in order to use the conference as a means of bringing about conceptual and methodological innovation. Considerable thought went into the choice of issue (more so, it would seem, in Switzerland than in Britain and the Netherlands), but this was nonetheless secondary to the principled choice of the consensus conference as a technology assessment project.

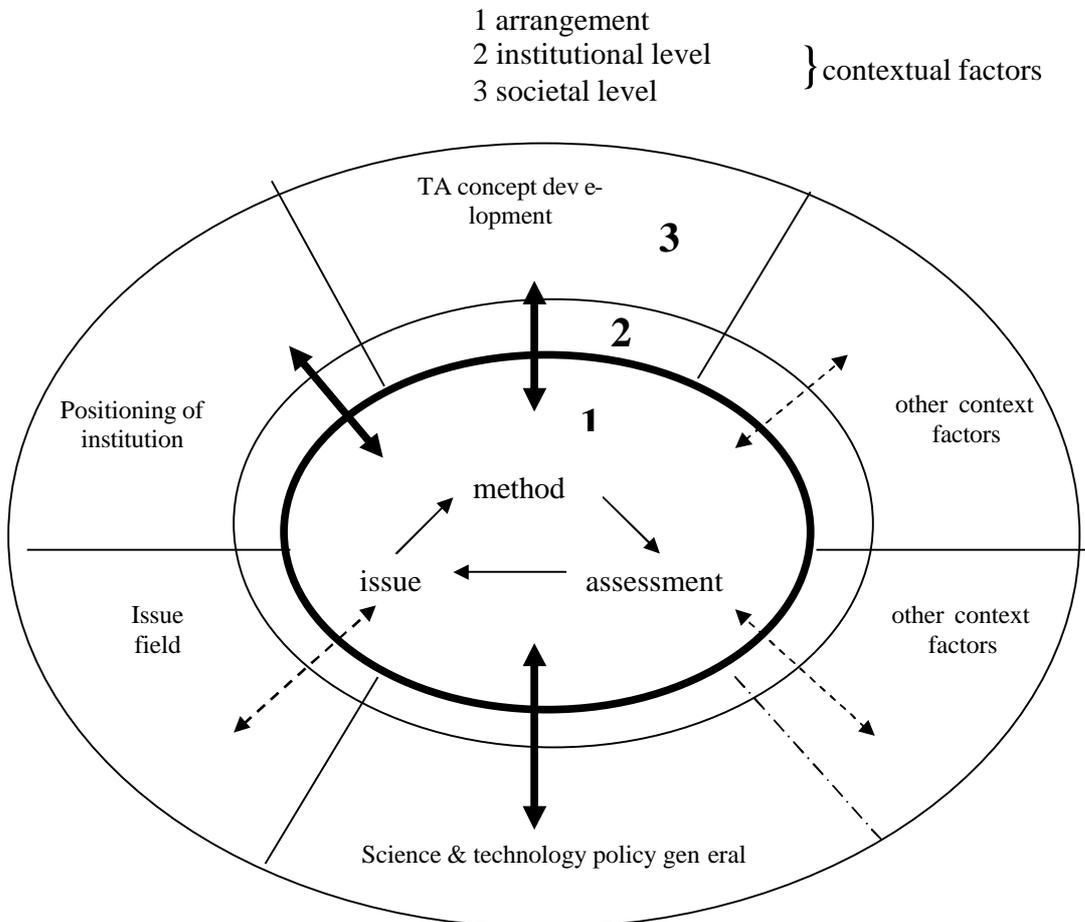


Figure 3: non-issue-driven use of CCs in "import" cases.

Figure 3 illustrates the aforementioned contextual factors that lay behind the import of the consensus conference model in Britain, the Netherlands and Switzerland. Comparing Figures 2 and

3, then, shows that there is a difference of emphasis between the Danish cases, on the one hand, and the British, Dutch and Swiss cases, on the other, as far as the contextual factors that drove the use of the participatory arrangements are concerned. This difference is mirrored in the actual roles reported in the case studies. While in Denmark, the future search conference's function was said to have been mainly in relation to the issue (as has been the function of most consensus conferences, as reported elsewhere; see, for example, Klüver, 1995; Joss, 1998), in Britain, the Netherlands and Switzerland the role of the consensus conferences was said to have been, through the treatment of specific issues, mainly in relation to the conceptualisation and methodological development of participatory technology assessment and institutional profiling.

The British case, for example, showed that the conference had hardly had any substantive effect on the (social) assessment of plant biotechnology and the related policy debate (let alone policy-making). It did, however, turn out to have considerable effect on the development of the official public understanding of science in initiative and the discussion of science and technology policy. In the Netherlands, too, the conference was reported to have had little impact on policy-making relating to transgenic animals (especially since the conference had taken place after a relevant decision on the issue had been taken in Parliament). Again, however, it was reported to have been something of a turning point in Dutch technology assessment development.

Considering the institutional situation of the cases concerned, it appears that the import of a participatory method into a well-established institutional context with existing experience of participatory technology assessment, such as in Denmark, is mainly issue-related, both in terms of the underlying motivation of the organisers and the actual role of the arrangement. In contrast, an import into an institutional and societal context with limited or no such prior experience, such as in Britain, the Netherlands and Switzerland, is less issue-related and more concept-, method- and institution-related.

This shift of emphasis does not seem to be problematical in the sense that an import into a new environment does not render the participatory arrangement less useful than its deployment in an existing participatory technology assessment context; it simply means a relative shift of function. So, while arguably not greatly influencing the substantive, issue-related assessment and discussion, the British, Dutch and Swiss consensus conferences nevertheless appear to have functioned as important driving-forces regarding (national) technology assessment development.

At the same time, however, this shift of emphasis may be problematical, so far as the issue-related assessment is concerned: those participating as experts or citizens in the reported consensus conferences did quite naturally have considerable expectations (of one kind or another) vis-à-vis the issues discussed. While for the organisers a relative lack of issue-specific relevance of the imported method, although disappointing, is made up by the conceptual, methodological and institution-specific relevance, for participants such a lack may be more serious. The evidence of the case studies does in fact point to this problem. In Britain, for example, both experts and lay panellists complained that the issue did not seem to fit into wider debate and the assessment resulting from the conference was not subsequently taken up by the relevant policy-making institutions – that is, the aim of carrying out social assessment and policy advice, inherent to the consensus conference model, had not really been achieved. It would seem important, therefore, that this (potential) problem is borne in mind when importing a participatory method into a new context.

Austria: issue-driven use in new institutional context

The Austrian ozone consensus conference and the Salzburg traffic forum are interesting cases not least because they represent an issue-driven use of imported participatory methods in institutional contexts with no prior experience of participatory technology assessment. Neither was linked to a technology assessment institution (both were local government bodies); thus they were not utilised to drive the conceptual development of participatory technology assessment. Arguably, they may be said to have been used for methodological innovation, but only to the extent that this furthered the aim of carrying out issue-specific policy assessment.

This absence of a clear concept- and method-driven motivation, therefore, seems to have been due to the particular institutional settings of the two arrangements. In addition, it may also have been due to the apparent lack of interest in the issue of (this kind of) public participation in the Austrian socio-political context. Consequently, the organisers may have concluded that emphasising the conceptual dimension of public participation could reduce the chances of the imported methods gaining (political) credibility as a means of achieving effective policy analysis.

Interestingly, the reported limited issue-related effectiveness of the two cases (despite their issue-driven underlying rationale) may precisely have had to do with the fact that they were set within institutional contexts that were not used to participatory technology assessment methods as a form of policy analysis and advice. By the same token, the lack of concept- and method-related innovation drive, appears to have prevented the two arrangements from having a noticeable effect, beyond the arrangements themselves, as initiators of participatory technology assessment development. Furthermore, by more or less leaving aside the conceptual dimension within an institutional context of relative inexperience of public participation, the two cases risked falling victim of political instrumentalisation. The consensus conference, for example was used (at least in parts) by the regional authorities involved as a means of putting pressure on federal government to implement a tropospheric policy programme.

In conclusion of the above analysis, the introduction of participatory technology assessment in the form of "import" can be tentatively summarised as follows (see Table 3, for comparison): in situations with no prior experience of participation, the import of a participatory method is often strongly motivated (on the part of the organisations involved) by the aim to further the conceptual and methodological development of technology assessment. As a consequence, the arrangement's issue-related function is somewhat limited (see British, Dutch and Swiss case studies). In contrast, the import of a participatory method in a context where there is an existing, positive experience of participation, the arrangement's motivation is more issue-driven (and less concept-driven), as is its actual role (see Danish example). Finally, an import of a participatory method in a context with no relevant previous experience may show comparatively little effectiveness if the use of the method is issue-driven, with no, or only little, motivation to induce conceptual and methodological innovation.

Table 3: Motivations/intentions of "import" of participatory methods (+ = limited; ++ = moderate; +++ = important/main)

Case Study	issue-driven	Concept-driven	Method-driven	Institution-driven
Ozone AU	++	++	+++	++
GM Animals NL	+	+++	+++	+++
Electricity CH	+	+++	+++	+++
Plant Biotech UK	+	+++	+++	+++
Traffic Forum AU	+++	+	+	++
Cophg. Traffic DK	+++	+	+++	+

Import as a means of overcoming resistance

The issue-, concept-, method- and institution-driven motivations underlying the import of participatory methods of technology assessment have been explained in the previous sections with the status of the organisations involved (whether they have existing experience of participation or not, whether they are technology assessment institutions or not, etc).

Additionally, the EUROPTA case studies discussed here point to another aspect that helps explain the phenomenon of import: (institutional) resistance towards participatory technology assessment. It would appear that where there is considerable resistance, either within or outside the organisation concerned, the import of an elsewhere well-established, tried participatory method can help overcome that resistance.

Take the example of the British consensus conference. The idea of public participation was met with resistance both from within the organisation (especially on the part of the BBSRC, which would probably not have committed itself to funding the conference, had it not been for the great enthusiasm of its chief executive, which outweighed the relative reluctance by the middle management) and from influential sections of the political system (several representatives of which let it be known to the organisers that such technology assessment had not much of a place in the British political system; if anything, it would have to be directed at public debate). Using the consensus conference model, the organisers could refer to the Danish experience, thus reassuring the sceptics that this was a well-established, respectable method of public participation. Following the conference, the earlier resistance seemed to abate somewhat (though not completely), and the discussion of the role of participatory technology assessment in the British context became more relaxed and pragmatic.

In the Swiss case, too, the fact that the PubliForum was modelled on the Danish consensus conference helped "break the ice". There were lingering doubts in certain quarters within the Swiss Science Council about the usefulness of public participation as a form of technology assessment. The reference to the long-standing Danish and other foreign experiences helped overcome such

doubt. In wider public debate (as reflected, for example, in media reports), too, the knowledge that the consensus conference was used as a matter of course elsewhere helped the argument in favour of trying out the method in Switzerland.

Resistance was also reported in the Dutch case study, where it was noted that NOTA's board of governors did not at first want to sanction the use of the consensus conference method, arguing that this did not represent proper technology assessment. (The board could eventually be won over, after PWT had agreed to act as co-organiser.) NOTA's staff, however, had attended a consensus conference in Denmark (notably on transgenic animals) and reported back that it seemed to work there. In retrospect, that conference was said to have been a turning point in Dutch technology assessment, which has since developed a strong participatory tradition.

Table 4. Resistance and individual push in "import" cases. ("resistance" = resistance towards participatory technology assessment within and/or outside organising institution; "individual push" = enthusiasm of individual(s) relevant for driving import; - = low; + = medium to high)

case study	Resistance	individual push
Ozone AU	+	(+)
GM Animals NL	+	+
Electricity CH	+	+
Plant Biotech UK	+	+
Traffic Forum AU	-	+
Copenhagen Traffic DK	-	-

Table 4 gives an indication of the "resistance" dimension. Not surprisingly given the long-standing experience of participatory technology assessment and the issue-related emphasis in Denmark, the future search conference is the one example in the category of imports which appears to have met with the least amount of resistance.

The Swiss, Dutch and British cases also show that where there is resistance towards public participation in technology assessment, the introduction of participatory methods is made easier if there are enthusiastic individuals that push for an import.

Summary

In summary of the analysis of "import" cases, the following three overall observations can be made: first, "import" as a form of introduction has been shown to be quite useful as a process of inducing conceptual innovation in (participatory) technology assessment, both at the methodological and the institutional level. This is particularly the case where there is a need for a "role model" – that is, where participatory technology assessment is as yet not well-established and accepted and where there may be considerable resistance; in short, where the climate is not entirely ready for "going it alone" (say, by designing one's own method). In this situation, importing a participatory method is particularly attractive, since, on the one hand, it has been shown to work elsewhere and, on the other, it comes with a certain built-in role that can be (tried to be) emulated. Import, in this context, may also help induce institutional change and re-orientation.

Again, the reference to "success" in other institutions can help overcome resistance. However, the issue-related function of such imports may be rather limited.

Secondly, where a participatory method is imported into a well-established participatory technology assessment context, the above observation does not hold: the import here is not so much about institutional profiling and conceptual development. Instead, the import serves the issue-related use of a method. In other words, the aims inherent in the method are more specifically applied to the issue under consideration.

Finally, the import of a participatory method by institutions with no previous experience in the field seems least effective if the import is not linked to a conceptual and methodological debate (within the organisation and beyond) about the issue of public participation. Furthermore, in the absence of a proper conceptual basis, such import risks being instrumentalised for political purposes.

What lessons can be learnt from these observations in terms of the design and use of participatory technology assessment methods? This question is addressed in the concluding section of this chapter. First, the "national innovation" cases need analysis.

"National innovation"

Compared to the "import" case studies, among the cases featuring under the category of "national innovation" there is more conceptual, methodological and institutional variety. Table 5 summarises the main characteristics of these various cases, which have in common that they represent participatory methods that were either designed entirely from scratch or by combining elements of different existing TA methods.

The two Dutch arrangements, Gideon [Gideon NL] and Novel Food [Novel Food NL], were based on what in the Netherlands has been conceptualised as "interactive TA", and "consumer constructive TA", respectively (for information on these concepts, see Grin, v.d. Graaf & Hoppe, 1997; and Hamstra, 1995). Both arrangements were a combination of participatory methods with conventional TA methods. They were part of two larger projects involving stakeholder as well as consumer groups. They differed from one another in relation to their respective aims, conceptualisations and institutional embedding. The concept of the Novel Food project was designed by STD, a governmental program that acquired the status of a temporary 'think tank' to promote sustainability, and realised by SWOKA. The Gideon project was arranged by the Rathenau Institute.

The Urban Ecology [Urban Ecology DK] arrangement was carried out by the Danish Board of Technology. It was based on the "scenario workshop" method, which the Board of Technology had not used before. In designing the scenario workshop method, the Board of Technology was inspired by the method of "future workshop" (*Zukunftswerkstätte*) which had been developed in Germany by Robert Junk et al. (see, for example, Bischoff, Selle & Sinning, 1996). The scenario workshop distinguishes itself from the future workshop method, among other things, in respect of the number of localities involved (four local workshops, rather than just one) and the type of interaction among participants (exchange of views between participants of all four workshops, as well as within each local workshop). Like the imported future search conference [Copenhagen Traffic DK], the scenario workshop represents the use of a new participatory method within an institutional context with ample experience of participatory technology assessment. So

does the voting conference [Drinking Water DK], which was designed by the Danish Board of Technology from scratch.

Case study	Method	organisation	institutional characteristics	new institutional use of PTA
Delphi AU	Delphi	ITA	public national TA organisation	X
Drinking Water DK	Voting Conference	DBT	public national TA organisation	0
Urban Ecology DK	Scenario Workshop	DBT	public national TA organisation	0
Discourse GMP GE	Stakeholder Discourse	WZB	private scientific research org.	X
Gideon NL	Interactive consumer TA	Rathenau Institute	public national TA organisation	0
Novel Food NL	Future Visions on Consumers	STD SWOKA	public governmental think tank consumer research org.	0
Gene Dialogue CH	Citizens Panel	Ad hoc project committee	public inter-organisational	X

Table 5: "Innovation" case studies (Abbr.: ITA = Institute of Technology Assessment, Austrian Academy of Sciences; DBT = Danish Board of Technology; WZB = Wissenschaftszentrum Berlin; TVC = Future Visions on Consumers; STD = Interdepartmental Research Programme on Sustainable Technology Development; SWOKA = Dutch consumer research organisation; public/private = public/private organisation)

The Austrian Delphi initiative [Delphi AU] was a blending of the established, expert-focused method of "technology foresight" with certain participatory elements. It was carried out by the Vienna-based Institute of Technology Assessment, a national TA organisation based at the Austrian Academy of Sciences. As the Institute of Technology Assessment has traditionally been geared more towards the "classical", expert-oriented model of TA, the Delphi project represented new methodological innovation. The Swiss Gene Dialogue [Gene Dialogue CH] project embodied yet another methodological approach to public participation. It combined lay participation (based on the consensus conference model) with stakeholder participation (loosely based on the model of co-operative stakeholder discourse). It was instigated by a Member of the Federal Parliament and organised by an *ad hoc* coalition of prominent individuals and institutional representatives working (more or less closely) with issues relating to genetic testing.

Finally, The German Discourse initiative on genetically modified plants (GMP) [Discourse GMP GE] also falls under the category of national innovation. It was designed as a social science research project, which actively involved various stakeholders in the assessment of aspects of risk

relating to the release of genetically modified crops into the environment. It was co-ordinated by the Berlin Science Centre (*Wissenschaftszentrum*), with the support of other research institutions.

In summary, some of the participatory methods featuring under "national innovation" combined lay and stakeholder participation [Drinking Water DK, Urban Ecology DK, Gene Dialogue CH]. Others involved stakeholders only [Delphi AU, Gideon NL, Novel Food NL, Discourse GMP GE]. Interestingly, the term "stakeholder" was defined more or less broadly in these cases, thus involving various kinds of social actors (in the Dutch Novel Food initiative, for example, consumers participated as stakeholders, whereas in the German Discourse GMP only professional interest groups were involved). In three cases, the institutions responsible made use of participatory methods for the first time [Delphi AU, Discourse GMP GE, Gene Dialogue CH], while the Danish and Dutch organisers had previously used participatory methods.

Issue-driven use

The analysis in the previous section showed that, depending on the level of institutional, and wider national, experience of participation in technology assessment, the import of a participatory method can be more or less issue-, method-, concept- and/or institution-driven. Roughly, an imported participatory arrangement tends to be more concept- and method-driven when instigated by an institution with no prior experience, while an arrangement is usually more issue-driven when imported by an organisation with existing experience of public participation.

Interestingly, as far as the national innovation case studies are concerned this observation does not fully hold (see Table 6, below). Across the institutional spectrum covered by the cases concerned, the motivations behind, and the aims of, the various arrangements appear to have been largely issue-driven. Regardless of whether or not the institutions responsible had experience of holding participatory initiatives, these cases were primarily designed and organised around the issues chosen. Needless to say that method-, concept- and institution-related motivations did also come into play, but these were secondary to the issue-related aims. With respect to our figures in the previous section, the national innovation cases thus followed a pattern similar to that of the issue-driven consensus conferences in Denmark (see fig. 2 in the previous section on imports).

Take the examples of the Dutch Gideon [Gideon NL] and Novel Food [Novel Food NL] arrangements. Here, participation was integrated into the assessment first and foremost as an instrumental tool to enable a certain kind of analysis. The Gideon initiative, for example, aimed at analysing and developing various policy options regarding the furthering of sustainable crop protection practice, for which the perspectives and assessments of relevant social actors were sought.

The national innovation cases, then, were generally less about the normative-conceptual and methodological development of participatory policy analysis and technology assessment *per se*. In this respect, the Swiss dialogue on genetic testing initiative [Gene Dialogue CH] was something of an exception: although it was strongly issue-driven – it was designed to fit into the official process of stakeholder consultation in relation to proposed new legislation on genetic testing – it also aspired to explore new methodological ways of extending stakeholder dialogue and consultation.

The three national innovation cases held by organisations with no prior experience of participation [Delphi A, Discourse GMP GE and Gene Dialogue CH] were also less about enhancing institutional standing, compared to the import cases held by institutions with no experience. The

Austrian Institute of Technology Assessment made use of a participatory methodology because this was deemed to suit the aim of the technology foresight exercise. As the issue of (citizen) participation in technology assessment has not been particularly favoured in Austria, its strategic use as a means of institutional profiling could even have backfired.

Table 6: Motivations/intentions of "innovation" cases (+ = limited; ++ = moderate; +++ = important/main)

Case study Country	Issue-related	methodological	conceptual	institution-related
Delphi AU	+++	++	+	+
Drinking Water DK	+++	+++	+	+
Urban Ecology DK	++	+++	+	+
Discourse GMP GE	++	++	++	+
Gideon NL	+++	++	+	+
Novel Food NL	+++	++	+	+
Gene Dialogue CH	++	++	++	++

In the case of the German Discourse GMP arrangement [Discourse GMP GE], this was conceived of as a social science research project, which fit in well with the Berlin Science Centre role as a reputable research establishment. Hence, institutional profiling was not much of an issue (though the project managers may well have sought to enhance their personal reputation). Institutional positioning was also no particular motivation behind the Swiss Gene Dialogue initiative [Gene Dialogue CH], as it was organised by a broad coalition of interested parties which dissolved once the initiative had been accomplished. It seemed, however, to have been motivated by the long-standing interest of its instigator, a Member of the Federal Parliament, to make a contribution to the development towards greater public participation in science and technology policy analysis.

Why national innovation?

As far as the four national innovation cases held by experienced institutions are concerned [Drinking Water DK, Urban Ecology DK, Novel Food NL, Gideon, NL], these pursued the aim of trying new methods, though not as a goal in itself, but as a means of achieving a particular, issue-related assessment. These cases, then, indicate that with growing institutional experience, in the course of which participation seems to assume more of an issue-related instrumental role (and less of a conceptual one), new participatory methods are increasingly designed in-house, thus making them directly responsive to the kind of analysis sought.

The three other national innovation case studies [Delphi AU, Discourse GMP GE and Gene Dialogue CH], however, also show that those institutions with no prior experience of participation succeeded – albeit perhaps in less sophisticated ways – in designing new participatory forms, too. Why did the latter not import existing methods instead, which might be considered a "safer" way of introducing participatory technology assessment?

There seem to be two kinds of reasons why an institution with no prior experience of participatory technology assessment should choose to design its own participatory method. One is that because the issue of participation in technology assessment has already been explored by other institutions in the same national context, the institution in question receives sufficiently broad support, and thus feels confident enough, to come up with an in-house, issue-tailored method. The Swiss Gene Dialogue initiative [Gene Dialogue CH] is a case in point: it was carried out following the successful, first use of a participatory technology assessment arrangement – namely the Swiss Science Council's PubliForum [Electricity CH]. The organisers were inspired by the PubliForum and used it as a point of reference, stating in which respect the Gene Dialogue differed from the PubliForum. It is likely that several of the 17 institutions making up the *ad hoc* organisation would not have agreed to back the Gene Dialogue initiative had not the reputable Swiss Science Council led the way with its arrangement. At the same time, the Member of Parliament instigating the dialogue initiative – whose advocacy for the initiative was essential to get it off the ground – did not simply wish to duplicate the PubliForum, but blend different methodological elements (lay and stakeholder participation) to suit the analysis of the issue of genetic testing within the context of public consultation relating to law-making.

The other reason – manifest in the Austrian Delphi [Delphi AU] and the German GMP arrangements [Discourse GMP GE] – is that by coming up with a method of its own, an institution can adapt participation to suit a particular cultural/national context, thus overcoming possible (external) resistance. The Austrian Institute of Technology Assessment would reportedly have stood little chance of importing, say, the consensus conference method, given the sustained reluctance of the relevant institutions to consider lay participation in policy analysis and technology assessment. Instead, modifying a conventional method (the technology foresight) with stakeholder participation to suit a particular analytical goal allowed the Institute of Technology Assessment to explore indirectly the issue of participation. Put differently, opting for a more moderate, system-friendly type of participation – as stakeholder participation arguably is compared to lay participation – may be the only way open to introducing participation in situations where the import of foreign, "system-alien" methods of participation would otherwise be too strongly resisted.

For the above reasons – existing familiarity with the issue of participation, as in the Danish, Dutch and Swiss examples [Drinking Water DK, Urban Ecology DK, Novel Food NL, Gideon NL, Gene Dialogue CH], or system-friendly adaptation, as in the Austrian and German examples [Delphi AU, Discourse GMP GE] – the level of resistance against the idea of participatory technology assessment generally appears to have been lower in the national innovation cases than in the import cases (see Table 7, and Table 4, for comparison).

As national innovations tend to be more issue-focused and the level of resistance may be less pronounced compared to imports, their actual role could be expected to be more directly issue-related. This appears to have been the case as far as the relevant EUROPTA arrangements are concerned. Even in the case of the German Discourse GMP [Discourse GMP GE], which was reported to have been fraught with methodological and procedural problems and which did not have a link to relevant policy-making, the arrangement's role was reported to have been predominantly issue-related.

Case Study	Resistance	Individual push	new institutional use of PTA
Delphi AU	(-)	-	X
Drinking Water DK	-	-	O
Urban Ecology DK	-	-	O
Discourse GMP GE	(-)	+	X
Gideon NL	-	-	O
Novel Food NL	-	-	O
Gene Dialogue CH	(-)	+	X

Table 7. Resistance and individual push in "import" cases ("resistance" = resistance towards participatory technology assessment within and/or outside organising institution; "individual push" = enthusiasm of individual(s) relevant for driving import; PTA established = previous PTA experiences in the country; - = low; (-) = some; + = medium to high)

4.2.2 Summary

The national innovation category covers various kinds of participatory arrangements: from the completely newly developed method, such as the voting conference [Drinking Water DK], to the cautious modification of conventional assessment tools, such as the participatory technology foresight [Delphi AU]; and from the arrangement involving a broad range of stakeholders (including lay people), such as the scenario workshop [Urban Ecology DK], to the one involving professional interest group representatives only, such as the German Discourse GMP.

Compared to the import cases, these arrangements are mostly issue-driven, and less so concept-, method- and institution-driven. This seems to be, on the one hand, the result of institutional and wider national experience – as in the Danish, Dutch and, to a lesser extent, the Swiss cases – where participation has assumed a reasonably normal status as one of various tools of policy analysis and technology assessment, and thus the focus of attention is on the issues under consideration. On the other, it seems the result of a cautious, slow approach to opening up expert-oriented assessment – as in the Austrian case – where participation is still largely considered incompatible with the prevailing system of policy analysis and technology assessment, and thus its introduction is best achieved by rendering it directly functional to the issue-related assessment. In the latter case, stakeholder participation seems more viable as a way of opening up conventional assessment procedures, as this is more "system-friendly" than lay/citizen participation which often acts as a counter-point to expert analysis. For the above reasons, then, external resistance against the idea of participatory technology assessment was generally lower than in most import cases.

4.2.3 Conclusions

Ten, fifteen years ago, there were many doubting voices about the feasibility of public participation in policy analysis and technology assessment. The idea of participation was mostly critically commented on, dismissed as unrealistic, and more often than not actively resisted by relevant institutions and commentators. It often took a great deal of enthusiasm of individuals for a participatory initiative to be set up and implemented successfully. And yet, ten years on and the

European landscape of policy analysis and technology assessment seems to have changed remarkably. While only a decade ago, there were just a small number of institutions actively pursuing participatory initiatives, nowadays there are dozens of organisations and individuals engaging in such activities. To be sure, there are still critical voices, and public participation is by no means fully established in institutional technology assessment; but the issue has certainly moved more centre-stage.

An important finding of the EUROPTA analysis is that the introduction of participatory technology assessment in various national and institutional settings has actually worked rather well. With the benefit of hindsight, this may seem like stating the obvious, but in the past there were many who insisted that participation had no place in science and technology policy analysis or simply could not work. The latter view seems to have been confounded.

The analysis in this chapter shows that in most of the cases participatory arrangements could be carried out more or less as intended. No doubt, the institutions involved faced various kinds of difficulties, but these appear to have been due as much to managerial problems (such as short timing, limited funding, insufficient participant recruitment etc) as to system-inherent incompatibilities (such as lack of participatory tradition, expert-dominated policy-making, institutional resistance etc). What seems pivotal for participatory technology assessment to be taken up by countries and institutions with no prior experience in the field is the dedication and willingness of either individuals or institutions to try this, against whatever odds. Such preconditions are given, as several EUROPTA cases show, when there is considerable pressure brought to bear on the system of policy analysis and technology assessment to open up and re-orientate itself, and/or when other institutions and countries can point to positive experiences.

As a broad generalisation, the analysis of the EUROPTA cases suggests two different ways in which participative technology assessment has entered the various national scenes. On the one hand, the institution responsible chose to import an established and well-proven method, mostly the model of the consensus conference. This proved to help considerably in initiating a process at the end of which it became obvious that trying PTA is worth the effort. It was a "safe bet", since the institution could legitimately point at successful applications of the method in other countries. This proved to be a valuable asset especially in situations where there was no existing experience in a country or within an institution. However, importing an established method proved to entail a relative shift of aims: whereas the PTA arrangements in the country of origin made use of the method in an issue-related way, those in the importing countries mostly emphasised concept-, method- or institution-related aspects. This is not a problem as such; it just means a relatively different role of the respective arrangement as compared to the country of origin. It also means that this shift of roles has to be taken into account if an import is considered in order to initiate the introduction of PTA in a country.

Clearly, import can help to overcome resistance and scepticism. In countries where decision making, and, often mirroring its political culture, also technology assessment tend to be rather expert-oriented, the import of a method that had already proven to "work" in other places served to "break the ice". In order to do so, a certain challenge might have been necessary to open up for new approaches. In the case of the consensus conferences, this challenge was often the involvement of lay people in technology assessment, as well as the method's main orientation towards the general public.

On the other hand, if the institution responsible were too opposed to lay PTA, the import of such a method would not work. On the contrary, it needs a certain dedication from the side of the i n-

stitution, and often from individuals in particular, to carry through the idea of participatory technology assessment against resistance and scepticism. Where a country, or a responsible institution, would not be ready for an "import" and the challenges it would entail – that is, where resistance to the idea of PTA is still quite high – careful, step-by-step adaptation and modification of established, more traditional TA methods, linked to the issue at stake, might be the only way of slowly opening up the system to participation. In the latter case, participation tends to start off as stakeholder involvement, as this is more closely related to traditional, expert-style analysis within technology assessment, and it is easier to orient the assessment towards a more restricted public or professional arena. In many cases it is easier to convince sceptics of the merits to gradually widen the range of those that (legitimately) may have a stake in an issue as compared to arguing for lay participation.

If an arrangement has finally been carried out, and, especially, if established and well-respected institutions and/or individuals endorse participation in TA, then the further development of PTA may follow. This marks the second step in national innovation: after one or several successful "imports" have taken place, the climate in the particular country may have grown more conducive to PTA, which then allows for carefully designed experiments. Such "experimental" national innovation presupposes a certain amount of institutional confidence; where this is high, totally new methods can be developed, which tend to be issue-focused.

This generalisation of (two possible) introductory modes should not be understood too rigidly, as the reasons behind the decisions to go down one or the other way are far more complex and related to specific national, institutional or even individual circumstances. The analysis, therefore, cannot offer definitive practical guidance as to whether an institution wishing to start using PTA should import or design a method itself. As the analysis of the variety of approaches taken in the EUROPTA cases has shown, there is no such thing as the golden way to successfully introducing and implementing participatory technology assessment. However, there is a lesson to learn from the various cases: even if the approaches may differ, one common and essential precondition for the introduction of PTA is dedication.

4.3 Project Management

- a matter of ethics and robust decisions

Lars Klüver*

It is in the project management, we find the “flesh and blood” of PTA. When a project has been decided, a project manager gets in charge, and what before could be seen as “institutional settings”, “national culture” and “innovation systems”, suddenly becomes very real - it becomes OK or not OK - and in the latter situation something has to be done.

Project management has to work with problems at macro as well as micro scale. The macro scale can be thought of as the project managers’ fight with the monsters - the national culture, the employer institution, the project organisation, and the project external world. The micro scale is the manager’s nursing of his surroundings - the handling of day-to-day problems, process emergencies, and the single persons in the project. Although in the analytical framework we have separated between these scales, from a project management perspective we will not make this distinction. Rather, the two scales are seen as they appear in the daily project manager life: hard to separate.

“Best practise” in technology assessment is a concept that has to be seen from many sides. What is best depends upon the circumstances - the topic, expectations, resources etc - and there is seldom only one good solution to a certain project management problem in TA. Many factors matter when a management problem has to be solved, and the evaluation of what matters the most will be crucial for taking the right decision. It follows that there are no such thing as universal management solutions; that is, no universal methods, no advice that works in all situations. But the lack of universal answers is not the same as if there are no answers at all, and it certainly is not the same as to say that there are no such things as wrong decisions. Hopefully, this paper will contribute to the understanding, that there indeed are decisions in project management that are better than other decisions.

It might be stated, that the most important competence for project management is the ability to choose the most robust and efficient solution. Given the often many-sided aims and considerations of the project, an overwhelming amount of influencing factors, a host of uncertainties and some universal claims for good participation practice.

Methodology in PTA is a rather new discipline, if such one can be defined as “the theory and practise of PTA methods”. The practise of these methods in many countries is less than five years old, and in few countries less than 15 years old. The theory is even more at a basic level, although developing fast these days. This leaves PTA management with a very thin support, and the challenges that management meets has to be handled very much intuitively or with exper i-

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ence as the most important reference. An intention with this text is to contribute to a broader set of references.

The aim of this chapter is to help clearing the road for better practice in participatory technology assessment in the future. The starting point for that expedition is not disheartening at all. Taking into account the relatively short history of PTA, our case studies leave the general impression that European practices in this field in general are of a high standard. Let this be stated once and for all, and let us then head for even better practices in the future.

4.3.1 Ethics of project management

Evaluating what is good/bad or right/wrong obviously has a problem of reference in it. In the context of participatory TA methodology, the principles of *discourse ethics* may serve as a frame for discussing best practice. Basically, if the deliberations in PTA do not live up to certain discourse ethical standards, the meaning of setting up participation vanishes. Because 1) deliberations must follow certain ethical rules in order to respect the participating individuals, 2) because credibility of a debate is closely related to the ethical quality of the debate, and 3) because the impact of TA is closely related to the credibility of the institution as well as the process⁴.

What discourse ethics is can give rise to many and long debates. In order to give some impression of a possible standard, the following bullet points can serve as a reference for the evaluation of project management in our cases.

Discourse ethical processes may be characterised by the following features⁵:

- Striving for an equal empowerment of the participants (equality)
- Based upon proper information (enlightened)
- Fair with regards to interpersonal relations (fair)
- Restrictions to the scope of viewpoints are kept to a minimum - the participants sets the agenda themselves (open-minded)
- Processes are self-documenting, and striving to be communicative, so that the need for interpretations are kept at a minimum (authentic)
- Rules of communication (formal or informal) are known and accepted by participants (transparent)
- All affected parties are invited into the dialogue - none is left out with purpose (legitimacy)

In practice, of course, it is very difficult to set up processes fulfilling this standard. Alone the difference in empowerment of the involved actors is a reality in our societies that cannot be taken away by setting up a PTA project. However, that must not be used as an excuse for not trying to optimise TA processes with regards to discourse ethics.

⁴See chapter on "The political role of participatory technology assessment".

⁵The list should be read as the authors own assemblage of discourse ethical criteria often found in the discussion of the quality of debates.

Discourse ethics have been put forward as a societal ideal, more or less as a synonym to democracy. “Bottom-up policies” on empowering the powerless have often been unconnected from their outcomes, and seen as good in themselves. The “master-free dialogue” in the Habermasian sense has the function of bringing in more and new rationales into the societal dialogue, because this would serve ourselves with conclusions that come nearer to the truth. Although there are many good things to say about such ideals, it is important to stress that the inclusion of discourse ethics as a standard for project management of PTA does not necessarily take its starting point in a societal ideal. Rather, discourse ethics in project management finds its reason in a much more *instrumental* approach: PTA can make a difference if it can serve the technology debate with “rooms of discourse” which have a high standard with respect to ethics, and accordingly gains high credibility and trust.

The instrumental role of discourse ethics in PTA covers the whole spectrum of purposes of TA. An open and fair discourse brings a *cognitive* value into TA due to the many-sided input and the deliberations of the participants. Most PTA processes make use of techniques that encourage the participants to search their own values and opinions in order to bring them into the debate – as a reality or a fact, which the other participants have to learn to know about and accept. The consensus conferences may be taken as one example.

There seems however to be a thin line between the *cognitive* and the *normative* input that the participatory processes deliver. The broader scope – or what could be called the personification of opinion – which is brought about by participation, on the one hand serves as a fact for the common process in the participatory exercise, and on the other hand, may serve as a highly *normative* input too. The mutual search for knowledge about each others’ points of view brings, as an unavoidable companion, the knowledge about differences in values and interests. One of the specific qualities of PTA, as compared to more traditional analytical TA, may be the capability of broadening the cognitive scope by mediation of knowledge and understanding of the norms and values in play. However, in order to get that far, the participants have to engage in and give trust to the process, and the features that make them engaged and trustful may well be the open-mindedness, authenticity and transparency of a well designed PTA project. Many workshop methods do have these ethical qualities, for example.

The *pragmatic* purpose of PTA can hardly be brought about without discourse ethics being prominent characteristics of the process. The pragmatism is closely related to the negotiation, the mediation and the common ground found during the process. And the fact that the outcomes of process, in terms of new balances or common action, have to be realistic in the world outside the PTA process, calls for standards such as legitimacy and authenticity. Some PTA methods – for example the Future Search Conference [Copenhagen Traffic DK], or the Swiss Dialogue [Gene Dialogue CH] - have their strength in the mediation of interests.

Discourse ethics can be implemented entirely because of the instrumental function they offer – and not because they represent an ideal. In practice however, there seems to be a dualistic relation between the ideal and the instrumentalism of discourse ethics – they may be seen as an ideal because they supply the discourse with functionality (enriched debate; new rationales; high credibility; trust; democratic procedures) – and they may work, because they are ideal (something to strive for, live up to; widely accepted).

Discourse ethics are indeed connected to the concept of democracy and as such, most people in democratic societies trust an organisation that explicitly tries to establish processes with high discourse ethical standards. The methods in themselves may contribute to a democratic devel-

opment. But as seen from a project management point of view, it is just as important that the general trust the organising institution and the project gains increases the likelihood of the project to have an impact.

Political decision-makers, who often are the addressees of TA projects, are very trained in evaluating the credibility of political processes. Lack of transparency or legitimacy is immediately revealed by that target group, and consequently makes it difficult for a politician to trust that the results of a project have the needed validity.

4.3.2 Heading for results

While claiming that the basic principle of the participatory element of PTA must be discourse ethics, it seems to be in utilitarianism that the overall purpose of TA can be found⁶. TA, in other words, is there in order to make a difference, to nourish change so that society can make the best out of the technology at hand now or in the future.

That TA has to make a difference, calls for a targeted project management. In that sense, it can be argued that there might be a conflict between the need for a project that actually comes up with visible, acknowledged and effective results, and a process that gives respect to discourse ethics. Participatory TA goes on in the real world, and therefore it has to adjust to the different demands, timing needs, changing conditions etcetera, imposed by the circumstances. It may be so, that it is not only the project management that has a need for such adjustment in order to be effective and make visible results out of the process. The participants may very well share that need, since they use time and resources, and since they have a motive for taking part in the PTA process. Accordingly, they might now and then too give effect priority over ethics.

In contrast, it may as well be stated that discourse ethics and effectiveness do not at all have to be in conflict. A transparent process from the beginning, so that the participants know what they engage themselves into, may be the starting point of a fruitful co-operation between a targeted project management and the participants. Participants who have worked together in a constructive and ethically reasonable process are likely to trust the management when the time comes for press releases and executive summaries. As seen from this point of view, one of the “traps” in PTA lies in the wrong, but possible, belief that a targeted management has to have a hidden agenda.

The truth seems to be found somewhere in between: In order to make the project leave traces, the project management has to be aware of the reasons for establishing the project (the problem analysis - see chapter on “the choice of methods in PTA”). She/he has to work strategically with regard to project set-up, composition and roles of participants, communication to the press and the target groups etc., in order to reach the kind of results the project set out for. But part of the strategy should be to respect the discourse ethical standards as far as possible, in order to gain the advantages - for the participants, the surrounding society as well as for the arranger - that a proper and trustworthy process delivers.

⁶See Klüver (1999)

4.3.3 A proposed model to the problem of PTA project management

Management of TA projects is about finding solutions to any challenge that comes from the circumstances given. We have sketched these circumstances in the theoretical and analytical framework.

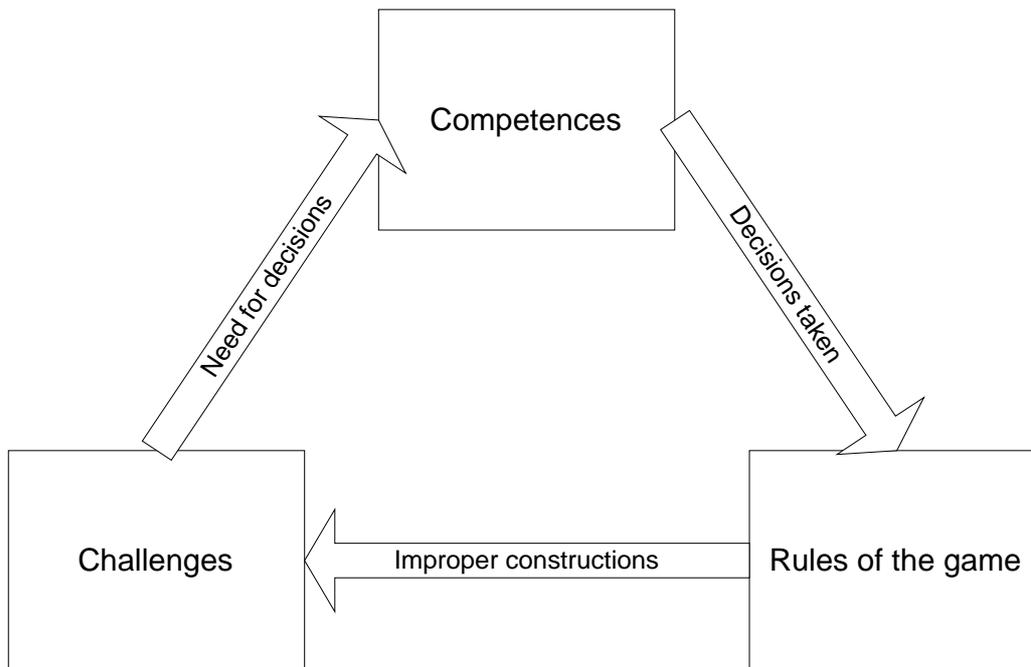


Figure 1. Model for the problem of project management

The management challenges may be of two kinds - setting up the right project (project set-up), and dealing with people and changes along the project time line (project management). The two kinds of challenges obviously are very interdependent. Setting up a proper project can proactively deal with many of the problems that otherwise would have appeared later on, and the case studies certainly shows that many problems can be avoided by picking the right method. On the other hand, if the way, the projects has been set up makes up too narrow boundaries for the process, proper project management should work plastically and pragmatically, and change the set-up as needed.

The following will mainly treat the project management perspective, but it is necessary to keep in mind the opportunities or restrictions the project set-up contribute with, as regards the degree of freedom left for the project management. And it is relevant to look at the problems imposed on management by improper set-ups.

The model in fig.1 gives an impression of the problem of project management. There are different challenges that calls for decisions to be taken. In order to take these decisions some competencies have to be present and active with or near to the project management. When decisions are taken, they alter the rules of the game in some way or another. This again might give rise to new challenges, if the necessary decisions do not fit the project construction (formal or informal

agreements; expectations; interests of the involved parties). In the following, the elements of this model are discussed.

4.3.4 Management challenges

Management challenges in this model should be interpreted broadly as any circumstance that makes it necessary for a project manager to react. The reason for intervention might be to ensure that the process strives for proper discourse ethics or to ensure impact of the project.

The challenges might be split into three different kinds:

- Project set-up
- Dealing with people
- Dealing with changes

There are multiple challenges of these kinds, and the cases uncover many. In the following, a sample will be presented to give an idea of the broad scope of possible challenges:

Project set-up:

- Lack of proper methods
- Lack of resources
- Biases in the project organisation
- Too narrow expert definition
- Collaboration problems between organising institutions
- Framing of the debate by organiser
- Lack of communication strategy
- The not-invented-here-syndrome
- Lack of experience

Dealing with people:

- Bad group dynamics, or disturbing people among participants
- Actor-groups difficult to get collaboration with
- Handling of the media
- Participants demand changes in procedures

Dealing with changes:

- Outside pressure groups trying to intervene into the process
- Stakeholder criticise the method/management
- Time pressure

In the following, most of these challenges will be discussed.

Lack of proper methods

PTA is a rather new function in the societal debate on technology. Methodologically it has developed to a point at which many countries are experimenting with very few methods, and only few countries have, what could reasonably be called an actual PTA methodology - mainly Netherlands and Denmark. Many possible reasons can be imagined, but it is a fact, that in many of

our cases, methods are taken in or developed. Even in the countries, that have the most experience with PTA, and the best equipped toolbox, new methods and procedures are implemented now and then, in order to be able to treat certain problem situations⁷.

If we focus on the search for methods, that fit a certain problem situation (problem driven motive), and for a time ignore that an important objective may be in itself to try out a method (method/introduction driven motive), it seems that there is a huge innovative power among the arrangers behind our cases. Many of the cases are using new methods explicitly in order to be able to deal with a certain problem situation [Delphi AU; Traffic Forum AU; Copenhagen Traffic DK; Drinking Water DK; Urban Ecology DK; Gideon NL; Gene Dialogue CH].

An interesting question, which actually cannot be answered yet, is if the arrangers in these cases found and used the best-choice method? The reason, this question cannot be answered is, that a comprehensive and coherent system of criteria for the choice of method has not been developed yet. The choice of methods in PTA in other words very much depends upon experience, intuition, local rules-of-thumb, and a dawning, though weak, set of criteria among the most trained institutions.

The choice of method is a challenge to PTA management, that, besides being difficult without a coherent set of criteria and a corresponding set of methods, is difficult because the amount of different, well described participatory methods is relatively little.

Biases in the project organisation

Only in very few countries we find institutions, with the aim to perform PTA, that are independent in the sense that they institutionally are self-governing and by large free of political influence from outside the organisation. Consequently, most PTA processes are set up as initiatives from engaged single persons, from parties that cannot be said to be independent, or from institutions that usually bear a different type of culture or methodology. It is important to note, that if these persons or institutions did not set up PTA processes, it is likely that the processes would not be set up at all. In a certain respect, possible bias can often be seen as an unavoidable side-effect of very admirable engagements in establishing a PTA culture.

From our cases it must be concluded, that bias is not a general phenomenon. Quite contrary, most cases can be seen as rather exemplary independent work. But even in these cases, bias could have been present, but have been handled - maybe by setting up proper project steering, by making the processes transparent, or by other means that either outbalance the biases or make it difficult for biases to be performed.

The challenge to management is to be sensible to the “system errors” it works under, try to be open about them and compensate for them in a way the participants must be envisaged to want. Else, there is a high possibility that the participants will uncover the bias and react towards it. Two of the cases below [Plant Biotech UK; Citizen GMO UK], in which signs of bias can be found mostly reflect situations in which the managers weren’t aware of the importance of managing bias. One case [Biotech Baden -W. GE] is an example of a project that was set up with intentions that were strongly biased.

⁷This touches upon the themes treated in the chapters “Implementing participatory TA”, and “The choice of PTA-Method”.

Case study findings:

- Biotech Baden-W GE: Project was initiated as a consequence of the worries of politicians and industry, that German regulation would make biotech industries leave Germany. The motive was a wish of technology push and deregulation from the side of one interest group. Project management was biased towards promoting biotech, and conceived the participatory process as a tool for that. No experts critical to genetic engineering were invited to the expert panel. Environmental issues were not investigated – albeit a broad range of other societal issues were.
- Plant Biotech UK: Set-up and management did not fully compensate for the possible bias and focus of the arrangers (a positive attitude to biotech; a Public Understanding of Science approach to the lay people). The Public Understanding of Science (PUS) approach of the arrangers resulted in many smaller changes of the method concept, that all together became profound. Examples: Lots of expert presentations and teaching at first preparatory weekend (7 experts, compared to 1-2 in the usual method); More experts at second preparatory weekend (12 experts, compared to 0-1 in usual method); A highly pressed expert presentation program at the conference (21 experts, compared to 12-16 in the usual model). NGO's criticised the process for being framed and biased. This happened before the lay panel had presented their final document, and seems to have contributed to the cautiousness of the panel.
- Citizen GMO UK: The project manager was initially member of the management board of the NGO that funded the project. He left the board in order to separate interests. But the distinction between the interest group that initiated the project (the NGO) and the project management was not really clear. Several stakeholders did not want to take part of the Stakeholder Panel, some with reference to the organisational set-up. The press event at the end of the project showed that the link to the NGO in effect was strong.

Too narrow expert definition

The assumption that *experts* are objective and free of interested parties is generally undermined by the idea of technology assessment, since TA works on the premises that technology is a social construction, and that experts take part in the networks constructing it. Besides, many conflicts about uncertainty in the modern society may be traced back to the expert as “part of the problem”, because uncertainties are made by technological innovations without science being able to come up with answers (see the Theoretical Framework).

However, this interpretation of the role of the expert is not distributed among all parts of society, and there is still a widespread believe, that experts can be trusted as unbiased and non-stakeholders. Therefore, participants can be frustrated when the bias of the experts becomes apparent.

In participatory processes it is important to clearly address this problem, and work with balances of experts, like one usually would work with balances of stakeholders.

The understanding of experts as the sole carriers of rational knowledge and facts, is fundamentally problematic in PTA. Other participants bring knowledge into PTA processes, and it might be valuable, though not scientific. PTA processes often, as part of its cognitive purpose, are intended to give room for knowledge that is often neglected by science – experience, tacit knowledge, knowledge about ones own life and situation, sensitivity to developments and situations here-and-now – and which all have their rationality behind them. Because of that, PTA often include participants with these kinds of knowledge, either as part of the assessors in the method, or as witnesses/experts.

Case study findings:

- Drinking Water DK: Expert participants were selected, so that a balance was made between expert-holder-groups, and experts from public research institutions were in majority. Politician participants were mixed with regard to decision-maker level and geography. Citizen participants were randomly selected.

- Biotech Baden-W. GE: The method, which is developed by the arranging institution, gives certain roles to certain actors: Experts are always establishing facts; Interest parties assessing feasibility; and citizens assessing desirability.
- Biotech Baden-W. GE: No experts critical to genetic engineering were invited to the expert panel. Environmental issues were not investigated - a broad range of other societal issues were. The non-experts (lay participants) seems to have been aware of possible biases among the experts, since they preferred authentic presentations from experts/stakeholders representing their own standpoint, instead of expert lectures about the pro- and con-standpoints.
- GM Animals NL: Expert presentations were considered biased by the lay panel.

Collaboration between organising institutions

Often - and there is a handful of examples among the EUROPTA cases - PTA projects are established by more than one institution. The reasons for this can be manifold. First, many PTA projects are initiated by ad-hoc organisations, that has to gain a certain organisational legitimacy [Plant Biotech UK; Citizen GMO UK; Gene Dialogue CH]. Second, competencies in management may be gathered by joint projects [GM Animals NL]. Third, it often serves as a good background for external funding that there are more than one institution engaged in a project [Novel Food NL was established as a co-operation project, and was financed by a research programme]. And fourth - although we do not find examples among our cases - the often cross-sectoral and cross-discipline approach of PTA makes it opportune to seek co-operation with other institutions (councils, governmental offices, universities, etc) about the project.

Project management has to deal with the different organisational cultures and different levels of PTA experience in such co-operation projects. This sometimes implies to act as a strong advocate for a strict and consequent methodology, which respects the ethics needed for a participatory process. Which again means to avoid compromises that may have an organisational logic behind them, but may have a profound reduction of credibility of the process as the result.

A special kind of co-operation is the use of an external consulting firm as operator on the project [Gene Dialogue CH]. Such companies may be extremely qualified methodologically and as such the management should be in good hands. Nevertheless, there are preconditions that have to be fulfilled before such a co-operation should be established. For example it should be ensured that it actually is the competent consultants that are doing the management, since the distribution of work inside the consultancy firm most often is out of the hands of the client. Another precondition is to ensure that the consultancy firm does not have very large clients that makes it difficult for the firm to act independently.

On the one hand consultants may take away project responsibility from an initiator of the project, that may be suspected for imposing a bias upon the project. But on the other hand it comprises a paradoxical risk that the hired consultant will anyhow try to live up to the supposed expectations of the initiator, and thus take over the bias. This hypothetical problem is only presented in order to picture the complexity of co-operation on PTA.

The pros and cons of framing the discourse

Framing may be defined as an action that sets the scope of the process, through definition of issues, roles or rules, so that for example the open-mindedness or legitimacy of the process is delimited.

A topic that is going to be treated in a PTA project most often is defined in a political process in which interests, values, ideals, political strategies and power relations play a role (see chapter on “The choice of TA method in relation to institutional and problem setting”). To the extent that the definition of the project is deliberately made in order to gain a certain outcome, one may speak of biased framing of the participatory discourse. Framing can, however, be made with the purpose to target the issue in order to make the project live up to its role, and in that situation we can speak of strategic framing. Obviously, there is a thin line between these two ways of framing the deliberations in a participatory process.

The cases show examples of both biased framing [Biotech Baden -W. GE; Plant Biotech UK] and strategic framing [Drinking Water DK; Biotech Baden -W. GE; Gideon NL; Novel Food NL].

Both kinds of framing are in opposition to the discourse ethical claims for fairness, equality, open-mindedness and transparency of the process, and because of that, framing might strike back as a general mistrust inside the project or to the project process or outcomes. If the organiser is aware of the possibility of the framing and the risk for counter-productiveness it represents, it is possible to establish an acceptable level of independence on a project basis, in order to compensate for the potential risk [Citizen GMO UK].

Strategic framing, on the other hand, may be well reasoned, and the risk for mistrust may be calculated and found reasonable, compared to other risks in the project. If the organiser spots a need for an assessment which is narrowly scoped, it serves a function to restrict the process to certain aspects or to a certain approach to the problem [Delphi AU; Drinking Water DK; Novel Food NL], but for obvious discourse ethical reasons it is crucial to be open about such decisions and the rationales behind them, and to be ready to change the conditions if necessary.

One example of such reasoning behind strategic framing is the situation when it is necessary to consider, that if the scope of the project is very broad and loosely defined, there is a risk that the outcomes become too general to be useful for policy-making. If the project is established in order to serve politics or other “customers” with assessments and options, the method as well as the framing of the problem have to be suited for that purpose [Copenhagen Traffic DK], which may mean that the issue has to be precisely defined, leaving less opportunity for the participants to find out themselves what scope they find relevant.

Case Study findings:

- Delphi AU: Project was a pilot exercise. That was not understood/accepted by some people outside, who afterwards criticised the limited scope of the project.
- Copenhagen Traffic DK: Very openly defined topic. Left to the participants to define the scope of the topic.
- Drinking Water DK: Project focussed on surface pollution from agriculture. The agriculture stakeholders found that this was too narrow a scope, and they forwarded that industry and household contributions to water pollution should have been included.
- Biotech Baden-W. GE: The motive was a wish of technology push and deregulation from one interest group. Project management biased towards promoting biotech, and conceives the participatory process as a tool for that. No experts critical to genetic engineering were invited to the expert panel. Environmental issues were not investigated.
- Citizen GMO UK: Project initiated by an NGO, who needed a specific GMO food perspective. The project manager insisted on giving the lay panel a more open starting point - future of food production and agriculture. The project management did not tell the citizen panel that the main interest of the organiser and much of the Stakeholder Panel, was about GMO foods. Outcome seems to have a broad scope, and as such it can be doubted if the initiators got the kind of answers, they expected.
- Gideon NL: Method focus on one stakeholder’s (agriculture) views on the topic. An “ecological crop protection” scenario was not considered viable and realistic by the stakeholder representatives.

- Novel Food NL: The aim of the project was to convince actors about novel proteins as substitutes for animal proteins, in order to gain sustainability. The aim was not an assessment of that vision. Back-casting processes were framing the scope of the project, since not only a future vision of a certain societal situation was envisioned, but a concrete technical solution too. The participants were not allowed to bring forward their own visions – and other technical or non-technical solutions to sustainable food were not made possible in the visions. There were situations when participants were annoyed by this framing, but the process manager closed these debates, reminding that definitions and problem choices were not open for discussion.

Modification of methods

Changes to methods are often seen, when a method is used first time by an organiser [Ozone AU; Plant Biotech UK; GM Animals NL; Gene Dialogue CH]. This might have its good reasons, if it has to do with necessary adaptation to i.e. national or institutional culture (see chapter on “Introduction of PTA”). But, on the other hand, there is a danger (that cannot be documented by the cases), that such changes are done because of a lack of humility towards the original procedures (such a reaction has sarcastically been called the not-invented-here-syndrome), and a danger that important qualities are lost or new problems born in the process.

Some of the cases can be taken as examples of problems arising from changes in methods [Ozone AU; Plant Biotech UK]. Experienced PTA organisers like for example the Danish Board of Technology have made many variations on well-known methods, and it is a general experience from such experiments that they are not at all always fruitful.

There are examples of cases in which the organisers have chosen to use a new method strictly in its original format [Copenhagen Traffic DK; Electricity CH], although the introduction of the methods did provoke debate about for example national culture difference from the nation, the method originated from. From both cases it appears that the methods worked well, albeit their foreign origin.

It seems nearby to conclude that it must be recommended to be cautious and take a step-by-step approach when changing well described and well tested methods.

Case study findings:

- Ozone AU: Citizen panel consisted of young people only – 16 to 28 year old. This deviation from the method ended up being counterproductive because of bad group dynamics among the young panel and the resulting lack of ability to make up politically relevant conclusions.
- Plant Biotech UK: The Public Understanding of Science (PUS) approach of the arrangers resulted in many smaller changes of the method concept, that all together became profound. Examples: Many expert presentations and much teaching at first preparatory weekend (7 experts, compared to 1-2 in the standard method); More experts at second preparatory weekend (12 experts, compared to 0-1 in standard method); A highly pressed expert presentation program at the conference (21 experts, compared to 12-16 in the standard model). The changes ended up giving too little time for discourse processes: 1) lay panel definition of questions, 2) lay panel choice of experts, 3) dialogue at the conference. Both lay people and experts regretted that.

Lack of communication strategy

Most PTA methods offer a procedure that makes it possible to reach certain goals together with the participants. However, only very few methods are in themselves offering the communicative mechanisms that are necessary in order to make the messages reach the target groups. Consequently, it must be seen as the responsibility of the project management to design and realise a communication strategy of the project.

There are a number of different approaches that can be taken with respect to effectively communicating the aims and results of a project. The list below is not intended to be complete, and it covers some techniques that are not necessarily mutually exclusive, and might be used in combination:

- *Making agreements with the target group beforehand*, about the dissemination and use of the project results. The target group and the arranger may have a common interest in ensuring that the target group is well informed about the progress and results of a project⁸.
- *Including the target group in the process* in order to make them informed about the outcome, but even more important to make them share responsibility for the outcome⁹.
- *Inviting target groups to give ideas to and refine the outcomes* of the project. When a TA project starts up, it is often possible and relevant to make a meeting at which stakeholders and other target groups are allowed to come up with ideas for problems to work with or questions to answer in the project. Similarly, when the project comes near to its finalisation, the target groups may be invited to comment on a draft report in order to correct factual errors or to come up with suggestions for conclusions and recommendations. Such consultation of the target groups may in itself serve as a participatory process [Delphi AU; Gideon NL; Gene Dialogue CH].
- *Internet debate* in parallel with project activities. The Internet makes it possible to establish debates, discussion clubs and chat-rooms that may serve as a side project to the participatory process. The management may feed in input to the discussions in the form of papers or background materials that have been used by the participants. This brings a possible contact and service to a much wider target group, increasing the interest and readiness for the coming results of the project¹⁰.
- *Networking or using personal contacts to communicate the result to the key players*. Besides the more open and public communication channels, personal contacts may play an important role in communication of the outcomes of a project. [Copenhagen Traffic DK; Gene Dialogue CH]
- *Information-meetings with key players* may be possible to establish. Often it is an opportunity for parliamentary TA offices to arrange such meetings for the parliamentary committees of relevance. Meetings with other target groups (leaders of workers unions and trade unions, industrialists, scientific societies etc) most often is an option. [Citizen GMO UK]
- *Dissemination through established adult education institutions* etc. Most countries have networks or programs of adult education, be it connected to religious communities, workers unions, political parties, or independent institutions. Often such institutions are lacking written texts to use as a background for debate. Booklets, easy-read pamphlets and such relatively cheaply produced materials may be distributed in hard-copy or through the Internet to such networks [Drinking Water DK].
- *Press activities*. Different activities might be directly aimed at the press: Press events before, during and after the PTA process; press releases; interviews with participants etc. The press

⁸[Ozone AU may serve as an example, since there were politicians that had shown interest beforehand. However, the results did not turn out to be of a kind suited for direct use by the politicians]

⁹[Urban Ecology DK included politicians, civil servants, industry and local citizen entrepreneurs in making local action plans on urban ecology]

¹⁰The cases do not comprise examples of Internet support activities, though such information and deliberation measures are known to be used by TA organisations. The Danish Board of Technology has made electronic Internet conferences in connection to several projects, and the UK Advisory Committee on Genetic Testing have had a main activity going on Internet deliberations (Finney, 1999).

is an important message carrier to political target groups, since they always read their newspaper¹¹.

There are many more possible actions that may be taken as part of a communication strategy. Implementing such actions into the project from the beginning of - that is, already at the set-up of the project - increases the chances of a proper communication. Inventing initiatives along the project line may turn out to give creative results, but the risk of taking an initiative too late is big.

The main point is to avoid the project to be an activity that is closed and maybe even hidden for the target groups until the end of the day when the report is released. Many a fine, efficient and well managed TA project has lived a very quiet life - even after it finished - because of the lack of focus on communication as part of the activity.

Lack of experience

Among the 16 case studies in the EUROPTA project, the level of experience is as follows:

- 14 examples of the use of methods that are new to the organiser¹². New in this respect means that the method has been used for the first time, or has been developed by the organiser.
- Out of these 14 cases, 8 were performed by arrangers with none or rather little experience in PTA¹³. The rest were performed by arrangers with profound experience in other participatory or deliberative processes.
- Out of the 8 cases of new methods used by inexperienced organisers, 4 had experts in methodology connected to the project¹⁴, and 3 had an evaluation of the project made¹⁵ (these figures might be misleading, since we have not specifically asked about evaluation procedures in the research protocol).
- 1 EUROPTA case has a medium status with regard to experience, since the project was performed in an organisation that has developed the method, but was carried out by another department by inexperienced project managers¹⁶.
- Only one case is an example of a method that has been used repeatedly by the organiser¹⁷.

This outspoken tendency of lack of experience is not general for PTA. Rather, it stems from the fact, that the cases come from all EUROPTA partner nations, of which some have only little experience with PTA. Further, it stems from the selection of cases, as for example the Rathenau Institute and the Danish Board of Technology has chosen to analyse cases about introduction of

¹¹[Drinking Water DK; Plant Biotech UK; GM Animals NL; Electricity CH are examples of cases that include active press strategies before, during and after the PTA process]

¹²[Delphi AU; Ozone AU; Traffic Forum AU; Copenhagen Traffic DK; Drinking Water DK; Urban Ecology DK; Discourse GMP GE; Plant Biotech UK; Citizen GMO UK; GM Animals NL; Gideon NL; Novel Food NL; Electricity CH; Gene Dialogue CH]

¹³[Delphi AU; Ozone AU; Traffic Forum AU; Discourse GMP GE; Plant Biotech UK; Citizen GMO UK; Electricity CH; Gene Dialogue CH]

¹⁴[Plant Biotech UK; Citizen GMO UK; Electricity CH; Gene Dialogue CH]

¹⁵[Delphi AU; Plant Biotech UK; Electricity CH]

¹⁶[Biotech Baden-W. GE]

¹⁷[Sustainable Menu NL]

new methods. (For a further discussion of the use of new methods, see the chapter “Implementing participatory TA”.)

PTA is spreading these years, which means that there will be many more projects in the future that are managed by inexperienced institutions or staffers. This is not necessarily a problem in itself, since everything has to start at some point. But it should have its implications on the ambitions and expectations connected to the projects. An inexperienced team must not be expected to be as targeted, efficient and instrumental in its use of PTA methods, as more trained teams. And accordingly, they should not be expected to contribute with the same level of fulfilment of project goals, as the experienced teams.

As participatory processes will be judged by the participants from their individual roles (stakeholders, citizens, experts, politicians...), it is very difficult for the project management to get a picture of the judgement without an evaluation.

The evaluation might be project specific in the sense that the participants and the affected stakeholders are asked for their evaluation, or it might be in the form of a more broad audit of the effect of the project on the debate (records of parliament debates, newspaper coverage, citations etc.)

One case on first-time use of the consensus conference method in a country [Electricity CH] reports of the very important positive effect of consulting experienced PTA expert when setting up a project, and of setting up an evaluation. The information helped to trim the procedure, to cope with management problems, to discuss the method with outsiders, and to evaluate the feasibility of using PTA methods in the future.

There are examples of evaluations that have been of big importance for the further debate or use of PTA in the country [Plant Biotech UK; Electricity CH]. The Swiss example shows that an in-depth evaluation may serve as a reference for the discussion with external observers (scientists, politicians, etc) - a discussion that may help clearing the road for later initiatives.

Besides these national effects of evaluations, there is an international effect that should not be neglected. Evaluations make up an important basis for methodological discussions and the diffusion of methods in TA, and in the end such debates make up a forum for the refinement of PTA management.

Bad group dynamics, or disturbing people among participants

Dealing with people is an important part of participatory TA project management. In its essence, it is what participation means, so the persons involved in management have to be aware of and able to handle situations when inter-personal relationships becomes problematic. As our case studies show, the managerial handling of such situations may make the difference between success and failure of the participatory process. On the one hand, differences in opinions, values and attitudes are the energies that makes the participatory project run. On the other, it may be the energy that makes it explode.

Among our cases we find one project [Ozone AU] in which a change was made in the consensus conference method, so that the lay panel was made up of young people only. The group had bad group dynamics internally and was rather sceptical to the facilitation. During the process they

wanted to work without facilitation, but they were not able to manage the facilitation themselves. This resulted in a final document that did not live up to the expectations, and accordingly did not have any impact, although politicians actually were ready to listen to the panel.

Another case [Electricity CH] had problems with one participant who was disturbing to the other panellists, and was very resource demanding for the project staff. The staff decided to serve the panellist as he wanted, and let it up to the facilitator and the rest of the panel to deal with the problems as they arrived. As the person was annoying to the rest of the panellists, they developed even better group dynamics through that process, as they to a certain respect had a common “enemy”, and minor conflicts in the group were easily handled. According to the arrangers the problem ended up being positive for the whole process.

In general, the handling of inter-personal problems has to balance between respecting the individual person - even if he/she acts in a problematic way - and the need of the majority. This may be done by using the management's right to set certain rules (for example to impose facilitation upon the group) or, quite opposite, to expel from setting specific rules by pushing the participants to take action themselves. Both sides of the balance may be seen as actions that respect the discourse ethical claims for the process, as long as they are exerted with openness and transparency.

Case study findings:

- Delphi AU: One participant made trouble, not accepting the given procedures. He was alone with his standpoint, but took away much resources from one of the moderators.
- Ozone AU: Citizen panel consisted of young people only - 16 to 28 year old. Deviation from the method that ended up being counterproductive because of bad group dynamics in the young panel. The panel was very sensitive to influence from the arrangers, and eventually did not want the help of a facilitator. The arrangers respected that decision.
- Electricity CH: One lay panellist was problematic, not accepting procedures and outcomes. Took away resources from management. In the beginning it resulted in problematic situations among the lay people, but by time it actually strengthened the group dynamics among the other panellists.

Actor-groups difficult to get into collaboration with

Many PTA projects run into problems of getting access to or involving some very important actors. Most often politicians can be difficult to engage in the process, but other busy people - industry leaders, top level civil servants - may be difficult to engage too.

Some methods are very vulnerable to cancellations from the participants. It seems to be a challenge for the development of methods in PTA to come up with methods that serve these important actors by giving them an offer to participate, without making the method dependent on them. In the end, the problem cannot be fully solved - only partly compensated for by for example ensuring participation from staffers of the decision-maker, or by making use of other communication means to reach these persons anyway.

A solution for some arrangers - the parliamentary TA institutions - may be to make use of methods especially focussing on the needs of decision-makers, and adapted to fit into their busy lives. Such methods might be different kinds of public or parliamentary hearings on the premises of the MP's.

Case study findings:

- Copenhagen Traffic DK: The accept of the project and method by the planning group is a very vulnerable part of the method. If they accept, the project is rather safe from that point on. But if they reject to support the process, the project is impossible to carry out, and can as well be closed down. Planning group supported process, all actor groups participated, but the politicians were only present during parts of the process.
- Urban Ecology DK: Difficult to make the politicians take part in the scenario workshop process - Danish politicians are used to different local debates, and maybe a little over-fed with deliberative processes?? The method has been used in the EEC as a follow-up project, and in other European countries, there was a considerably bigger interest among politicians to take part.
- Sustainable Menu NL: A key actor in the debate (one of two politicians, who were the centre of the debate) cancelled his attendance the day before the debate. Another politician had to be found very fast, possibly giving rise to non-optimal preparations.
- Gene Dialogue CH: Swiss NGO's did not want to participate because of scepticism to the intentions behind the project.

Stakeholder criticise the method/management

PTA processes mostly deal with highly political issues, and consequently it is likely that stakeholders who do not agree with the outcome of a PTA exercise will criticise the project (see chapter on the political role of PTA). However, the more obvious it is, that the process has been set up with respect to certain discourse ethical criteria (enlightenment, transparency, authenticity, legitimacy) the more difficult it is to criticise the project.

Enlightenment might be supported by testing the information input to the process with the stakeholders. For example a preparatory group, composed with respect to balancing interests, might be set up in order to prepare or approve the information material that is fed into the process.

Transparency may be ensured by such a preparatory group, or by other audit procedures.

Authenticity can be accommodated by making the participants produce their own documentation, and avoiding steps in the procedure that involves "messengers" translating or interpreting the outcome of the process. In other words, by letting the participants speak for themselves. In some situations, the authenticity of the procedure may be supported by testing the results. It may be done by repeating the process or - when representativity of the participants is crucial - making a survey among a representative part of the population.

The legitimacy of the process is increased when the composition of the group of participants is relevant. This might be achieved through planning and selection of participants together with, or under audit of, the stakeholders.

Obviously, it is of crucial importance to avoid specific and relevant critique of the project. Because of that, it is very central to manage the set-up of the project (especially the project organisation) in order to compensate for possible weak points in the procedure.

Our case studies show some examples of external critique, but taking into account that most cases touch upon sensible matters, it seems that the cases show a general trust and accept of the methods. Or, at least, that the answers to the critique has turned out to be satisfactory.

Case study findings:

- Drinking Water DK: At the voting conference, the participants (composed of equal numbers of politicians, experts and citizens) vote on suggested action plans. The "losers" afterwards criticised this element as populist. After the conference, the agriculture stakeholders claimed that the citizen group had not been representative.

Consequently, the arranger launched a public survey with 1000 respondents, asking the same questions as were asked at the conference. The poll showed exactly the same result as the conference.

- Biotech Baden-W. GE: Project established with a bias towards pro-biotech. The Ministry of Environmental Protection criticised the lack of environmental assessment, because it would have been an important input to the social discussions in the participatory phase. The Conservation League criticised the project for not being a critical assessment, but a “maximisation of economic gains”.
- Plant Biotech UK: NGO’s criticised the process for being framed and biased. This happened before the lay panel had presented their final document, and seems to have contributed to the cautiousness of the panel. For example, the panel excluded the project management and the facilitator from their deliberations in order to avoid external critique for the panel having been manipulated by the arrangers.

4.3.5 Competencies

The word competencies has two connotations to it, both relevant in project management: The meaning of ability - the skills and knowledge necessary to do a competent job. And the meaning of empowerment - the authority to take decisions.

When decisions are to be made, the access to competent decision-makers is crucial. Competence is a resource, if it is there when you need it. But not having access to the needed competencies, or maybe even fighting with the problem of having to work together with people, who do not have the needed competencies, is often the reality of project management.

Project management relies on a multitude of competencies, distributed among many people or actors. Most projects (cases) hold a rather complicated project organisation which many groupings exert influence on parts or phases of the project. In order to embrace some of the aspects of competencies in project management, some comments on the different management actors will be given.

The host institution/organiser.

As describes the analytical framework, the institutional context of a PTA has profound impact upon the set-up and running of a project. The decision-makers of the organiser (board, chairman, director, senior staffers, project manager) do not necessarily have the needed methodological skills to take the right decisions - but they might not know that, and they have to take the decisions anyway.

The remedy to this kind of problem may be to forward methodology as an important factor for the success of the institution. This can be done by arranging methodology seminars, publishing notes/books on methodology, or maybe even by stating methodological competence as one of the goals of the organisation. The expected internal effect of such a strategy may be a greater respect towards those possessing the needed competencies, and accordingly a more attentive approach to the advises given by project management. (See “lack of experience” for further discussion of institutional competencies).

The steering group (or Planning Group; Reference Group; Support Group).

The project organisation (project-internal decision-making structure) is often constructed with great respect for the professional knowledge about or interests in the issue at stake. More seldom, methodological expertise is included, despite the fact that many methodological decisions often are taken by or in dialogue with the steering group(s).

External methodological expertise is most often needed at first -time use of a method, and mainly when the arranging institution does not have a tradition for PTA [Plant Biotech UK; Citizen GMO UK; Electricity CH; may serve as examples of the first -time use of external expertise]. But there are examples of experienced institutions that had a need for development of new methods, and accordingly established co -operation with other methodological experts [Urban Ecology DK, among others]

An important role for the steering group is to function as a watch dog regarding the ethical quality of the management. This includes keeping an eye on the fairness of the process, ensuring legitimacy of the participant group as well as of the inputs given to the participant, and claiming and supporting transparency of the process. In order to act as a watch dog, the group has to be composed so that it has the competence to take a stand regarding the process - no matter if this means to criticise the process or to protect it from critique.

Project manager (or TA -researcher).

TA - and maybe especially PTA - demands a skilled and experienced project manager, or as compensation for the lack of skills, an experienced advisor. Because of the process -oriented projects in PTA, there are many kinds of traps one can run into. This chapter sketch a series of traps and problems of this kind. Awareness towards the “warning signals” does not come by itself - it is a competence that has to be developed through training. A general impression from our case studies is that the well settled, PTA experienced institutions [Copenhagen Traffic DK; Drinking Water DK; Urban Ecology DK; GM Animals NL; Gideon NL] run into less problems than ad hoc projects at lesser experienced institutions [Ozone AU; Plant Biotech UK; Novel Food NL], although there are exceptions from that rule [Citizen GMO UK; Gene Dialogue CH].

Build up of methodology competencies within TA staffs takes time, and one of the most important factors to ensure such competence is a certain continuity among the staff. It takes a permanent staff at a permanent institution to be able to guaranty for capable managers. And of course it takes a rather consistent policy on the use of PTA methods.

From the experience of the established institutions in this field, the following qualities may be suggested as something to look for when employing PTA project managers:

- A democratic attitude to processes
- Respect for other people, no matter of their formal status
- A sensitivity to political topics
- Process- as well as result-oriented
- Fast move from thought to action
- Ability to place process outcomes over ones own ambitions regarding influence
- Innovative

Facilitator/mediator.

In many PTA methods, a central role is given to the facilitator. It follows, that often the difference between success and failure is put in the hands of this person. The cases tell stories of both successes [Copenhagen Traffic DK; GM Animals NL; Electricity CH] and less lucky outcomes [Ozone AU; Plant Biotech UK] at least partly due to the qualities of the facilitator.

The solution to problematic facilitation might be to intervene and support the participants by withdrawing the facilitator from his role [Ozone AU shows an example of such intervention, but the arrangers did not apply another solution to the need for facilitation; Plant Biotech UK is an example of the participants taking over facilitation themselves and doing it well].

A specific problem with facilitation is how to instruct a facilitator to play the needed role. Attempts have been made to make a manual on the expected “style” of facilitation [at an Australian consensus conference not described in the EUROPTA cases ¹⁸], with positive outcome. The Danish Board of Technology has had positive effect from very thorough briefing of the facilitator before and during his/her first-time assignment to a method. But albeit these positive results from briefing, facilitation is very dependent upon the personal qualities of the person in speaking - and the selection of person plays a major role in gaining successful facilitation.

Qualities that may make up a good facilitator can be:

- Pedagogic competencies
- Democratic attitudes
- Conscious about discourse ethics
- Psychological sense
- Conscious about group dynamics
- Result-oriented

4.3.6 Rules of game

Any project has its rules. They may be formalised and transparent, or they may be informal and unspoken. This counts to the extent that a method might be defined as a set of rules of action and interaction. It follows, that any decision made in a project in its effect is a change of the rules, and as such changes the conditions of participation. These changes might not be welcomed by the participants, which will end with new conflicts demanding new decisions to be taken.

The rules of a project can be classified as

- Rules that cannot be subject to negotiation. An example is the rule that the lay panel in a consensus conference defines the questions that will be answered at the conference, and answered by the panels itself in the final document [Electricity CH and others]. If this rule was subject to negotiation, so that for example the experts defined the questions, the consensus conference would lose its open-mindedness and authenticity - some very important ethical characteristics of that method.
- Rules that are set, but may be negotiated. An example is the internal procedure of the consensus conference lay panel when they write the final document. The facilitator should suggest a solution, but should be open to changes if the lay panel wants so.
- Rules that are defined by the participatory process. An example is the rules that has to do with structuring of content of the deliberation, done by the participants - like it happens during different workshop sessions.

¹⁸Personal communication with project manager Mrs. Alison Mohr at the 2. EUROPTA workshop

The involved organisers in our case studies have different approaches to how they define a project, and this may influence the way that rules are made, and following the way that they are perceived by the participants. A more open definition of a project [Gideon NL; Genetic Dialogue CH may serve as examples] in which the project - an following the rules - is defined along the project line leaves a lot of decisions with the project management, and subsequently the credibility of the process is a matter of trust to the manager. In contrast, with a more strict and detailed project definition [Copenhagen Traffic DK] many decisions about rules are taken in the initial phases during project establishment, and the manager from then on follows up on the scheduled plan. This frees the project manager from the personalised responsibility of inventing the right processes as they proceed, and this again leaves the credibility coupled to the method used.

Rules not efficiently communicated

It follows from the discourse ethics (transparency, equality, fairness) that as far as the rules of a project/method can be described in the terms above, the project management has an obligation to do so and communicate it to the participants. The degree of freedom for the participants to define or change the rules must be clear to everyone inside the process - and often outside too.

In general, the case studies leave the impression that the arrangers of PTA projects are aware of the degree of flexibility that can be imposed upon the rules of a method. However, there seems to be examples of procedural problems in the cases that may be interpreted as a failure in proper communication of the status of given rules.

Case study findings:

- Ozone AU: Policy options were not communicated efficiently to the panel by the experts, because they thought it was not acceptable for experts to come up with options. Consequently, the citizen panel misinterpreted this as an unwillingness to forward such options. The organisers knew that politicians were ready to take the consequences of the results of the conference - the impact was nearly guaranteed in advance. However, the citizen panel was not informed about that, because the organisers were afraid of the changes to the kinds of recommendations, the panel would make if they knew about the political interest.
- Plant Biotech UK: Lay panel thought that their consensus had to be in balance with what they believed the general citizen/consumer would think. An expert thought that the conference had the purpose to inform the audience - because he had already met the lay panel at the preparatory weekend.
- Novel Food NL: Back-casting processes was framing the scope of the project, since not only a future vision of a certain societal situation was envisioned, but a concrete technical solution too. The participants were not allowed to bring forward their own visions - and other technical or non-technical solutions to sustainable food were not made possible in the visions. There were situations when participants were annoyed by this framing, but the process manager closed these debates, reminding that definitions and problem choices were not open for discussion. The fact that the scope had been decided in advance was not communicated to the participants.

One way of making the status of the rules clear to the participants is to describe the method in writing, as part of the invitation of participants. The more or less rigid rules are most often easily communicated this way, and that leaves room to concentrate on the negotiable elements during the PTA process.

Participants demand changes in procedures

PTA processes in general builds upon some sort of *procedural consensus* that has to be established between the arranger and the participants, and among the participants. If the participants do not accept the method as it is, negotiation has to take place, and a solution - a new procedural consensus - has to be found.

It is seldom that the participants demand changes to be made in the fundamental rules of a method, but it happens now and then. “Negotiable rules” on the other hand are often challenged.

As stated above, it is important that the project management is aware of the opportunities and risks connected to changing the basic rules of the game, and in general it must be recommended not to change the rules that are bearing the characteristics of the method. In contrast, it must be recommended to be very open, if the participants want to change a rule, if for example the rule is only connected to the use of a certain technique in the process.

Case study findings:

- Ozone AU: The youth panel of the consensus conference was very sensitive to influence from the arrangers, and eventually did not want the help of a facilitator. The arrangers respected that decision, although as seen in retrospect, they should not have changed that rule.
- Biotech Baden-W. GE: Lay people in one Citizen Forum wanted to see and comment the arrangers’ summary before publication. The arranger invited the lay panel to a presentation of the results, and the results were accepted.
- Plant Biotech UK: Lay panel suspended collaboration with their facilitator, because they found her unhelpful and manipulating. The choice of chairman of the conference was questioned by the lay panel, because he had prompted them not to be too critical towards biotech. The arrangers did not accept to change to another chairman, although the choice of chairman must be regarded as a negotiable rule.
- Gene Dialogue CH: A change in plans took place: Lay people did not want all in the stakeholder panel to answer all questions, and they did not want written answers, but would rather put forward the questions orally at the main event (conference). The management accepted these changes.

Formalising rules by “letters of understanding”

In some cases the arrangers make use of formal contracts about rules (in one literally a contract was signed) with the participants [Plant Biotech UK; Sustainable Menu NL; Gene Dialogue CH]. One of these projects had considerable problems concerning the collaboration between management and participants, which might reflect that the formal rules did not cover the need for common understanding of and agreement in the procedures and rules.

In other cases a process of discussing rules and procedures was initiated by the management [Copenhagen Traffic DK; Electricity CH], apparently with a much better result. It may be so, that signing a paper can even have the opposite effect than the intended, because it might provoke a suspicion that “these people try to catch me in some sort of agreement that I will regret later on”. Discussing the roles may take away such suspicion by making the relations between the players in the method transparent and understood.

Project management’s influence on content.

The roles given to the project organisation differs depending on the specific project and method. There is a tendency that the more responsibility is given to the participants, the more the project management gives up his/her influence on the content. Or in other words - the process management takes up more of the managers attendance, the more participatory the project is. This can be illustrated by the following scheme.

Roles of participants and management

Participation type	Role of participants	Role of management	Case study example¹⁹
Survey / interviews	Information sources	Researcher	[Gideon NL]
Deliberated survey	Evaluators/voters	Organiser & analyst	[Delphi AU; Drinking Water DK; Biotech Baden-W. GE; Novel Food NL]
Constructive dialogue	Stakeholders	Organiser & mediator	[Copenhagen Traffic DK; Urban Ecology DK]
Public consultation	Consultants	Organiser	[the four consensus conferences; Gene Dialogue CH]

It is of importance to be conscious about the role of the management, since confusion about this may end up as conflicts between the participants and the management.

If the management ignores the imbedded rules about split of responsibility, and acts as a participant or a researcher, when he should play the role of process consultant or practical organiser, then the process may get out of the hands of the project manager. And it may become difficult to get back into managing the process, since the manager has lost the “virginity” of an unbiased, personally impartial manager. But the opposite problem is just as bad: If the participants rightfully expect the manager to take the lead regarding content - for example to suggest competent and relevant experts for a consensus conference expert panel - he should not avoid to take that responsibility with reference to the risk of introducing bias.

Case study finding:

- Electricity CH: Ran into time pressure problems at one of the preparatory weekends with the lay panel, which meant that the choice of experts gave problems. The lay panel intended to do it, but in practise it was not arranged so that they were able to. Project management ended up deciding together with some lay panellists, and some lay panellists stated that this help should have been planned from the beginning of.

The scheme in more general terms represents a spectrum of participatory content of the methods. From top to bottom in the scheme there is a growing level of participation coupled to a growing level of discourse ethics (enlightenment, open-mindedness, authenticity and transparency). The more the arranger or manager gives up his/her own ambitions (or other motives) to be the one researching and concluding, the more credibility the project possibly will gain. Alone for this reason - the negative proportionality between the manager's influence on content and the credibility of the project - it is very important to be aware of the split of roles between management and participants.

The discussion of the role of the project manager has a side of it that has to do with the scientific viability or legitimacy of participatory processes. On the one hand, participatory technology assessment is an activity that is based upon knowledge (the scientific knowledge-base being very important for technology assessment), builds up knowledge (see the discussion of the cognitive purpose of participatory technology assessment in the beginning of this paper), and has ethical standards connected to this activity. On the other hand, participatory technology assessment is

¹⁹Only a selection of examples. Few of them are easily placed as one type of participation only, as most projects make use of more than one participatory technique.

not in itself a scientific activity, as it does not rest upon the positivistic scientific method (but rather on methods for social debates), and accordingly it makes use of other ethical standards.

The viability of participatory technology assessment does not necessarily connect to scientific aims (the production of “truth”), but much more often to aims of political and public discourse (the production of discourse that has “credibility”). Obviously, this reason-for-living of participatory technology assessment is not in conflict with science, but a necessary addendum if scientific findings are going to be implemented properly in our societies.

Getting back to the role of project management, this has its implications for the professional profile of project managers. Participatory technology assessment project management does not contribute to a larger curriculum vitae as a scientist, but the CV definitely grows in other directions. In order to perform a clear role as a project manager, it is necessary that the single person - as well as the institution - is articulated about the kind of professionalism that is expected.

Text transformation problems

Procedures that are not self-documenting holds a risk that meaning is changed by the person who takes over and brings on information (text transformation problems).

As the scheme shows, some methods leave a role for the manager to analyse or conclude on the participatory process. This might go on during the project, when information has to be summarised from one phase and given to the next [Urban Ecology DK; Gideon NL], or at the end of the project, when the results have to be analysed, transformed into policy options [Urban Ecology DK; Biotech Baden-W. GE; Gideon NL]. Authenticity may be lost during such processes, lowering the credibility of the project as such.

Similarly, information made by the project management for use by the participants may lose meaning in the process. For example, research questions in surveys/interviews [Delphi AU; Drinking Water DK; Gideon NL; Novel Food NL] may be misunderstood, or the respondents may use the question to put forward a meaning that does not fit to the question. That the respondents answer another question than they are put is a generally recognised problem with survey-like methods. Participatory projects that make use of predefined questions during the process are likely to suffer from the same problem.

A solution may be to increase the authenticity through self-documenting processes, in which the participants themselves decide the scope of the topic, the relevant questions, the relevant answers, and the conclusions and recommendations. Methods that comes near to such a degree of self-documentation is the consensus conference and the Citizen Foresight [Citizen GMO UK].

Don't overestimate their knowledge, and don't underestimate their intelligence

This wise sentence from the field of journalism seems to count for PTA too. In our cases we find examples of information overload of the lay participants [Plant Biotech UK] as well as lack of information [Citizen GMO UK] and the participants seem to be fully aware of both kinds of problems.

It follows from the claim for an enlightened discourse that the participants of a PTA process should have available the knowledge they need in order to make their assessments. This may be

in the form of information sources or often better, in the form of direct access to experts. On the other hand, overload of information might happen, when it takes away resources, time or focus from the process of deliberation, and that leaves the participant in an unfair situation where a product is expected from them, but they do not get the circumstances needed to make it.

Information overload may be forced upon the participants because of lack of trust to their capabilities, but it is worth noticing that firstly, there are no complaints about low quality of the participant assessments in our cases, and second, if an information overload occurs, this might in itself be the reason for a not optimal product.

Under-information may happen because of the idea that lay participants should not be educated to a level where they end being lay, and begin to be “lay experts”. This way of interpreting the lay element of certain PTA processes might too arise from a lack of trust in the capabilities of the involved lay citizens, since it is based on the notion that an enlightened person loses the values and attitudes he/she had before he/she received the information. Nothing from our cases - or from the experience of numerous PTA projects around the world - reflects that the basic values of the participants are changed because of the information given in the process, but it is seen that the lay people demand access to knowledge in order to gain a basis to form an opinion.

4.3.7 Conclusions

This chapter has taken up the different aspects of PTA management, as they appear in our cases or as they are known from the experience of our team. In the discussion of the challenges of management, some ideas, “tricks”, conclusions and recommendations are given - connected to the specific managerial problem. These hints to possible solutions shall not be repeated here, but will rather function as a background for some conclusions and recommendations that are of a more general kind. The conclusions comprise conceptual issues as well as concrete recommendations to the further development and use of PTA.

- Discourse ethics seem to be useful as an overall frame for evaluating best practise in PTA management. There is, however, a need for further research, since the actual role of discourse ethics in PTA practise needs to be uncovered. Although touched upon in the EUROPTA project, such research has been beyond our scope.
- There is a need for more research regarding quality criteria for the outcomes of TA, as these in the end make up an important guideline and evaluation tool for project management.
- Participatory TA experience and research has developed to a level, at which it seems relevant and feasible to head towards the establishment of an actual “cookbook” that
 - A. Describes the qualities of the different methods in use
 - B. Describes problems to be aware of, and possible solutions to the management of different phases of TA projects
 - C. Describes the procedures of standard and variant methods
- It must be recommended to take a step-by-step approach, when managing methods that are new to the arranging institution. Adoption of methods should be done with some humility to the original format, only changing the parameters of the method if forced to. Especially the specific characteristics of a method should one be very cautious to preserve, at least until the experience with the method allows for making changes.

- The practise of PTA in the cases studied is generally of a rather high standard. However, there still seems to be a difference between the management done by “first time users”, and that of more experienced institutions. A nearby conclusion from that observation is to emphasise the need for continuity in the use of and build up of expertise about PTA methods in the European countries and the institutions involved in technology assessment.
- Inexperienced PTA project managers - everything else being equal - must be expected to take less optimal decisions, as compared to the work of experienced PTA staffers. The case studies support that suspicion. This speaks for the establishment of international training and courses in PTA theory and practise. The expertise for establishing such courses is present.
- There is a need for a coherent and comprehensive set or system of criteria about the strengths and weaknesses of PTA methods. It is a challenge that really should be followed up upon, to develop an analytical tool that can be used for the choice of methods in PTA.
- Project management has to be effective in all its aspects. If not, the activity cannot be expected to give rise to big changes or impacts. Especially it seems to be problematic, if the management
 - A. Does not take into account the needs of the “customers” (by a proper problem definition, suited project set-up, and a targeted management), or
 - B. Is not based on a reasonable degree of discourse ethical practise
 - C. Does not ensure a proper communication - of process as well as outcomes - by establishing communication lines to the addressees
- Although some aspects of project management are not optimal, the project may have been positive to the participants or the arranging institution, as a learning process or as a necessary forum for dialogue.
- Since politicians or decision-makers are important target groups for PTA activities, it is a challenge to develop methods that specifically aim at politicians as participants. No existing method seems to be able to solve the problem that politicians cannot afford to use large amounts of time as participants or audience in PTA projects. Consequently, there is a need for methods that focus on the needs of politicians and at the same time provides them with the broad scope that is characteristic for PTA projects.

This chapter has focussed on problems, and it may leave the reader with the wrong impression that PTA always goes wrong. That is, however, not at all the situation. The case studies in the EUROPTA project shows in general, that PTA exercises in Europe are of a very high standard. Errors are made of course, and the aim of this chapter has been to bring them out into the open in order to learn from them. In the hope that this approach has been and will be received well, the last conclusion of this chapter shall be:

Let us be open about bad as well as good experiences, because we can learn from both.

4.4 The choice of participatory TA methods

Josée van Eijndhoven* and Rinie van Est**

4.4.1 Introduction

In this paper we set out to look at the relationship between the PTA method, the situation in which the method was applied and some design elements. As mentioned in the analytical framework, for instance, it is more likely that ethical questions are delegated to lay people, whereas questions related to uncertain data or risk assessment are more likely to be discussed in expert panels and with organised interest groups. Another issue mentioned in the analytical framework is the important role of the maturity of the technology and the types of questions that can be dealt with in an early stage or at a later point in time. At an early stage the opportunity to influence the development is relatively high but little is known about possible impact. At a later point in time influencing the development may be rather more difficult, but at least much is known about the effects. The problem setting of a PTA is an important design criterion. In this chapter we use the information from the case studies to analyse a number of issues that may clarify which forms of participatory TA have been used in what situation and conclude about the design choices that an organising institution has to deal with.

We relate the *type* of participatory TA that was used primarily to the *issue* that gave rise to the TA activity. In this part of the analysis we look at the situation around the technology: the stage of technological development, the type of problem encountered and the social situation around the technology. Then we delve one level deeper into the set-up of the PTA by reflecting upon a number of *design characteristics*: the relationship to (political) decision-making, selection of participants, communication rules within the PTA arrangement and the way problem framing is dealt with in the arrangement.

Section 4.4.2 sketches the main concepts used in the paper. These form the basis of the analysis of the role of the problem setting in section 4.4.3 In section 4.4.4 some design characteristics of the cases are discussed. Section 4.4.5 sketches some important choices.

4.4.2 Analytical approach of the paper

Technology assessment and therefore also participatory technology assessment can be viewed as intervention in society: the intervention aims at changing aspects of the ongoing societal process.

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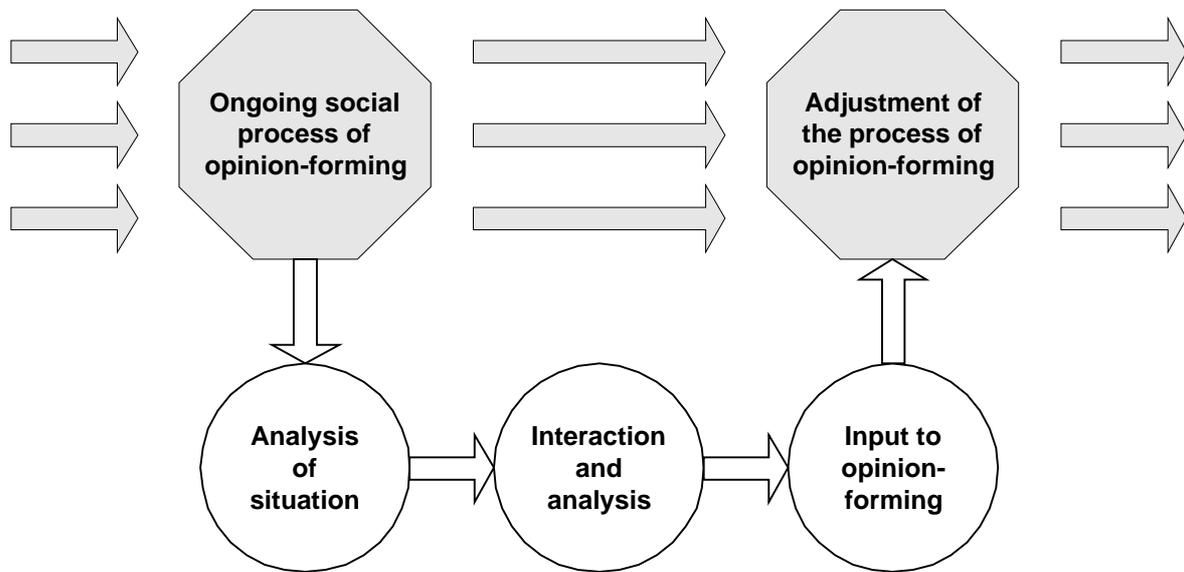


Figure 1. Relation between Technology Assessment and the ongoing social process

Problem setting

Typically the starting point for setting up a PTA arrangement will be a situation in which a certain scientific or technological development has come under scrutiny (e.g. biotechnology) or is seen as implicated in changing a problematic situation (e.g. as a help in getting a more sustainable direction of development). Would the situation be clear-cut in the sense that it is clear which measures can solve the problems of the technology involved or how the technology can solve the problems at hand, a TA would not be asked for. Situations where TA is called for are those in which uncertainty and/or dissent exist on facts and/or values. Especially in the case of dissent over facts and values participatory arrangements are in order (Grin, van de Graaf and Hoppe, 1997).

Such situations are typically complex, and differing views of what the problem is, will be entered into the situation. The institution setting up a PTA arrangement will have a problem definition of the situation to start with. But typically this problem definition will shift in the course of the activities. As a result of the activity, interactions and responses of actors, the problem definitions of the involved actors change, as do the perceptions, relations and roles of those actors. The problem setting therefore entails a view of a specific situation including not only the scientific or technological development itself but also the societal setting of it.

Methods

The decision of an organisation to select a situation for PTA entails the choice of a method, a way of intervening. The method and strategy chosen will be in accordance with the organisation's analysis of the issue. The TA organisation will hope to contribute to taming (part of) the problem situation. It will choose a method in such a way that it may hope to intervene in the

problem setting in a constructive way, constructive for the problem as perceived (at least by itself and hopefully by others, lest it loses its legitimacy) and constructive for its own position. The method or methods chosen in a PTA arrangement constitute the design of the planned societal intervention. Without a design, although possibly incomplete and partially experimental, we would not speak of PTA. The design attempts to structure the societal intervention. The structuring can be seen as a way in which the organising institution tries to channel a transformation of the problem setting.

Forms of (P)TA

With respect to participation we distinguish between three types of TA: classical TA, expert / stakeholder PTA, and public PTA. This distinction is based on the type of actors (not) involved in a TA.²⁰ In classical TA only the TA researcher or expert is involved. The result of the TA is a report that is intended to provide a neutral, factual input to decision making. The former U.S. Office of Technology Assessment (OTA) stretched this concept of classical TA by involving stakeholders in the advisory panel and the extensive external review process (see e.g. Van Eindhoven 1997).

Whereas OTA involved stakeholders in guiding the technology assessment and reviewing its result, stakeholders were still outsiders. When experts or stakeholders become actively involved within the TA process, we speak of expert / stakeholder PTA. Finally, we speak of public PTA when citizens play a central role in the method.

In the EUROPTA project the following PTAs were directed at involving experts and stakeholders:

- Delphi AU
- Gideon NL
- Novel Food NL
- Traffic Forum AU
- Copenhagen Traffic DK
- Urban Ecology DK
- Discourse GMP GE

In the EUROPTA project citizens played an active role in 9 PTAs.

- Ozone AU
- Plant Biotech UK
- GM Animals NL
- Electricity CH
- Biotech. Baden-W GE
- Citizen GMO UK
- Sustainable Menu NL
- Gene Dialog CH
- Drinking Water DK

²⁰ These three categories relate to a discussion of four paradigms of TA by Van Eindhoven (1997). In contrast to classifications based on the democratic role of TA in society (e.g. Bechman 1993), we use a purely descriptive - in fact common sense - way of typifying (p)TA. See also the analytical framework.

In the Gene Dialogue and the voting conference on Drinking Water citizens play a role side by side with experts, stakeholders, or politicians. We categorised them as public TA, because forms of TA in which members of the public play an active role need specific attention to that factor, whereas in all forms of interactive TA experts are somehow involved, even if only as a resource person.

4.4.3 Analysis of the problem setting

In this section we explore the relationship between the problem setting and the choice of method. We defined the problem setting as a situation that gives rise to a felt need for intervention. What we set out to do in this section is to explore the way in which various variables in problem setting influence the choice of method and relate this to the method(s) chosen in the cases.

In the analytical framework the setting that gave rise to participatory TA was very generally described as a perceived need for bridge building in or between four important communities in society –citizens, politicians, experts and stakeholders. As discussed in the analytical framework different types of problem may inspire an institution to organise a PTA project. The reasons may be related to uncertainties or risks of a technological development and/ or the surrounding structures and relationships. An institution may set up a PTA arrangement when it perceives a need for building bridges between actors. However, it is likely that it is also important whether such a perception is widely shared, which is more likely when an issue is high on the public agenda than in case it is not.

Therefore, in analysing the problem setting we will take the following variables into account:

- The characteristics of the technological development and/or the situation in which the technology is implicated (the technological system)
- The characteristics of the societal arrangement around the technology or the technological system
- The characteristics of the actual situation: does the issue figure on the public agenda.

In discussing each of the above three variables the characterisation of the problem setting cannot be done independent from the institutional setting of the organisation setting up a PTA arrangement. The problem definition following from the analysis of the problem setting is not a given but strongly mediated by the problem perception of the analyst, the analysing institution and the arrangements involved in problem seeking. I.e. a certain problem definition may well be seen fit for a (p)TA by an institution involved in implementing a policy, but not by an institution working for parliament. The latter point is not worked out further in this section.

Characteristics of the technology

Technology assessment is primarily associated with new and emerging technologies and the questions that arise because of a lack of uncontested knowledge about their impacts, of consensus on the related normative issues and/or a lack of capacity of the (political) system to steer technology development. Uncertainties and the threat of growing inequality may lead to a non-optimal development of the technology. Apart from situations where new technologies lead an institution to set up a TA project, there are also situations where it is not a newly developing

technology that leads an organisation to consider TA, but an existing situation in which TA can be a decision support tool.

Therefore there are at least three types of situations around science and technology in which an institution considers technology assessment:

- A. Relatively new scientific or technological developments that have come or may come under scrutiny because of the possible negative impacts that some actors fear. Examples of such technologies are biotechnology and nuclear energy.
- B. Relatively new scientific or technological developments in which groups that are or will be confronted with the developments in due time (in German 'Betroffenen') are not or too little actively involved, with possible detrimental effects on the direction the development takes, given the path dependency of technological development. Information and communication technology (ICT) is an example.
- C. Situations in which technology is seen as a possible supportive means for change in a desired direction, as is the case in the quest for sustainable development.

In the former two situations the technological development may be in a rather early phase of development and therefore the situation is on one "horn" of the Collingridge dilemma: little is known about possible effects. In that sense there is no difference between A and B. But in situation A there is awareness of the fact that there is an issue at stake, most likely there is already a lively societal debate on aspects related to the issue. In situation B the technology may still be debated, but –as still in many instances around ICT - the debate may be limited to only a relatively small number of aspects (e.g. economic) and actors (e.g. economic actors).

In situation A, questions arise around the reality of the presumed risks, ethical concerns may come to the fore and important questions therefore are how the possibilities generated by new scientific and technological developments should be gauged. Should they be accepted because of the supposed benefits, or should they not because of conflicts with normative viewpoints or because of possible risks that emerge. Is it possible to make cost-benefit analyses or should ethical concerns (positive as well as negative) outweigh such calculations?

Whereas in situation A an important driver of the societal debate and of the wish to assess scientific and technological development is the existing or feared resistance amongst some stakeholder groups and a large, but sometimes unknown part of the population, in situation B no such driver exists. In an example like information and communication technology quite some efforts are made in many countries to stimulate the development of the technology because of its potential. Those interested in the potential, mainly but not only, for economic reasons tend to push the development, whereas other actors are lagging behind. However, a lack of scrutiny from the part of these actors may be to the detriment of the direction in which the development takes place. If in such cases TA is conducted one could call this early warning TA, because it is directed at avoiding future problems. Contrary to early ideas about possible roles of TA, however, it is no longer believed that negative effects can be presaged; now this form of TA is rather seen as a guide in choices.

In situation C the role of technology may be less obvious. Such is the case in the search for sustainable development, where technology shifts may be seen as positive options. But in this category it is less clear which technological options are implicated and what role they play in a d-

addressing the problem situation. Typically the starting point from where a TA arrangement is set up will be a problematic societal situation like the traffic situation, the quality of water supply or the management of water systems. In these situations technology is implicated in two ways. Technology was part of the shaping of the present problem situation because without technology the situation could in many cases not have existed in its present form, but technology can also be part of the answer by generating options for solving the problem. Typically in these cases the implied technology is less visible than is the case in situations A and B where science or technology is the starting point for the problem definition.

Social arrangement

The social arrangement around a technology, a technological development or a technological system can be analysed in a number of ways. A well-known way to do so is to make a societal map, in which the relationships between actors involved in the technological development are analysed. Societal maps can enable the analyst to discern obvious "gaps" in involvement and also strong and weak links between actors. For instance in the project technology for the handicapped of the Rathenau Institute it became clear that organisations involved with research were strongly linked, but had only weak links to organisations providing handicapped with supporting devices.

A full-flung societal map may be indicated for arriving at specific recommendations to enhance the co-operation between specific groups or to generate a specific information flow. However, to come to a choice of a PTA arrangement a somewhat coarser approach might already be sufficient help. Here we derive this approach from Bunders and Van Eijndhoven (1987) and from Van Eijndhoven et al. (1987).

At the basis of the idea to set-up a PTA project is the fact that the situation around the technology warrants an intervention to shift the existing situation, and more specifically an intervention that involves some form of participation. Presumably, therefore, the participatory arrangement will involve actors or individuals that without the arrangement would not have been involved in the decision-trajectory or involves them in a different way than would otherwise have been the case. Bunders and Van Eijndhoven divide actors around technology development in primary and secondary actors, primary actors being actors involved in the decision-making and secondary actors those not involved. A division between involved and not involved may be too strict, certainly if one views a decision-making process as a trajectory. But it may still be fruitful to view the social arrangement around a technology as one in which core actors and non-core actors are involved. A PTA arrangement can then be seen as an effort to broaden the conceptual and/or the participatory basis for decision-making by bringing more actors into play. The question to be answered becomes which actors need to get involved, for what reason? Each PTA method is an answer to this question but also to the question how the organisers think such a broadening can be achieved.

Whether a PTA method is fit for a certain situation can further be analysed by looking at the way the technology is institutionally embedded. To assess the degree embeddedness we can analyse two characteristics of the problem setting. These are the *degree of institutionalisation* and the *degree of antagonism* (Bunders and Van Eijndhoven, 1987).

The *degree of institutionalisation* indicates how strongly institutionalised the setting is. For instance, in many countries there are strong and powerful institutions around socio-economic questions in which labour movements, employers and the state are involved. Likewise the structure

around energy production or the road infrastructure are in most cases strongly institutionalised. In such cases there may be a strong demarcation between those who are normally involved in decision-making processes and those who are not (primary and secondary actors). On the other hand, in the development of a new technology in many cases institutionalisation is much weaker and the division between primary and secondary actors may be much less clear-cut or at least less fixed. For instance, the boundary between primary and secondary actors in biotechnology is still very much open to shifts, whereas in areas like the former monopolies on telecommunications clear state interventions were needed to open up the actor groups involved.

The *degree of antagonism* is a second important dimension because it indicates how difficult an intervention may be. In an antagonistic situation it may be difficult to intervene especially if there is strong institutionalisation, because then the existing societal arrangement should first be delegitimised, which may be something that a TA institution is not able or probably not willing to do. Actors involved in a PTA arrangement may be aiming at deconstructing the status quo, but not able to do so. One way of explaining why environmental organisation left in the Discourse GMP case in Germany is that they were not able to get their perspective well enough over the counter. In such cases additional information and analysis may be needed to put the discourse on a different footing. This may be a counter indication for a PTA arrangement. A more traditional TA method may be more appropriate in this case.

The public agenda

The reason for viewing a situation as warranting a PTA set-up may be acute or not. In some cases a media hype may lead to requesting such activities. The case of cloning is an example. Another immediate cause may be a concrete request by an important actor. A third type may be a natural event, like heavy rainfall leading to reconsideration of water management. In these three situations the public attention to the issue is large to start with. In many cases, however, the reason for starting PTA is the felt need for broadening the basis for decision-making on technology without a broadly shared feeling of urgency.

Whether the cause for setting up a certain PTA project is immediate and visible or more distant is an important variable in choosing a method and in designing the project, although it may be more important for the management of the project than for the choice of method per se. In an acute situation quick operation is urgent, because it is likely that others will not stay idle and the urgency may lead to many actors becoming involved. The effort may be wasted if the PTA activity does not gain cognisance or if decisions are taken before results are generated. A strong institution may be able to monopolise the intervention, but more likely others will develop their own strategies for intervention. In that case the organisation has to decide whether to stay out of the issue or to tune its activity with that of others by co-operation or otherwise. The acuteness of a situation may also prevent certain methods from being fruitful.

More generally an important characteristic is whether the issue addressed is visible on the public agenda: is it reported upon in the media and thereby widely recognised as being an issue. If an issue is not visible it may be more difficult to gain attention for it and to involve people that do not directly have a stake. Even more extreme is the situation if the issue addressed in TA does not figure on bureaucratic agendas either.

An advantage of a non-acute situation is that there is more leeway with respect to timing. It may even be that it is difficult to find good moment to get attention for the results. In that case it is

important to actively seek for a good moment or to create an event. Creating an event may be relatively easy for institutions with good relationships with the media, but not otherwise. Creating an event may be done by involving well known people, like popular ministers or royalty, but it may also be possible to create events by creatively jumping into the possibilities generated by smaller events, like international conferences, accidents, parliamentary debates and the like.

Choice of (P)TA

Looking at the case studies in the light of the above discussion on the situation of the technology, the social arrangements around the technology and the presence of the issue on the public agenda we can try to relate the problem situation to the type of PTA that was conducted. In table 1 we brought together the main characteristics of the problem setting in the cases conducted.

Type of PTA	Technology	Societal situation		Public debate
		Fixed	Antagonistic	
EUROPTA case study		Fixed	Antagonistic	
<i>Expert-stakeholder PTA</i>				
Delphi AU	C	+/-	-	-
Gideon NL	C	+	+	+/-
Novel Food NL	C	+/-	-	-
Traffic Forum AU	C	+	+	+
Copenhagen Traffic DK	C	+	+	+
Urban Ecology DK	C	+	+/-	+/-
Discourse GMP GE	A	-	+	+
<i>Public PTA</i>				
Ozone AU	C?	(-)	+	+
Plant Biotech UK	A	-	+	+
GM Animals NL	A	-	+	+
Electricity CH	C(A)	(+?)	+	+
Biotech Baden-W GE	A	(+/-?)	+	+
Citizen GMO UK	A	-	+	+
Sustainable Menu NL	C	-	+/-	+/-
Gene Dialog CH	A	-	+	+
Drinking Water DK	C	-	+/-	+/-

Table 1. Problem settings of various case studies.

We again put the cases into the category expert/stakeholder TA and public TA. For each of the cases we indicated whether the situation around the technology involved corresponds to situation A, B or C as introduced before. We also indicated two characteristics of the existing social situation surrounding the technology. The first is the degree of institutionalisation, here denoted by the term *fixed*, because it is not so much important whether institutions do exist but how fixed the relationships are and how closed they are to the outside world. The second is the degree of *antagonism*. In an antagonistic situation there are clear differences of opinion and/or interest. In the last column we indicated whether the situation is one in which there is public debate around the issue or not.

Relationship between type of TA and the characteristics of the technology

An interesting observation from the table is that almost all A-type cases are in the category public TA. This corresponds with our initial expectation that ethical questions are more likely to be delegated to lay people than issues involving uncertain data or risk assessment. It is not exactly the same, however, because the issues discussed in the cases categorised as public TA in our table can involve ethical as well as data and risk aspects. We should make a closer analysis of the division of roles within the cases to be able to address this question. It may be that the risk discourse is delegated to the experts involved.

Another interesting observation, however, is the degree to which type C cases show to be expert-stakeholder TA. It is not clear that there are good reasons why citizens could not be involved in those cases. If anything, those situations can be better gauged by citizens than many of the A-type cases. This may have nothing to do with the a priori feasibility of arranging a PTA in such cases, but with the fact that other methods are considered to be more effective in those situations. There may exist a relationship with the social situation that in many type C cases may be rather fixed as opposed to type A situations.

The finding also allows a rather more negative conclusion, namely that the use of public PTA is not so much driven by the wish for democratisation, but born out of embarrassment: public PTA as a means out of an impasse. Some evidence may be found in a case that was not part of this study but analysed in Vig and Paschen (Hoppe and Grin, 2000). In the traffic case of the Rathenau Institute, stakeholders and politicians involved did not really feel the need for a confrontation with citizens to make up their minds.

No clear examples of situation B are found amongst the cases. Of course, with a sample of only 16 cases the lack of type B cases may be due to the way the cases were selected, and probably cases of type B could be found. However, alternatively and even more likely participatory TA is not the method of choice for issues in this situation. Presumably, a situation in which non-evident sub-optimisation of a technological development takes place is not a good case for conducting TA in a participatory way. In Van Eijndhoven (2000) the example is discussed of the *Fatima* project around telecommunication technology, where the analysis of the problem situation led to the conclusion that there was an urgent need for critical analysis of the development and only thereafter interactive processes were in order. From our findings we may draw the tentative conclusion that in a case where the issue can be placed in category B the method of first choice will not be a PTA method.

This should, however, not be interpreted as a categorical dictum. There are three reasons to consider more classical forms of TA in those cases:

- The first has to do with the lack of well-developed arguments to be entered into the interaction. With respect to that argument one can say that a TA arrangement if it is to involve live interactions should not only be interactive but also include assessments of other kinds to develop the reasoning.
- The second is one of timing and context. In Denmark PTA projects and even public TA projects have been conducted in the area of ICT (Klüver, 2000). It should therefore not be seen as an eternal law that PTA should not be conducted in a type B situation. It may well be that PTA becomes feasible around such an issue as soon as and only if PTA has gained credit as a standard way of conduct in a democratic society.

- The third is one of design. PTA, and certainly public TA needs to be seen as relevant to those involved. For situations of type B the relevance is less easily perceived and therefore the mortgage on the TA arrangement may be heavier.

Choice of PTA and the social arrangement around the technology

Table 1 shows a division between the degree of institutionalisation observed for the expert/stakeholder TAs and the public TAs. Apparently in a heavily institutionalised situation where the roles are relatively fixed TA is more directed at opening up the existing situation by introducing new stakeholders or confronting the old ones in a new way than by involving citizens. Presumably it is felt that rehearsing the old interests in front of a new public does not lead to new insights nor to the desired shifts in arguments (see the above mentioned example by Hoppe and Grin). Interestingly, public TA is mainly applied in cases where the degree of institutionalisation is low or the existing institutionalisation is contested.

It is perhaps not surprising that most cases in which PTA was conducted present antagonistic situations. Because organising PTA is very resource intensive, it can be understood that those resources are only made available in situations where stakes are high.

The existence of a public debate is also seen to be of relevance. In a situation where there is no public debate it may well be difficult to interest citizens to get involved with a PTA. In that case expert/stakeholder TA may be the method of choice, although also for them holds that the issue should be on their agenda or at least be seen as relevant enough. In case an organisation thinks public TA is called for even if an issue is not on the public agenda an effort should be made to find inroads to the issue that come as close as possible to issues seen as relevant by the public.

The characteristics of the technology, of the societal situation surrounding the technology, of the actual situation and of the planned intervention all are relevant for the choice of TA method. The various dimensions discussed above can be used in a checklist for choosing PTA methods.

4.4.4 The PTA design

The first question a TA organiser has to address is should we set up a participatory or a non-participatory TA? The former section shows that when opting for a participatory TA arrangement, a TA organiser can basically choose between two types of PTA: public PTA and expert-stakeholder PTA. We found that the problem settings in which TA organisers select public PTA or expert-stakeholder PTA differ widely. When a relatively new technological development is involved and the degree of institutionalisation is relatively low organisers mostly opt for public PTA. In contrast, expert-stakeholder PTA is used when the institutional setting is rather fixed. In these cases, technology seems to offer an opportunity for change.

In this section we study the type of design decisions involved in both expert-stakeholder and public PTA. On forehand, there seems to be a crucial difference between involving citizens or experts and stakeholders. In contrast to experts and stakeholders, citizens do not represent a specific interest nor have a clearly defined position within the problem setting the PTA is dealing with. Citizens are supposed to represent the general public interest. Moreover, experts and stakeholders will have a history within the problem setting, and will play their role within the problem setting before, during, and after the PTA. In contrast, the lay people involved will likely play a

temporary role and normally leave their involvement with the problem setting after the arrangement has ended. Since the connections between the involved participants within public and expert-stakeholder PTA are so different, we may expect the design characteristics between these types of PTA to be qualitatively different. Consequently, we will analyse the two types of PTA separately in order to compare them.

Participatory TA as a transformation of the problem setting

We consider the PTA arrangement as an artificial transformation of the problem setting in order to change that setting for the better. Accordingly, we characterise a PTA as a set of transformations. Each transformation will involve various design decisions. For example, spatial transformation is an obvious transformation type involved in almost every PTA. Although obvious, to take people out of their normal setting, and bring them together into a nice physical environment is an important success criterion for PTA. Design decisions involved are selecting a nice location, paying travel costs, etc.

Here we focus on four basic transformations: relation to (political) decision-making, participation, interaction and problem framing.²¹ Each type of transformation challenges the PTA organiser in various ways, and provokes various design decisions or dilemmas (cf. Pröpper and Steenbeek 1998).

Relation to (political) decision-making: Participatory TA is often said to create a "creative space" outside the political decision making process. Not all PTAs, however, occur at arm's length of the political process. The Salzburg Traffic Forum is a point in case here in which the outcome of the PTA is supposed to play a direct role in politics. To position a PTA at a certain distance of the political world is an important type of transformation.²² Creating distance with respect to the (political) decision-making process can be done in various ways: by selecting participants that play a role behind the scenes, by putting a long-term perspective on an issue, by clearly separating the PTA from the political process, etc.

We talk of a *direct* PTA arrangement when the outcome of the PTA is expected to have a direct or non-mediated impact on the decision-making process.²³ In case of an *indirect* PTA no direct commitment of decision makers is expected. In this case the impact on the (political) decision-making process is less straightforward. External commitment may be created during the process and / or mediators may be used to translate the results of the PTA into (political) action.

Participation: A second type of transformation involved in PTA is selection of participants.²⁴ It is exactly this type of transformation that distinguishes PTA from classical forms of TA as well as public from expert-stakeholder PTA. Here, we will focus on design issues like who many actors should be involved in the PTA, what kind of actors should play a (central) role, etc. In particular, the issue of representativity puts a real challenge to the organiser of a PTA.

²¹ See analytical framework, section III.A Set-up and process, and III.B Values, assumptions and goals.

²² See text under heading 'Design' of section III.A of the analytical framework.

²³ Idem.

²⁴ See text under heading 'Participants' of section III.A of the analytical framework.

Interaction: A third type of transformation concerns the communication rules that apply within the PTA.²⁵ The rules of a PTA can be classified as: rules that cannot be subject to negotiation, rules that are set, but may be negotiated, and rules that are defined by the participatory process (see chapter 4.3 on Project Management).

Problem framing: Finally, framing of the problem setting presents an important type of transformation.²⁶ Friend and Hickling (1997) present five broad dimensions in which the organiser of the PTA needs to make a choice. There is a choice between a more focused or synoptic treatment of problem scope, between a more simplifying or elaborating treatment of complexity, and between a more reactive or interactive treatment of conflict. There is a choice between a more reducing or accommodating treatment of uncertainty. Finally, the organiser may choose for a more exploratory or decisive treatment of progress through time.

In the subsections "Public PTA" and "Expert -stakeholder PTA" we discuss, how PTA organisers have dealt with the design questions or dilemmas involved with each of the four basic transformations in the case of public PTA and expert -stakeholder PTA, respectively. In the subsection "Comparing public PTA and expert -stakeholder PTA", we compare our findings and see what the similarities and differences in design are between the two broad types of PTA.

4.4.5 Public PTA

An explicit role for citizens can be found in nine out of the sixteen EUROPTA case studies. The public PTA arrangements aim to give the voice of citizens a proper place within the social debate on a certain technology-related topic and to stimulate public debate around that topic. Participatory TA arrangements aimed at these two objectives was denoted as public PTA. Whereas specific designs in order to reach these two goals differ widely, organisers of public PTA seem to face similar type of design issues.

Relation to (political) decision-making

In most public PTA cases the relationship with the political decision making process is weak, and it is up to politicians whether they take seriously the outcome of the PTA or not. Whether the outcome of a PTA is taken seriously by the political system depends on the history of that method within a certain political culture and the attitude toward that particular method. For example, the Swiss PubliForum (Electricity CH) was an attempt to break grounds for the consensus conference within Switzerland and to see whether the Swiss political system could appreciate such a method. It seems that the appreciation for certain PTA arrangements differs across various political cultures. Most organisers seem to be aware of this fact and adopt their designs to a lesser or a greater extent. Analysing the transformation types participation, interaction, and problem framing can be used to check this statement.

²⁵ See text under heading 'Interactions' of section III.A of the analytical framework.

²⁶ See text under heading 'Problem definition' of section III.B of the analytical framework.

Participation

The direct role played by citizens within a certain problem setting is often marginal. In contrast, citizens play a central role within public PTA. On June 7, 1998, a Swiss referendum was held that aimed at prohibiting several applications of biotechnology. Let us, for the sake of argument, regard the Swiss initiative as a public PTA. This event involved all entitled voters. In the public PTAs under scrutiny, however, selection had to be used to make the PTA manageable and affordable. How to select citizens in such a way that the result of the PTA is seen by the outside world as representing (to a large extent) the public's view? The cases show different ways of how PTA organisers have tried to deal with this question.

For a consensus conference normally some 15 people are selected as panellists. By advertisements in the papers interested lay people are invited to join the public panel. From the applicants 15 to 20 people are selected in order to get a wide diversity of different people and related to this a wide variety of public viewpoints.²⁷ The selection criteria can easily be adapted to a particular political context. For example, the Swiss PubliForum had proportional numbers of French, German and Italian-speaking Swiss in its lay panel. This seems to be a logical prerequisite for a diverse Swiss lay panel. The disadvantage is that the lay panel becomes larger and presumably more difficult to handle.

Organisers of consensus conferences normally do not claim that the selected public panel is representative for the whole (national) population.²⁸ Despite of this, the method is often criticised for the fact that some 15 people can never represent the whole population. The Dutch media constantly highlight this issue. The remedy of the Dutch organisers was to leave out the demand of reaching consensus. In this way, the organisers emphasised that showing a variety of public views is more important than reaching consensus. Despite of this the critique remains.

The Danish voting conference (Drinking Water DK) shows an interesting example of how one might deal with the issue of representativity. After the voting conference a major poll was held to check the outcome of the citizens' vote at the conference. The survey came up with the same results and proved that the outcome of the method was representative for the whole Danish population. In Switzerland the results of a survey were used to select participants with a diverse set of views. The PubliForum's (Electricity CH) outcome turned out to be in line with the results of the survey. This fact considerably strengthened the credibility and applicability of the outcome of the PubliForum for politicians.

The German Citizen's Forum method (Biotech Baden -W. GE) shows another approach again to the problem of participation. Instead of one lay panel, some eight panels with in total 194 participants have been organised. It is possible to even increase the total number of participants. In Great Britain, The Wellcome Trust is organising at the moment the largest public panel ever, involving almost a thousand people. In this way the Wellcome Trust tries to get results that are indeed representative for the whole British population. These examples seem to show that the ways in which problem of participation is dealt with differ among various political cultures. While in Denmark the issue of representativity has not caused major problems, the critique in

²⁷ This only works when a sufficient number of people react. For example, in the case of the South-Korean consensus conference on cloning, held in September 1999, only some 17 people reacted.

²⁸ Still, most organisers strive after representativity.

countries like Germany, Great Britain and the Netherlands are much louder and consequently organisers are forced to address this criticism.

In organising a 1000 -people strong public panel, the Wellcome Trust tries to address the issue of representativity. Although this huge and expensive set -up will probably do the job, the Swiss and Danish experiences (Electricity CH and Drinking Water DK) seem to imply that there is an easier and cheaper solution, that is, to combine the organisation of a diverse small (15 -20 participants) public panel with survey techniques. Survey techniques can be utilised before, during and after the PTA.

Interaction

The citizens' role versus experts or stakeholders is a crucial design characteristic. The consensus conference is normally depicted as enabling a balanced dialogue between citizens and experts and stakeholders. Some argue that stakeholders and experts act as information sources and transmitters within this method, whereas lay people are merely positioned as information receivers.

The Swiss dialogue on genetic testing (Gene Dialogue CH) deals with this critique by treating citizens and stakeholders both as information sources and receivers. The public and stakeholder panels enter into discussions and both panels write evaluative statements at the end of the PTA.

The Danish voting conference (Drinking Water DK) represents yet another interpretation of the citizens' role versus experts and politicians. Citizens, experts and politicians are regarded as equal judges of proposed policy scenarios. Finally, the Dutch sustainability debate (Sustainable Menu NL) limits the role of the public to that of an active audience. One might say that this method embodies only the public -PTA objective of stimulating the public debate.

Problem framing

At a consensus conference the lay panel is allowed to set up its own agenda, select experts or stakeholders it wants to hear, and writes its own report. This method embodies a synoptic treatment of problem scope and an elaborating treatment of complexity. The PTA is more involved with problem finding than finding solutions. As noted above, a key difference between on the one hand Dutch public debate and Swiss PubliForum and on the other the Danish and British consensus conferences (Plant Biotech UK) is the (lack of) requirement for consensus.

In contrast to the consensus conference method, the citizens' forum is at the mercy of a strictly planned predefined lecture schedule and the organiser writes the final report. In the latter case the commitment of citizens to the outcome of the PTA is clearly put to the test. The German case showed that some lay participants demanded that the report should first be presented to the whole citizens' forum before they would give their approval.

Conclusion on public PTA

We have summarised the main findings of the subsection Public PTA in table 2. We found that in most public PTA cases the relationship with the (political) decision -making process is rather weak. At the moment, most Danish parliamentarians acknowledge the added value of the consensus conference method, and its results are being appreciated as valuable input for the deci-

sion-making process. In other countries, MPs seem to be less acquainted with and more sceptical towards public PTA, or as the saying goes “unknown, unloved.” In most public PTA cases, organisers tried to prove the relevance and worth of public PTA for politicians. In their country, the public PTA often represented a first attempt to stand up for public PTA.

Although organisers seldom claim that the outcome of the public PTA represents *the voice of the people*, its results are often criticised for not being representative. One way to address this criticism is to organise a larger number of public panels. For example, the German Citizen’s Forum method opted for organising 8 public panels consisting of a total of 194 participants. At the moment, the Welcome Trust is even organising a 1000 -people strong public panel. The experiences with the Swiss PubliForum (Electricity CH) and the Danish voting conference (Drinking Water DK) point at a cheaper and less laborious solution, that is, to add to the opinion of a public panel of some 15 people, the results of a wider public survey.

In public PTA the citizens’ role versus experts and stakeholders is a crucial design characteristic. We have found several roles. In most cases the citizens’ panel receives information from an expert-stakeholder panel in order to make a "lay" judgement. Lay information is made available to experts and stakeholders by means of a product. In the Swiss dialogue on genetic testing (Gene Dialogue CH) the citizens’ and stakeholders’ panel acted both as information sources and receivers. In this case, lay information is made available to stakeholders by means of an interactive process. The Danish voting conference (Drinking Water DK) positioned citizens, experts and politicians as equal judges of proposed policy scenarios.

Most public PTA embody a synoptic treatment of problem scope and an elaborating treatment of complexity. The focus is on finding problems rather than solutions. Whereas some public PTAs emphasise the need to find a common problem definition (consensus), others consciously give room for expressing a variety of views. In most public PTAs, the public panel is in control of its own agenda, inviting experts and writing the final report. In other PTAs (e.g. Biotech Baden-W. GE), the organiser defines most of the process and writes the final report. The latter may challenge the involvement of lay people and their commitment to the outcome of the PTA. In these cases it seems advisable to still formally get the public panel’s approval on both the process as well as the product.

4.4.6 Expert-stakeholder PTA

Section 4.4.3 showed that expert-stakeholder PTA is often involved with fixed, antagonistic problem settings. The aim of the PTA is often to get away from this situation. Obviously getting away from a certain situation by involving experts and interest groups that define that situation leaves the TA organiser with various puzzles or design dilemmas. Involving these types of actors into the PTA implies the danger of introducing the strategic behaviour and positioning that exist within the problem setting within the PTA. The challenge is even bigger when the PTA is supposed to affect the political decision making process or when the related problem setting is characterised by conflict. In this subsection, we study how organisers took up these challenges, and set up the PTA in such a way that involving experts and stakeholders improved the situation.

Relation to (political) decision-making

All expert / stakeholder PTA cases, except for the Traffic Forum AU, can be seen as indirect PTAs. At the start of the Traffic Forum, the city council considered the Forum as a legitimate

institute to come up with a new traffic plan. The design of the arrangement was strongly criticised by the participants and was seriously altered during the process. Initial rules of participation and communication that aimed at creating an "ideal speech situation" were attacked by participants and got shaped according to the rules that applied in the real problem setting. Moreover, in the course of the event the city announced they no longer automatically would adapt the traffic plan that would come out of the PTA. The PTA changed from a direct one to an indirect one. This had a positive impact on the behaviour of the participants within the PTA, since a strategy of confrontation (which characterised the situation in the real world) was traded in for a search for compromise.

In contrast to the Traffic Forum AU, all other expert / stakeholder PTAs try to get away from the actual problem setting and its related power games by putting a future perspective on the PTA. This helps to produce a *protected* analytic space, which enables participants to safely depart from established patterns of thinking. Although actors within the problem setting often feel a need for change, change is often prohibited because of a lack of a consistent set of new ideas, and because of existing institutional barriers of a structural or cultural nature. Expert / stakeholder PTA may provide an experimental playing ground – without institutional barriers – to develop a coherent set of new ideas.

Emphasis on the future also creates several challenges. First, why should busy people become involved in a process that does not directly deal with the current problem setting? We will address this question under "participation". Second, how to translate the results of a future-oriented PTA to the actual (political) process? This issue will be treated under the "problem framing".

Participation

We start the discussion with the special case Traffic Forum AU. By properly selecting participants the organisers aimed to a Habermasian "herrschaftsfreie" discussion. In order to achieve rational discussion between various interests, each interest was given the same number of representatives. In this way the method tried to circumvent the unequal power position of various interests within the actual problem setting. In particular actors who represented the business interest rejected the idea of "one interest, one representative" and demanded a stronger membership in the Forum. This "revolt" led to replacing the initial representation model, which was based on discursive rationality, by one based on power. In short, since the outcome of the PTA was expected to have direct political impact, the participants demanded a participatory process guided by the rules of representation of the real world.

The future-oriented, indirect expert / stakeholder PTAs face other types of problems. The first is to get people interested to participate in the PTA. A way to tackle this is to address the PTA to a powerful actor. Actors will then miss an opportunity to exert influence when not participating in the PTA. A parliamentary TA institute is able to address its project to the Parliament. As an example, the results of the Gideon NL project were to be presented to MPs and used for evaluating the crop protection policy plan. Since the Delphi AU was commissioned by the Ministry of Science and Traffic experts could see the relevance of the project.

Another way of getting people involved is by getting support from powerful key players via whom other actors can be invited. The Copenhagen Traffic DK and the Novel Food NL choose this route. The organisers of the future search on traffic set up an advisory commission consisting of the main stakeholders, who were asked to select eight actors of each interest group. Within

the Novel Food NL case, superiors were asked to approve of the PTA and to allow their subordinates to join the PTA.

A second question that needs to be addressed by organisers is who should participate? Answering this question depends on the PTA's objective. The various PTAs differ with respect to the location or pole in the innovation chain that they address. As part of the interdepartmental Sustainable Technology Development Program, the Novel Food NL focuses on the industrial R&D process. Accordingly, the engagement of industrial players (technologists and R&D managers) was crucial. In contrast, the Delphi AU produced input for setting up a governmental R&D policy, and relied on the active participation of scientific experts at the universities. Moreover, the Rathenau Institute (Gideon NL) and the Danish Board of Technology (Copenhagen Traffic DK) address the political process, and the crucial actors are interest groups and, ultimately, politicians.

A third design question is whether participants should be based on desired input in the process (e.g., expertise, creativity, power position) or should they be representative? In the Delphi AU this question was easy to answer since almost the whole Austrian expert-community took part in the project. In most other expert / stakeholder PTA the organisers tried to find a balance between the issue of representation and desired qualities of players.

In general, the following set of criteria were used to select participants:

- Overall, actors should represent a broad variety of actors and views within the problem setting²⁹
- Participants need to be creative and able to explore new solutions and novel ways of defining the problem.
- Participants need to be in sufficiently senior positions, so they can mediate the results of the PTA to their organisation.

The Dutch Gideon project put emphasis on the second criterion. People from the "shop-floor" were invited rather than from general management, and prominent actors within the public debate were avoided. Instead, the organisers of the Copenhagen Traffic DK accentuated the third criterion in order to get the message spread that would come out of the PTA.

Interaction

Again the Traffic Forum AU presents a good starting point for our discussion. The PTA was set up to open up the political deadlock with respect to traffic planning in Salzburg. This stalemate was largely due to actors representing business interests, who refused to budge an inch within the debate. Whereas the problem setting was characterised by non-compromising behaviour, the PTA was supposed to enable a rational discourse between the participants. Since the stakes of this direct PTA were high, the PTA failed to create an "ideal speech situation", and strategic games and behaviour entered into the PTA. When the PTA changed into an indirect one, the strategic behaviour of the participants shifted too. A search for consensus came to replace the strategy of confrontation. Maybe participants came to realise that a common statement was needed to have any effect on politics at all.

²⁹ Using predefined interests, like in the Traffic Forum AU, is counterproductive. Organisers should have a proper insight into the social map of the problem setting before defining these interests.

The indirect PTAs show that putting the PTA at a certain distance from the decision -making process makes it to a large extent possible to free the PTA from the strategic behaviour and unequal power positions within the real problem setting. In this way it produces a temporary creative analytical niche.

Problem framing

With respect to problem framing several aspects can be distinguished. First, participants need to get away from their fixed viewpoints. Second, different frames of meaning have to be confronted with each other and perspectives have to be accommodated. Finally, to be relevant for the current political debate, the results of the future-oriented PTA have to be translated back to the real world. We will briefly discuss these three items.

Ad 1) A main goal of expert-stakeholder PTA is to get actors away from the daily routine. It takes a serious effort to guide participants away from their current mindset. The Gideon NL case proves this. At the start of the Gideon project the organisers had expected that expert -interviews would deliver long-term perspectives on the issue of crop protection. This assumption proved wrong, and the organisers came to decide to change the initial design of the PTA and to include an extra activity in the form of a future-oriented workshop. Due to the creative character of the workshop the goal of formulating various future visions was achieved.

Besides looking to the future, looking back into the past represents an important tool for establishing a creative space. For example, during the Copenhagen Traffic DK people were asked to review, on the basis of their personal experience, Copenhagen's transport situation in the past forty years. Afterwards they were asked to assess the present. In this way it was tried to prevent participants from simply stating their known positions.

Ad 2) It is important to clarify to all participants the borders of the problem to be discussed in the PTA. The Novel Food NL dealt with novel protein foods as a substitute for meat. Environmentalists became annoyed by the restrictive treatment of the problem. Whereas the tight demarcation of the project did not allow an open political discussion, it did help to get industry involved and to develop an R&D program.

Within the Gideon NL project the outer limits of the debate were determined by the idea that in the long run the Dutch agricultural sector needed to be economically viable as well as ecologically sustainable. This kept the project activities focused.

Ad 3) Whereas a future perspective helps to escape the current political power games, it also limits the PTA's relevance to the current political decision -making process. This seems to be less the case when the outcome exactly is an outlook to the future, like in the case of Delphi AU (a Delphi study) and Novel Food NL (an R&D proposal). One could argue that these two more expert-like PTAs are both future-oriented as well as directed at finding solutions.

The other more stakeholder-like PTAs are future-oriented and aimed at problem finding. In these cases, translating the results of a PTA into action is less straightforward. Some organisers try to involve mediators to translate its result into action.³⁰ In the Copenhagen Traffic DK participants had to be sufficiently senior positions in order to be able to bring back the conference results to

³⁰ See analytical framework, section III.A under Design.

their organisations. Members of an advisory committee are also expected to play such a mediating role. In the Gideon project, a serious attempt was made to translate the outcome of the project into a form that could be directly used by politicians. This was done with the help of the advisory committee, whose members were expected to have a good feel for the relevant political issues and demands. The limited number of EUROPTA case studies seem to indicate that a special effort is needed (e.g. a separate design phase within the PTA) to translate the results of a problem-oriented PTA into results that are better ready-made for (political) decision-makers.

Conclusion on expert-stakeholder PTA

We have summarised the main findings of the subsection "Expert-stakeholder PTA" in table 2. With respect to expert-stakeholder PTA the distance to the (political) decision-making process is a crucial design characteristic. The cases strongly suggest to position expert-stakeholder PTA at arm's length of the (political) decision-making process.³¹ If this is not done, the PTA arrangement loses its elementary function of creating a creative analytical space. Normally, the PTA tries to escape the current (political) situation by looking at the future. This is supposed to allow participants to leave their fixed positions and views, and look for new sorts of solutions, problem perceptions, and strategic alliances.

Among the cases we grouped under the heading expert-stakeholder PTA, some PTAs can be considered more expert-oriented and others more stakeholder-oriented. Typical of the more expert-oriented cases (like Delphi AU and Novel Food NL) is that the end product is an outlook on the future. Related to this the PTA aims at finding solutions. The more stakeholder-oriented PTAs (Gideon NL, Copenhagen Traffic DK) basically deal with finding common problem definitions. The orientation to the future helps to enable this process by creating a proverbial "ideal speech situation".

When selecting participants, organisers of expert-stakeholder PTA need to find a proper balance between content- and power-related qualities. Participants were selected who represented a broad variety of actors and views within the problem setting, who were thought to be creative, and who were in the position to mediate the results of the PTA to their organisation.

4.4.7 Comparing public PTA and expert-stakeholder PTA

Section 4.4.3 showed that public PTA and expert-stakeholder PTA are used within different problem settings. Public PTA was used to stimulate public debate and inform politicians about the opinion of (informed) citizens in case of new technological developments that lead to a critical public debate. Although antagonistic, the societal situation addressed was often not fixed. This contrasts to expert-stakeholder PTA that normally dealt with existing technological systems and related fixed societal situations. In this subsection, we compare the design characteristics of public and expert-stakeholder PTA (see table 2).

³¹ Traffic Forum AU seems to indicate that in case of a direct PTA, organisers are bound to respect the rules of the related decision-making process with regards to participation, communication and problem framing. We would like to argue therefore that there is no such thing as a direct PTA. When a participatory process becomes an integral part of decision-making, it ceases to be a PTA and becomes a participatory policy-making process. Participatory policy processes and participatory TA processes are often wrongly lumped together (cf. Grin 1998: 6).

Table 2. Comparing public PTA and expert -stakeholder PTA.

Public PTA	Expert-stakeholder PTA
<i>Relation to decision making</i>	<i>Relation to decision making</i>
Indirect	Indirect by putting future perspective on the PTA
Improvement of impact by <ul style="list-style-type: none"> • Building up reputation 	Improvement of impact by <ul style="list-style-type: none"> • Involving people who can mediate the results to their organisation • Addressing the PTA to a powerful actor • Getting support from key players
<i>Participation</i>	<i>Participation</i>
Main selection criterion <ul style="list-style-type: none"> • Lay people should represent a broad variety of views 	Main selection criteria <ul style="list-style-type: none"> • Participants should represent a broad variety of interests and ideas • Participants need to be creative • Participants need to be in the position to mediate the results to their organisation
Issue of representation may be dealt with by the use of survey techniques	Issue of representation may be dealt with by involving key players in the selection process
<i>Interaction</i>	<i>Interaction</i>
Various types of roles of lay people versus experts and stakeholders <ul style="list-style-type: none"> • Lay people getting informed by experts • Lay people questioning experts to form their opinion in order to advise decision makers • Lay people and experts getting into dialogue • Lay people and experts as equal judges of proposed policy scenarios 	Free interaction among participants from the strategic behaviour and unequal positions within the real problem setting. The creation of a protected analytic space is guided by the Habermasian notion of the "ideal speech situation"
<i>Problem framing</i>	<i>Problem framing</i>
Participants have to get acquainted with the views and positions within the actual problem setting	Participants have to get away from the fixed ideas and positions within the actual problem setting
Treatment of the problem <ul style="list-style-type: none"> • Synoptic treatment of problem scope • Elaborating treatment of complexityInvolved with problem finding 	Treatment of the problem <ul style="list-style-type: none"> • Within clearly set boundaries that agree with the objective of the PTA • Within boundaries accepted by all participants
The written results of the PTA should always be approved of by the participants	Translating the outcome of the future-oriented PTA into policy advice needs separate design step

Relation to (political) decision making

One might say that a public PTA is indirectly linked to the (political) decision-making process by nature. It aims to support the representative democratic system, by informing politicians about the ways of world making of the people they represent. The impact of a public PTA therefore crucially depends on the way decision-makers appreciate this type of information. In this respect, familiarity of parliamentarians with the method is crucial. The EUROPTA cases often present first-time national experiences with public PTA. MP's acquaintance with public PTA

therefore is expected to be rather low. Building up a reputation takes a long -term effort of honest, serious and transparent experimentation.

Whereas public PTA normally deals with a problematic current debate but open future, the expert-stakeholder PTA deals with a fixed, often antagonistic, present situation that will – without any change - lead to an undesirable future. There is quite often a felt need within the problem setting for change. At the same time, this setting prevents change that depends on joint action. In order to escape the current technological, institutional and cultural fixes the expert -stakeholder PTA needs to take place at a safe distance from the decision making process. In this way the PTA functions as a creative space, a laboratory to find new common alternatives. To escape the current power games normally a future perspective is put on the PTA. Depending on whether the PTA is more oriented toward problem- or solution-finding, this "transformation" has many repercussions for the design (see also discussion below).

The more solution-oriented expert-stakeholder PTAs aimed at creating joint forecasts of the future in the form of R&D plans or scenarios. In this case the information produced within the PTA can easily be used by decision-makers. When the expert-stakeholder PTA is oriented toward problem-finding the direct usefulness of the PTA's results for decision makers is much smaller. In this case, the PTA's aim is rather to strengthen the existing climate of change and to offer a "temporary" platform to cultivate the existing seeds of change. Working out more ready-made policy advises seems to need a serious extra effort and a more permanent platform.

Participation

Lay people within public PTAs are selected to represent a broad variety of views. While organisers seldom claim that the PTA is representative for the whole population, the issue of representation is often raised by critics. It was found that this point of critique could well be addressed by using additional survey techniques.

Like in public PTA, participants of an expert -stakeholder PTA need to stand for a large variety of views. Besides participants are selected for their ability to leave beaten tracks. A selection criterion typical for expert-stakeholder PTA is the participants' capacity to mediate the results to the problem setting.

Interaction

In public PTA a crucial design criterion is how to shape the role of lay people versus experts and stakeholders. Several roles were found: lay people being informed by experts, lay people using experts as advisers, lay people and experts getting into dialogue, and lay people and experts acting both as judges of proposed policy scenarios.

The expert-stakeholder PTA shapes the interaction amongst experts and stakeholders. The organisers normally strive after creating a protected analytic space in which each participant – in principle - has the same power position. In this way the outcome of the PTA is to be determined by argumentative power instead of political power.

Problem framing

Whereas in public PTA participants have to be informed about the problem setting, the participants of the expert-stakeholder PTA have to get away from the fixed ideas and positions within the actual problem setting – in a sense they have to become de-informed.

A public PTA is often more involved with finding common problem definitions than with coming up with solid solutions. This resembles the problem-oriented expert-stakeholder PTA. In both cases, participants themselves to a large extent define the boundaries of the problem. In contrast, the solution-oriented expert-stakeholder tries to deliver a plan for the future. To come up with workable solutions this type of PTA needs a more clear and narrow boundary of the problem.

4.4.8 Conclusions

In the analytical framework the rationale for PTA was introduced by posing a number of questions:

- What kind of problems are suited for treatment through PTA?
- And what determines the choice of method in PTA?
- When is it necessary or valuable to set up a PTA?

We will not answer the above questions in general as was done in the analytical framework but address them in relationship to the choice of method and the design elements relationship to decision-making, participation, interaction and problem framing.

To address the third question first. The choice of a method for PTA is the search for a manageable and legitimate tool and a design for intervening in a problem setting. Since PTA methods are by definition involving people and therefore are requiring people to be involved these methods bear a price beyond the formal costs. This limits the applicability of PTA methods to situations seen to be of importance by the actors to be involved. Societal stakes have to be high enough in the eyes of all those to be involved. In the design of a PTA method an important design criterion is whether the chosen form of PTA will be attracting the co-operation of those indispensable for its success.

PTA methods therefore should only be used in situations where the importance of the issue is clear to those involved. The types of situation (type B) where a technology needs scrutiny in the eyes of some analysts or policy watches but where this is not recognised (yet) can in general better be addressed by more classical forms of TA. If one still thinks such issues warrant PTA because of the importance of the issue an effort should be made to search clear examples of the effects to be expected in order to draw those to be involved into the issue.

New scientific or technological developments with large uncertainties about effects and about the values involved and norms to be applied provide most examples of public PTA. Such situations are accompanied by relatively flexible social arrangements (relatively little vested interests) and high visibility on the public agenda. In these cases involvement of a lay public seems indeed to be most legitimised, probably because of the uncertainty involved.

In relatively fixed situations of fully developed technological systems with high stakes involved we find relatively many examples of stakeholder TA.

The fact that public PTA and expert-stakeholder PTA are used to address different types of problem settings has consequences for the design of the PTA. It is advisable to position both forms of PTA at arm's length of the (political) decision making process in order to make clear that the PTA is rendering a service to decision makers and is not trying to take over their job. In expert-stakeholder PTAs putting a future perspective on the issue at stake normally does this.

Participants of both types of PTA are selected to represent a broad variety of views. With respect to expert-stakeholder PTA extra requirements are set for participants, like creativity and ability to mediate results. The issue of representation is relevant in both cases. In public PTA this issue can be dealt with by using survey techniques. In expert-stakeholder PTA it is often wise to key players in the selection process.

Different public PTA designs can be distinguished on the basis of the roles lay people play versus experts and stakeholder within the arrangement. Central in most public PTAs is the transfer of knowledge from lay people to experts and/or vice versa. Expert-stakeholder PTA is not solely about sharing knowledge, but also about creating new common knowledge. The more interactive nature of the expert-stakeholder PTA is guided by the Habermasian ideal of the "ideal speech situation."

Whereas in the case of public PTA participants have to be informed about the problem setting, in expert-stakeholder PTA a huge effort has to be made to get the actors involved away from the myths and truisms that dominate the problem setting. Both public and expert-stakeholder PTA allow for a broad problem scope. Actually most PTAs are mainly involved with problem finding. In these cases, the PTA seldom delivers ready-made advice for decision makers. An extra more permanent effort seems necessary to elaborate on the ideas generated within the PTA in order to make them practicable.

4.5 The Role of PTA In the Policy-Making process

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4.5.1 Introduction

In its essence, Technology Assessment has a strong political dimension. When the American Congress developed TA in the 70's, it imagined a political instrument which would give to its members access to independent, objective and competent information on scientific and technological issues. Congressmen would thus be in a better position to appreciate legislative projects and able to base their political action on more viable alternatives. The concept of TA evolved further over the years, in particular in Europe. First, the addressees of TA studies were not always the legislators but increasingly also the bureaucracy and other levels of government. Second, while the American model was based on a rather scientific approach of the assessment (involving stakeholders only afterwards), European TA always struggled with how exactly to integrate interests and values in the assessment. One strand of European TA – mainly originating in Denmark – is trying to solve the problem of how to make values and interests fruitful by organising participatory procedures. With this “participatory turn”, the political dimension of TA is even reinforced as it is no more an academic activity whose outcomes are to be communicated to and used by policy-makers, but a political activity itself. Integrating various actors is eminently political, as questions of power, influence and responsibility intervene.

The politicisation of TA activities by integrating participatory elements has its origins in the recognition that the State is under pressure. As discussed in our theoretical framework, new developments in science and technology put public authorities under stress as they are faced with *uncertainty* about the consequences of these developments and with a plurality of values and interests about them. In this sense, the development of PTA arrangements is a kind of response to the legitimacy crisis of the State. Also our other theoretical lens, *inequality*, highlights the possible political contribution of PTA, in particular to take into account the plurality of views and values present in society and to give them a voice.

The question we want to raise in this paper is: How do PTA arrangements perform in the policy process? What exactly is their answer to the legitimacy crisis of modern States? Aiming at integrating the analysis of scientific and technological developments into the societal debate, participatory processes face an ambitious task while their role within the policy-making process³² is rather complex. First of all, as a new instrument, PTA arrangements still have to prove to be worth the effort. Even then, the place they might find is far from obvious: participatory TA comes in addition to already highly complex political procedures and institutions which are, moreover, different from country to country. Therefore, PTA has to construct its role in each

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³² By “policy-making process” we understand here the various processes shaping a policy in a particular issue area (here mainly in science and technology policy).

political system³³. This becomes evident from the cases studied in the EUROPTA project. Most initiators wanted the PTA arrangements to influence the process of policy -making in some way, but with different goals and perspectives. However, the chances of a P TA arrangement to have any political influence not only depend on the aims of the initiators, but as well on the type of arrangement, the societal and the institutional context.

In this paper, we look at our case studies from a comparative perspective. We analyse both the types of roles in the process of policy -making which can be assigned to a PTA arrangement and which factors influence whether or not the PTA succeeds in having any political function. We proceed in three steps: first, we establish an inventory of political roles to be possibly played by PTA arrangements (4.5.2). Second, we have a look at the practice and try to assess the political performance of the arrangements (4.5.3.) before discussing the intervening factors influencing the actual political role as well as the relationship between these "success factors" and the political aims of the PTA arrangements (4.5.4). Our concluding section (4.5.5) summarises our findings and includes a few recommendations. The scope of our analysis focuses on the political role of PTA arrangements in the policy -making process in a narrower sense. Other actors, such as political parties, social movements and industry, may also be individually or collectively affected by PTA arrangements (social movements can, for example, gain legitimacy, an actor network can be restructured or replaced, etc.). Given the data gathered by the EUROPTA team, which analyses PTA mainly from the point of view of practitioners, we only occasionally consider political impacts who are not mainly directed towards the State³⁴.

4.5.2 Description of political roles of PTA arrangements: an inventory

Generally speaking, PTA, as a special form of conducting TA, is an instrument to analyse technological developments and related policy options. In letting many actors intervene in this analysis, a common ground is created with a view to address the question of risks and chances and to confront the different values. PTA is not bound to any specific phase of the policy -making process and hence its political role is potentially manifold. Studying the EUROPTA cases reveals that the organisers of the PTA arrangements had different objectives in mind. Note, however, that we can only discuss openly or implicitly stated objectives for this purpose, as we do not have additional information about possible hidden agendas only in rare cases. Furthermore, we can see that the actual role of a PTA arrangement is not always the one expected or is not fulfilled in every respect (below 3.). We trust that having the evidence of some 16 case studies of six countries with a broad range of subjects will reveal the main political roles which are empirically possible (bottom-up).

Before presenting the various possible political roles found in our case studies, we need to make the reader aware that we construct the following categories for analytical purposes only. In reality, most arrangements are intended to or actually play a mix of different roles. If we are mentioning a case in only one or two of our ideal -typical categories, this would not mean that it plays

³³ We will use the term "political system" in a rather general way, meaning the set of actors who are involved in dealing with a policy problem such as energy or telecommunications (see Analytical Framework).

³⁴ By the "State" we mean the public authorities, including the state bureaucracy, government and parliament as opposed to the civil society including institutions representing interests.

exclusively these particular roles, but we only regard them as being the most typical example in that category.

(1) *PTA with at best indirect political role*: To begin with, and despite the main European conception of TA as an instrument for policy advice, we have to acknowledge that some PTA arrangements do not seek any (direct) political role at all, at least if we define the “political” rather narrowly as we do in this paper. We found four types of only vague or indirect political aims. First, the PLANT BIOTECH UK consensus conference was mainly intended to contribute to the public understanding of science, even though the Science Museum (one of the two initiators) tried to establish stronger political links³⁵. In more general terms, we may coin this role as *promoting communication between science and the public*. Already in the beginning, the Biotechnology and Biological Sciences Research Council (BBSRC) which financed this consensus conference stated that they would not change their policy on plant biotechnology as a result of the conference report. Accordingly, politicians and civil servants did not show strong political interest and/or commitment in the event.

Second, the GM ANIMALS NL debate mainly aimed at *stimulating public debate*. Of course, organisers had also political aims (see below), but their focus was, by allowing an open dialogue between experts and non-experts and spreading information, to stimulate and enlarge public debate on genetically modified animals³⁶. This seems also to be the case with the SUSTAINABLE MENU NL debates.

Third, the (nevertheless) “political” target of the arrangement is not the decision-making processes itself but rather to attain political or societal goals indirectly via *awareness building*. The NOVEL FOODS NL conference is a case in point which was based on the idea that changes towards a sustainable development could not be brought by direct governmental attempts at steering technology, but as the result of a variety of actors adopting new options and alternatives. Consequently, this conference did not aim at influencing technology policy(-making), but at exemplifying the feasibility and the paths towards a sustainable development.

Other PTA arrangements described in our case studies clearly share similar aims with these examples. Especially, many arrangements seek to build bridges between science and society and to raise interest among the broader public. But these aims are coupled with other, more explicitly political aims (for example, both the PubliForum on ELECTRICITY CH and the citizens’ forum BIOTECH BADEN-W. GE aimed at fostering public debate next to their direct political objectives, see below).

Other examples show that other “indirect” roles can be considered, even though they have not been clearly stated by the organisers. A rather implicit role was that, in some cases, the arrangement should *raise sensitivity for the PTA method*, such as in PLANT BIOTECH UK, CITIZEN GMO UK and ELECTRICITY CH. This kind of role can be treated as a further (indirect) political role since these changed perceptions may eventually have an impact on how the discourse about the policy-making on scientific and technological is shaped in the future. In a sense, the introduction and eventual wide-spread use of PTA can be said to be an “indicator” for a changing political climate.

³⁵ Public understanding of science can also be understood as a political role since it is an official government policy in the UK.

³⁶ This focus is mirrored by the title of the arrangement itself (“public debate on genetic modifications of animals”).

Even though we have to account for indirect political roles, the majority of the case studies examined within the EUROPTA project were designed to target the political decision-making process directly. Obviously, the PTA arrangements differ not only with respect to their structure and procedure but they are also designed to impact on the political decision-making process at different points and in different forms. We have found the following direct political aims:³⁷

(2) *PTA as agenda-setter*: The legitimacy and management crisis of the State may often have its origins in the inability or unwillingness of its representatives to recognise or acknowledge a problem. Traditionally, NGOs or citizen action groups are trying to put an issue on the political agenda and, hence, pressure on the governments to consider these neglected problems or issues. The media often play an important role in multiplying the voices of the NGOs. In countries with a tradition of direct democracy, new issues can also be raised through popular initiatives (there was, for example, in Switzerland an initiative on genetic engineering). We argue that PTA arrangements can have similar goals. By inviting several actors to discuss an issue and giving publicity and transparency to these discussions, the initiators of a PTA arrangement aim at putting issues on the political agenda. Such a PTA arrangement thus tries to identify all aspects related with the issue. The scenario workshop URBAN ECOLOGY DK can be described as the paradigmatic example of an “agenda-setter PTA arrangement” aiming at putting the issue of the barriers and solutions to the implementation of the (already politically known and decided) sustainability aim on the political agenda. It succeeded to catch the attention of decision-makers on this topic. Also the OZONE AU consensus conference had a similar goal. It was however more part of a political game between some *Länder* which launched the PTA and the federal government: the issue of ozone was already recognised as a major issue, but the *Länder* wanted to force the hesitant federal ministry to launch a broad political debate on the issue, thus instrumentalising the arrangement.

(3) *PTA as exploration of objectives*: The plurality of values in modern societies implies that discussions about new technological and scientific developments are characterised by the presence of different and often conflicting preferences and values. PTA arrangements may be considered a platform of dialogue and exploration between different conceptions. In doing this, PTA arrangements set up a creative space. Their function then is to clarify the different preferences and values as well as to develop proposals for normative judgments on a problem or an issue. In this sense, such PTA arrangements are intended to deliver advice for the preparation of a decision by helping to define the objectives. The case of the CITIZEN GMO UK and the GENE DIALOGUE CH aimed at giving advice on the general objectives. In integrating laypersons in an early discussion on the new developments in this field, the organisers and associated institutions wanted to give advice on hopes and fears present in society with a view to guide future decisions. The PubliForum ELECTRICITY CH had a similar goal: even though the theme of electricity had been discussed for a long time in Switzerland, the country experienced the end of a ten year “armistice” and many signals indicated the emergence of a new energy policy. In this situation, the PubliForum aimed at indicating paths for this future policy. Similarly, the future search workshop COPENHAGEN TRAFFIC DK intended to create common visions of future scenarios for traffic in this big city. The citizens’ forum BIOTECH BADEN-W. GE aimed at exploring benefits and risks and public acceptance from the perspective of laypersons. Another explorative ente-

³⁷ Note that in the following we shall mention particular case studies only in order to exemplify our categories; the examples given are not intended to be an exhaustive classification of all our case studies; one of the reasons for this is that information about the (sometimes hidden) aims is not exhaustive, another is that a few case studies would fall into more than one category.

prise was the first phase of the DELPHI AU where experts generated alternative visions of the future of their fields. GIDEON NL is a final example of this category. In this case, the aim was to find solutions and enable the members of parliament to evaluate the current policy in the light of these findings.

(4) *PTA as filter of policy alternatives*: The political process might also be, in some cases, more advanced, but still in need of dialogue procedures. If several options or alternatives are considered, PTA arrangements can offer advice on the alternative to choose. The voting conference DRINKING WATER DK had the goal of putting in perspective different options with a view to contribute to the Parliament's legislative procedure. The citizens forum BIOTECH BADEN-W. GE aimed at filtering those alternative applications which would be acceptable to the general public. In the case of the DELPHI AU, while the participatory process with expert groups generated alternative visions of the future technological developments, the Delphi survey itself should be a means of assessing these alternatives and, hence, reducing them.

(5) *PTA as "blockade-runner"*: It often happens that the policy-making process is blocked – be it in the phase of the definition of objectives or of alternatives – with the consequence that no step further can be done. Some PTA arrangements were indeed designed in such a context. More precisely, no further step could be undertaken because of unsolved conflicts between the concerned actors. Consequently, these arrangements had the objective to contribute to the management of this political conflict. The TRAFFIC FORUM AU is one example of an arrangement in which participation is seen as an alternative form of political dispute resolution. In a slightly different sense, also the future search COPENHAGEN TRAFFIC DK was intended to overcome stalemate: here, the innovation system had developed into not being innovative at all. In this situation, the arrangement tried to reopen the system in order to admit reshaping of the technology.

(6) *PTA as implementer and evaluator*: Implementation and evaluation are still other phases of the policy process and we can find some cases of PTA intervening at this stage. First, even though the public debate GM ANIMALS NL aimed at advising politicians on GM animals with a view to law-making, the arrangement had more the role of testing whether the ideas of the public were in line with the ideas of the politicians as the law had actually been enacted a few months before the conference³⁸. It turned out that ideas of the public were in line with those of politicians, as both the law and the lay panel report pleaded for a restrictive use of genetic animals. In that sense the debate strengthened the existing policy. Policy evaluation is a genuine political role since if the result had been that the public had other views on the topic, this might have led to agenda-setting. Second, the NOVEL FOOD NL sessions focused on implementing the ideology of sustainability, e.g. by influencing the priorities of funding institutions – again a clear political act. Third, even though it had not been clearly stated, the initiators of the BIOTECH BADEN-W. GE hoped that the outcome of the arrangement would endorse the rather liberal, market-oriented policy of the regional government. But these hopes had not been fulfilled, as the report was rather critical of biotechnology.

This latter example shows that aiming at implementing or evaluating a policy can be rather tricky. The author of the case study pointed out that the implementers showed a tendency to "instrumentalise" the PTA arrangement in the direction of promoting acceptance of biotechnology. Of course, such instrumentalisation can also occur when the aim is to explore objectives or to

³⁸ Such a quick decision was something unintended for the organisers and shows how timing can be tricky (see below).

foster public debate, but the risk of such bias seems to be higher in the case of implementation and evaluation of policies.³⁹

Table 1 summarises the above analysis by making an inventory of the various political roles of PTA arrangements and attributing our case studies to them. Note that, in particular as regards items (2) to (6), the list reflects in which stage of the policy development the issue at stake is placed: starting with putting the issue on the agenda, two phases during the policy definition phase are covered (exploring objectives and filtering policy alternatives); other possible stages where PTA may intend to play a role are cases in which policy-making is blocked or in the implementation and/or evaluation phase.

<i>Possible political roles</i>	<i>Examples</i>
(1) Indirect political role	
a. <i>promoting communication between science and the public</i>	PLANT BIOTECH UK
b. <i>stimulating public debate</i>	GM ANIMALS NL SUSTAINABLE MENU NL
c. <i>awareness building</i>	NOVEL FOOD NL
d. <i>raising sensitivity for method</i>	PLANT BIOTECH UK ELECTRICITY CH CITIZEN GMO UK
(2) <i>Agenda-setter</i>	OZONE AU URBAN ECOLOGY DK
(3) <i>Exploration of objectives</i>	ELECTRICITY CH GENE DIALOGUE CH COPENHAGEN TRAFFIC DK BIOTECH BADEN-W. GE DELPHI AU GIDEON NL CITIZEN GMO UK
(4) <i>Filter of policy alternatives</i>	BIOTECH BADEN-W. GE DRINKING WATER DK DELPHI AU
(5) <i>“Blockade-runner”</i>	TRAFFIC FORUM AU COPENHAGEN TRAFFIC DK
(6) <i>Implementation and evaluation of policies</i>	NOVEL FOOD NL GM ANIMALS NL BIOTECH BADEN-W. GE

³⁹ In this respect, PTA implementers looking for such a role should be open to redefine the policy in question if the outcome happens to be in contradiction with the existing policy. Otherwise, they will automatically face critics of instrumentalisation like did the organisers of the BIOTECH BADEN-W. GE.

Table 1: Possible political roles of PTA arrangements

The EUROPTA theoretical framework came – in a top-down approach – to the conclusion that PTA has a double role in, on the one hand, providing a playground for deliberation and exploration and as a means of social learning and, on the other, in aiming at improving (and thus, implicitly, influencing) decision-making in a cognitive, normative and pragmatic dimension. Our bottom-up view based on the evidence of the case studies mirrors these two roles and therefore supports these general reflections: while what we chose to call here "indirect political role" (1a to 1d) may be seen as part of the "social learning" component of PTA, the direct political roles in the various policy-making phases (2 to 6) reflect the other side of PTA.

4.5.3 Political performance of PTA

In the previous section, we established an inventory of implicitly or explicitly intended political roles. Before discussing the intervening factors influencing the role performance, we shall have a second look at our cases, asking how did the arrangement actually perform in practice. Were the various expectations met and how? We are entering here the tricky area of impact research. We shall come back later to the manifold difficulties of such ex-post assessments⁴⁰, but need to start with inserting a twofold caveat. First, due to the dynamics of politics, it is very difficult to distinguish between effects directly related to the PTA arrangement and those which have other direct causes. Second, in-depth analysis of the effects has been actually undertaken only seldom. Consequently, we do not have much empirical data in this respect.

In a first step, we looked again at the types of political roles we previously defined on the basis of the aims of the PTA arrangements described in our case studies and checked whether they match with reality. From this first general analysis, we observed that all our case studies came to the conclusion that the arrangements *actually played in some sense a political role*. Even arrangements without specific political aims have led to some discussion in the political arena. Note however, that the political performance, i.e. the attainment of the envisaged political roles, of a majority was rather weak (see below).

In a second step, we tried to specify *to which extent* the expected role was achieved and made the distinction between a weak, moderate and strong role. As we do not have precise measures of impacts, it might be difficult – and somewhat subjective – to state with certitude whether a PTA arrangement had a weak, moderate or strong political influence on the policy-making process. Moreover, as we observed many and different political aims, the extent to which they have been met should be assessed accordingly. Table 2 defines the characteristics of our three degrees for each of the political roles of PTA arrangements.

As a general feature, we say that a PTA arrangement has a “weak role” when the overall assessment of the case indicates that the actors involved in the respective policy-making process were informed about the process, but did not explicitly react. In such a case, we cannot exclude that the arrangement implicitly influenced the policy-making process. We consider a PTA arrangement to have a “moderate” influence, when the case study shows that the arrangement led to

⁴⁰ See in particular the chapter 4.6, entirely devoted to the evaluation of impacts of PTA arrangements.

some political discussions. Finally, a PTA arrangement can be said to have a “strong” influence if politics could not ignore it and if it led, for instance, to a concrete decision. See Table 2 for our operationalisation with a view to the various roles.

<i>Political role</i>	<i>Weak</i>	<i>Moderate</i>	<i>Strong</i>
(1) a. <i>promoting communication between science and the public</i>	some communication took place	a wider communication process was established	The public and/or scientists learned something about the others
b. <i>Awareness building</i>	arrangement was taken notice of by the public	results were discussed in public	Arrangement led to changes in attitudes and behaviour
c. <i>Stimulating public debate</i>	arrangement was briefly mentioned in the media	arrangement was extensively mentioned in the media	Arrangement led to further events
d. <i>Raising sensitivity for the method</i>	arrangement was taken notice of by public/politics/media	method was discussed	PTA was integrated in policy-making
(2) <i>Agenda-setter</i>	arrangement was taken notice of by politicians	issue addressed reached the political agenda	Arrangement is considered ex-post a milestone
(3) <i>Exploration of objectives</i>	arrangement was taken notice of by politicians	results were discussed in the political arena	Results were integrated in the policy-making
(4) <i>Filter of policy alternatives</i>	arrangement was taken notice of by politicians	results were discussed in the political arena	Results were integrated in the policy-making
(5) <i>“Blockade-runner”</i>	first steps towards breaking up the stalemate taken	co-operation is again possible or stalemate is broken up	a final solution to the conflict was found or the system is being reshaped
(6) <i>Implementation and evaluation of policies</i>	results were discussed	changed attitudes in the respective field	Was a major contribution to the implementation/evaluation

Table 2: Criteria to assess the actual political role of a PTA arrangement

When reading our case studies based on this grid, we have to acknowledge that the expected political role is almost never completely fulfilled. Many factors can intervene and we shall discuss them in the next section. Nevertheless, some arrangements happen to be more successful than others and we believe that they are examples of good practice. A very successful PTA arrangement seems to be the voting conference DRINKING WATER DK as Parliament considered its results to take a decision on the issue. The scenario workshop URBAN ECOLOGY DK was also suc-

successful in putting this issue high on the political agenda. The arrangement in GIDEON NL turned out to be a way for a minority proposal to get approved. This proposal was then not new in the debate, but as it has been endorsed by a wide variety of actors participating in the arrangement, its legitimacy was enhanced in the Minister's eyes and could be transformed into a concrete policy measure⁴¹. The project also seems to have played the role of "enlightenment" in the policy process: as a result of the GIDEON NL project, the Minister, in public, established a relationship between the objective of pesticide reduction and preventing plagues and diseases (which was something new). The PubliForum ELECTRICITY CH can also be counted amongst the success stories: even though its influence on the issue remained limited, public authorities considered the method as a meaningful tool to be implemented in science and technology policy-making.

Still, a large proportion of our cases had only a weak or moderate political role. But this assessment is certainly relative in time. For example, in the UK, a government minister recently released a statement saying that there should be wider public consultation on science and technology issues, such as in the form of consensus conferences (note that the consensus conference on PLANT BIOTECH UK took place in 1994 already). That came after another government minister, in 1997, recommended carrying out consensus conferences, and a Royal Commission suggested using consensus conferences more permanently, too. So may be our assessment with regard to the case PLANT BIOTECH UK may shift in the longer run.

Moreover, even though the political impact remains small, case studies show some influence on the policy-making process. For example, the CITIZEN GMO UK arrangement resulted in the Environment Minister inviting the lay and stakeholder panels to a meeting at the Ministry to discuss their findings. Both the ELECTRICITY CH and the GENE DIALOGUE CH arrangements have been presented to members of the Parliament. The DELPHI AU has also been considered by the Minister and seemed to have influenced his political agenda. Moreover, it served to attach higher legitimacy to the later decisions taken by the Ministry since it was handy to point at the results of this study which were based on the involvement of a large proportion of the relevant expert and stakeholder community. However, in an overall assessment, the impact of this arrangement was only moderate since it covered a variety of subject areas (from high technology to organically grown food) and had almost no follow-up in some of these.

The reasons for this varying political impact are manifold and we shall try to understand them later.

The following Table 3 summarises our results up to now.

⁴¹ As is discussed in chapter 4.6 on impacts, it is difficult to trace back how much the PTA arrangement influenced the decision. At best, we can say that it contributed to it.

	<i>Weak</i>	<i>Moderate</i>	<i>Strong</i>
(1) a. <i>promoting communication between science and the public</i>	ELECTRICITY CH	PLANT BIOTECH UK	
b. <i>Awareness building</i>		NOVEL FOOD NL	
c. <i>Stimulating public debate</i>	GM ANIMALS NL	SUSTAINABLE MENU NL	
d. <i>Raising sensitivity for method</i>	GM ANIMALS NL BIOTECH BADEN-W. GE	PLANT BIOTECH UK CITIZEN GMO UK	ELECTRICITY CH
(2) <i>Agenda-setter</i>	OZONE AU		URBAN ECOLOGY DK
(3) <i>Exploration of objectives</i>	CITIZEN GMO UK	COPENHAGEN TRAFFIC DK ELECTRICITY CH GENE DIALOGUE CH DELPHI AU	GIDEON NL
(4) <i>Filter of policy alternatives</i>	BIOTECH BADEN-W. GE	DELPHI AU	DRINKING WATER DK
(5) <i>Blockade-runner</i>		TRAFFIC FORUM AU COPENHAGEN TRAFFIC DK	
(6) <i>Implementation and evaluation of policies</i>	BIOTECH BADEN-W. GE	NOVEL FOOD NL GM ANIMALS NL	

Table 3: *Ex-post assessment of political role of PTA arrangements*

As a postscript to this assessment of role performance, we need to point out that it is only in rare cases that a PTA arrangement will bring a new and original solution or option. Very often, participants in PTA arrangement do not “create” new ways of considering an issue or new policy measures, but got inspired by the current discussion. In this respect – and our case studies confirm this – the way PTA will influence on the policy-making process can be both innovative or legitimising. Innovative in the sense that it can bring new ways of considering an issue (URBAN ECOLOGY DK) and legitimising in the sense it can make a proposal socially and politically acceptable (GIDEON NL).

4.5.4 Factors influencing the political role of PTA arrangements

Up to this point, we considered the role of PTA arrangements within the policy-making process without discussing what factors or elements contributed to their “success“ or to their “failure“. Now, we shall address questions like this: Why is it that the URBAN ECOLOGY DK was quite a success, whereas the OZONE AU can be described as a failure with regard to its actual political role? To fully understand the role of PTA arrangements in the decision-making process and to learn something about possible future(s) of PTA, we propose to consider the intervening factors that ensure that an arrangement plays its intended political role. In the following, we will be using the EUROPTA analytical framework. The starting point is thus that these factors can be related to the societal context (below a), the institutional setting (below b) and the properties of the arrangement itself (below c). By quoting evidence from the various case studies, we try at the same time to find out which factors are most relevant for what political roles to be played.

a) Societal context

Analysing our case studies, we find two important factors under the heading of “societal context”:⁴² timing and public controversy (1), the political relevance of the topic (2) and structural properties of the political system (3).

(1) *Timing*: Participatory TA arrangements are, in general, not a formal part of the policy-making process, but a policy analysis instrument aiming at feeding the process with new perspectives. A need for such advice must exist: more specifically, as an instrument meant to integrate in a same process uncertainties and conflicting values, there must be a social debate or a political debate that put policy-makers under pressure. In other words, the timing of a PTA arrangement is of relevance. Put simply, this means that a PTA arrangement has to be set at the right moment. But what is the right moment? One may argue that it is linked to the phase in the development of the technology, or that the major factor to look at is whether the issue is socially debated or that the main aspect to consider is the stage of the political debate (thus privileging the policy-making process). Looking at our case studies suggests, however, that the answer might not be so simple. There seems to be no one right moment, but different right moments. According to the phase we are in, the right method with the appropriate aims should be chosen. Let's discuss more specifically our findings.

First, contrary to the idea that the political role of PTA might depend on the phase in the development of the technology considered, we did not find such influence. Of course, when setting up a PTA arrangement, one has to carefully choose the appropriate methods and goals according to the phase of the technological development, but this does not affect directly the political role which is aimed at or achieved⁴³. Rather, it is the phase of the policy-process which is of crucial importance. For example, if a new technology is in an early phase of its development, it will require a specific kind of political decision (e.g. whether or not to fund research and development) and this has to be considered. Similarly, when a technology is fairly advanced and agreed upon, the political discussion might concentrate on possible measures to implement so as to avoid side effects, which, again, has to be considered when setting up the PTA arrangement.

⁴² According to the terminology we use in our Theoretical Framework, “society” includes both the societal debates and the political system.

⁴³ To give an example: if a technology is in a rather early stage of its development, it would not make sense to arrange a PTA filtering policy alternatives if policy objectives have not been explored yet. In this sense one could not expect the arrangement to have a political impact.

Second – and logically following this first set of observations – timing with the political process is an important factor for the success of a PTA arrangement. The GIDEON NL project, for example, had a perfect timing as it had been planned in order to feed the debate in Parliament about crop protection. In contrast, the arrangements BIOTECH BADEN-W. GE and GM ANIMALS NL had a very bad timing with respect to the political process as in both cases a law on the considered issue had already been enacted at the time of the project took place (in the latter case, this could have not been anticipated by the organisers when they decided to launch the project).

Third, we observed that whereas political timing is of crucial relevance for the success of PTA arrangements, social timing must often simultaneously be considered. Especially when involving laypersons, a PTA arrangement must be in tune with the stage of both the social debate and the political debate. The example of ELECTRICITY CH shows that timing with the political debate alone is not sufficient to contribute to the policy-making process if the aim is to integrate lay-assessment in the policy-making process. While the issue addressed in the arrangement was hotly discussed in Parliament and with concerned actors, the social debate on energy was kind of “sleeping“. The energy issue was still being discussed, but the debate was much less heated as it had been during the seventies and eighties (at that time, Swiss citizens had had to vote on many popular initiatives dealing with the nuclear energy). At the time of the PubliForum, the media and the public had their eyes mainly turned in the direction of gene technology. Therefore, even though the ten-years “armistice” was coming to an end, it seems that policy-makers did not have the impression that they should listen to the “people’s voice”, or more generally: that they would have to involve more people. This does not mean that no participatory arrangement should be undertaken in such a situation. But maybe, in this case, the timing was not ideal to involve laypersons. It would have been worthwhile to involve concerned actors such as NGOs and energy producers. Such a strategy was, for example, successfully chosen in the case of GIDEON NL.

On the opposite side, we have an example where the mere existence or stimulation of a public debate might not be sufficient to guarantee that a PTA arrangement involving lay-assessment plays a political role. In the case of GM ANIMALS NL, the goal was to encourage public debate and the project was successful in some respect to attain this goal. But apart from raising sensitivity for the method, the arrangement could not have any major political impact since important political decision had been made just before the PTA. By contrast to these examples, the arrangements URBAN ECOLOGY DK and DRINKING WATER DK – which both involved lay-assessment – have been organised at the right time with respect to the policy-making process and the societal debate. In the latter case, Parliament was indeed preparing a law on this issue and public opinion was hotly debating it.

We may thus conclude that timing with the public debate is necessary if the aim of the PTA is to directly influence the policy-process inasmuch as lay participation seems only be accepted by politicians in times of public debate.

Timing with both public and political debate is, however, not a necessary condition in every case. As the GIDEON PROJECT NL shows, when a PTA arrangement only involves stakeholders, the fact that there is not a public turmoil about an issue does not really matter. This seems independent from the intended political role of the PTA arrangement (in the GIDEON PROJECT NL, the arrangement had the function of exploring objectives). However, even though we do not have evidence to prove it, timing with the public debate might not be so crucial when an arrangement aims at de-blocking stalemates or implementing policies. In these cases, the PTA has inherent political purposes, independent of the social debate (in some cases, the blockades can of course be accompanied by public discontent).

Finally, we observed in our case studies that some arrangements gained from a general climate demanding for more participation. This was for example the case with respect to the PubliForum ELECTRICITY CH. This arrangement occurred during a political campaign on gene technology: during this campaign, many voices claimed more dialogue between science and society and the PubliForum was thus considered as a model for such dialogue. It was then a perfect timing to raise sensitivity for the method.

To sum up these observations, good timing with social and public debate seems crucial for the perception as a valuable input for the political decision-making. But from the analysis of our cases, it remains difficult to say when is the right moment to have a PTA arrangement with respect to public and political debate. To answer this question, one certainly needs some experience in dealing with the political process and some insights about the way the issue is discussed in public. What can be said for sure, is that if the policy process is already well advanced, it might be difficult for a PTA arrangement to influence the policy process. Then, PTA may at its best legitimise an existing policy.⁴⁴ In fact, according to the phase of the policy-making process, the right aims of the PTA arrangement must be set: if it is much ahead of the policy-making, it should, e.g., aim at exploring objectives. With respect to public debate, the issue of timing also sheds light on the relationship between the type of public controversy about the subject matter: if the arrangement takes place when controversy is low, PTA may play a role in initiating a broader debate, bringing the issue to the attention of opinion leaders and putting the issue on the agenda or move it up in the list of priorities. If public controversy is high, PTA may play its role in facilitating and moderating this process of controversy.

As a last remark, we observed in many cases that unintended events helped the implementers of the PTA arrangement to be successful or, on the contrary, prevented them to achieve their goal(s) set. In other words, timing is something that one cannot entirely control. For example, it had not been foreseen by the organisers of the public debate GM ANIMALS NL that the Parliament would not wait for the conference to be over to take a decision on the issue. The organisers of the PubliForum ELECTRICITY CH have had more luck: in their case, the unexpected claims for dialogue between science and society raised the attentiveness for the experiment.

(2) *Political relevance of the topic:* Beyond timing with the policy process as discussed above, there are other subject-related factors which come into play in order to enhance political relevance of the PTA arrangement. There should be a problem that politicians actually think that it should be solved. For politicians to feel inclined to do something about an issue, it needs, for instance, that there is a group of people which would be affected positively or negatively by the topic. Or, the subject has to do with societal important movements in the economy, with regard to the infrastructure or the social development of a country. Obviously, politicians are not interested in all kinds of issues, but only in those which “sell” in the political marketplace. Obviously, this was the case in the DRINKING WATER DK Conference, as there was growing discontent with water quality in Denmark. Something had to be done and politicians seem to have been thus very attentive to any project around this issue. Similarly, URBAN ECOLOGY DK addressed an issue which was of special relevance for the new Ministry of Environment: whereas the arrangement was hardly noticed by politicians, it all of sudden had much more resonance when the new Minister had been appointed. He had selected urban ecology as a field to raise his own pro-

⁴⁴ An existing policy can of course be influenced by a PTA arrangement. But in this case, the policy process should, in some way, be (re-)opened for such inputs.

file and immediately asked for implementation of the project results. This latter example shows that as with timing, political relevance is something uncertain which cannot always be anticipated.

(3) *Structural properties of the political system*: Since political structures cannot be altered or amended at discretion, any element of policy-making-support, such as a PTA arrangement, has to be in tune with the structural properties of the given political system. The questions are: To what extent? How much tuning is necessary? Letting those cases aside which did not even attempt to have any direct impact on policy, we come to the conclusion that a certain degree of compatibility between method and political system is indeed necessary.⁴⁵

First, there seems a positive relationship between, on the one hand, a *political culture open for participation* and with a tradition of less formalised deliberation and informal procedures and, on the other, the actual role to be played by PTA. It probably is not by chance that we find two of the Danish case studies in the column for “strong political role” (URBAN ECOLOGY DK, DRINKING WATER DK). Note that we are not talking about the classical consensus conference model here but about rather new models even in the Danish context. Even if we take into account the supreme experience of the Danish Board of Technology in organising such events, we need to take into account the Danish political climate, which seems to be more open to public debate than in other countries. In this context, it does not come as a surprise that the first consensus conference in Austria (OZONE AU) was a failure since there is a rather non-participatory culture (referendums and popular initiatives as well as participatory administrative procedures are the rare exceptions to the rule of representative politics). And the same is also the case in the UK.

Note however that a general participatory culture seems by no way sufficient a condition for a high rate of political impact, as in the case of Switzerland. Obviously, other intervening factors have to be taken into consideration (as described elsewhere in this section). Furthermore, one might argue that the fact that a political system features highly formalised participatory elements, such as in a system with sophisticated and well-established direct-democratic elements, may even work against the introduction and, hence, a political role of new, non-traditional participatory elements. Organisers of the PubliForum ELECTRICITY CH, for example, had to face scepticism by people fearing that (representative) direct democracy would be replaced by (non-representative) PTA. Based on the Swiss example, we may therefore state more precisely that PTA is more successful in a political system with a tradition of *lively and vibrant civil society*. But this does not mean that PTA is not worth trying in less participatory political systems, it might only take more time to prove its value. Nevertheless, in countries where public participation is something accepted – like in Switzerland – this effort might take less time than in countries with less a tradition of empowering the people⁴⁶.

Second, our data from the case studies do not show any significant correlation between politically successful or unsuccessful PTA and a national corporatist culture. In fact, most of the countries considered in the EUROPTA project can be labelled as corporatist, except the U.K. But the PTA arrangements held in U.K. faced quite similar problems with respect to their political role as those arrangements held in the corporatist countries. And if PTA seems to be successful in the

⁴⁵ On this, cf. Chapter 4.2 on implementing participatory TA.

⁴⁶ We know that the Swiss TA Programme did not face this kind of criticisms anymore when organising its second PubliForum, whereas other countries like Austria are still resistant to PTA – at least when involving lay people – even though experiments have already taken place.

corporatist Denmark, the pattern is opposite for Austria – the archetypal corporatist system. There seems, however, an impact on the type and design of the arrangement: in corporatist cultures, PTA might be more successful when taking account of the particular way of dealing with highly-organised interests. In the Austrian cases, for example, the relative failure of two of the arrangements (OZONE AU, TRAFFIC FORUM AU) to have any substantial political impact seems at least partly due to this neglect of corporatist structures.

To sum up, our evidence is not clearly settling the issue whether or not there is the necessity of a close match or fit of the PTA method applied and the political system in which the arrangement takes place. There are, however, hints in our data that systems already open for informal participation are more likely to accept PTA and, hence, give it a political role. The alternative hypothesis that performing PTA may actually have an impact on the political system or culture itself (and not only on particular issues), could not be confirmed, but it may well be that we do not have enough long-term experience yet with applying well-established PTA methods in different settings.⁴⁷

b) The institutional setting

Under this heading, we shall look at two issues: the link to the political sphere of the PTA and/or the institution organising the arrangement (1), and the issue of credibility of both the institution and the process (2).

(1) *The link to the political sphere:* The link of the TA institution and/or of the PTA arrangement with the decision-making process is an important factor to look at. Obviously, it will be easier for organisers to meet their goals with respect to the political role if they are part of an ongoing political process – or at least when they are near the policy-making process. Being too close to the policy-making process might, however, be counter-productive, as the arrangement would face problems of legitimacy. In the case of the DELPHI AU, the PTA arrangement had been initiated and commissioned by the competent Minister and he sent representatives of the relevant sub-units of his department to the working parties within the PTA arrangement – thus, the Delphi project had quite a strong link with the policy-making process. It comes as no surprise that he considered this report when developing a policy. But we also find cases with a closer link to the policy-making sphere which were nevertheless unsuccessful: this was for example the case of the TRAFFIC FORUM AU. In this arrangement, that the vice-mayor of the city was involved in the participatory process was perceived as instrumentalising the arrangement for its own policy agenda. This example shows that having a too strong link to politics might be dangerous for the PTA arrangement.

The Danish Board of Technology seems to have maybe a near optimal link to the political sphere: it regularly reports to the Parliament and the Parliament can ask it to organise hearings on specific issues, but it remains independent. All institutions setting up a PTA arrangement do not have of course such a link with Parliament, but this example shows the importance of direct contacts with the political world. If no such privileged link exists, it can for example be substituted by involving political actors in the process (see also below).⁴⁸ However, this link and/or involvement of political actors is not crucial for all types of political roles aimed at. When the outcomes of the PTA arrangement are not directly addressed to political actors (as in the case of

⁴⁷ Cf. Chapter 4.2.

⁴⁸ The best solution is even to do both, as did the Danish Board of Technology in DRINKING WATER DK.

the aim to enhance public debate), this link is not crucial and political actors need not necessarily be involved. Political actors should rather be indirectly addressed by the arrangement, via the media for example.

(2) *The credibility of institution:* In order to raise decision-makers' interest in a PTA arrangement, the credibility of the organising institution is certainly one of the most important factors and possibly a necessary condition for a PTA arrangement to have any political role. In other words, the reputation and, hence, influence of a PTA arrangement is directly linked to the standing of the initiator. The Danish Board of Technology, for example, enjoys high credibility. It is considered serious and independent, and decision-makers are thus open to listen to its advice. Consistency of its activities seems to be one additional ingredient for playing a successful political role. In turn, performing thoughtfully organised PTA may enhance the credibility of the organising institution, as was the case with the Dutch N OTA/Rathenau Institute.

Whatever the aim is of the PTA arrangement (be it to launch a public debate, to raise awareness, to put an issue on the agenda, to give advice to decision-makers, etc.), it is of crucial importance that the organising institution appears as competent and independent. To meet this condition might, however, be problematic for recently created or ad hoc institutions. In these cases, the institution cannot rely on an existing reputation, but must create its credibility parallel to the realisation of the PTA arrangement. For example, the ad hoc organisation must be constituted of all relevant actors. And if this is not possible for any reason (in the case of the GENE DIALOGUE CH, for example, organisers could not get the critical organisations), the problem should not be hidden and the organisers should adapt their aims and method to this situation (the organisers of the GENE DIALOGUE CH, for example, stated that the arrangement should give advice to the institutions financing the project on how citizens think about gene dialogue).

c) Properties of the PTA arrangement

The de facto role of a PTA arrangement within the decision-making process depends also on the goal definition (1), on the process itself (2), on its product (3) and finally on the involvement of political actors (4).

(1) *The goal definition:* To play any significant political role, it seems that organisers clearly defining what they want to achieve, both for external communication purposes and for design purposes, will have a greater chance to be successful. When such goals are not formulated precisely enough like in the case SUSTAINABLE MENU NL (it was only said that the arrangement should “enhance public debate”), it is difficult to design the process around these goals. Consequently, the decision-makers which should eventually get involved and influenced by the process have a hard time to figure out if it is worth the effort. In this Dutch case, the vagueness of the objectives contributed decisively to the political failure although the institutional setting was otherwise optimal in so far as the PTA organisers acted on behalf of the government. Similarly, when many actors have a leading role in the PTA arrangement, it may lead to a confusion of goals, with each actor having its own goals. In the case of the CITIZEN GMO UK, for example, the funding organisation (a NGO) hoped to get a picture of the public opinion about GMOs, whereas the person in charge of realising the project was mostly interested in fostering a new method for discussing science and technology issues. This, of course, raised confusion about the aims of the project.

It appears that the goal definition is particularly important when the PTA arrangement is directed towards specific kinds of actors. If the PTA arrangement is meant to advise decision-makers (i.e. the roles agenda-setting, exploration of objectives and filter of alternatives) or help building awareness of an issue, it is important that this goal is clearly stated so that the addressees know that they are the target of the arrangement and get information on how to treat its output.

(2) *The quality of the process*: It seems essential that the PTA process is considered fair and competent by the observers. Otherwise, the whole process is not legitimate enough to play a role in the political arena.⁴⁹ For example, in the case TRAFFIC FORUM AU both the mediators and one of the key politicians (the vice-major) were criticised for not being neutral and promoting a personal agenda, the initial presentation was not accepted. Many ways can be found to guarantee the quality of the process, which all have finally to do with good management⁵⁰. Interestingly, one can note that the organisers of those cases which we ranked as playing a strong role in their respective category – the Danish Board of Technology, the Rathenau Institute and the Swiss TA Programme – work with steering groups or advisory committees, which are in charge of securing the quality and neutrality of the whole process. These steering groups are very useful to help the organisers in their work (they can, for example, help the organisers to find the experts, give input to the elaboration of a documentation, etc.), but they also act as control agents. In this respect, it seems essential that all the relevant actors dealing with the issue have the impression of being represented in these steering groups⁵¹. Other mechanisms can be developed to guarantee this “control”, such as hearings (PLANT BIOTECH UK). And it is also clear from our cases that having such a steering group or advisory group is not sufficient to be successful.

(3) *The quality of the product*: When the output remains vague or too visionary, it is difficult to translate it into political action. In other words, the results of the process relate back to the credibility of the process itself. In the case OZONE AU, for example, the poor quality of the outcome (only a rather thin consensus report with no proposals for action emerged) seems to be directly related to the lacking of any political role – although the institutional setting was certainly an even more important factor for the failure. Initially, involved politicians had guaranteed appropriate implementation of the conference’s findings. But when the results did not meet their qualitative expectations, they distanced themselves from their previous statements and ignored the recommendations of the lay-panel. Conciseness thus seems to be vital for success. When the arrangement aims at having a role in the choice of alternatives, results must show some practicability, i.e. they must present viable problem solutions. In the example of the BIOTECH BADEN-W. GE, the implementers wrote a report summarising the results of the many citizens forums that were part of the project. However, their recommendations appeared to be too cautious for the politicians to start anything with them. From these examples, we can see that it is important that the addressees of the arrangement understand the output and are able to make something out of it. That is especially important when the arrangement aims at awareness building, agenda-setting, exploration of objectives and filter of alternatives, as in these cases, the outcome is addressed to specific actors.

(4) *Involvement of political actors in the process*: The link to the political sphere not only plays a role at the level of the institution (see above), but also at the process level: If the PTA process itself is somewhat isolated and only seeks influence by forwarding its findings to the political

⁴⁹ Cf. the considerations about discourse ethics in chapter 4.3 on “Project management”.

⁵⁰ See chapter 4.3.

⁵¹ All actors cannot be formally represented, as steering groups must remain small.

sphere afterwards, we may expect a smaller impact than if the political actors play already a substantive role during the arrangement. To take just two examples, in DELPHI AU, representatives from the bureaucracies were part of the expert groups and thus deeply involved in various phases of the project, and in COPENHAGEN TRAFFIC DK politicians and officials were also active participants. By contrast, that politicians observe the arrangement from the distance or deliver a policy statement in the event only, seems not enough. The case ELECTRICITY CH, for example, shows that even though the organisers tried to involve politicians at different stages and levels (most of them received an invitation to attend the PubliForum; one was sitting in the accompanying group preparing the conference; some addressed a speech in press conferences or at the opening session of the PubliForum; two intervened as experts), the more engaged advocates of the arrangements were those who were part of the process.

To sum up, we can systematise in the following way the factors influencing the political role of a PTA arrangement (Table 4):

Societal context	<ul style="list-style-type: none"> • <i>Good timing with public controversy</i> • <i>Good timing with de facto policy -making</i> • <i>Political relevance of the topic</i> • <i>Political culture open for (informal) participation</i>
Institutional context	<ul style="list-style-type: none"> • <i>Link to the political sphere</i> • <i>Credibility and reputation of the institution</i>
Properties of the arrangement	<ul style="list-style-type: none"> • <i>Precise definition of the political goals</i> • <i>Fairness of the process as perceived by the political observers</i> • <i>Product of the arrangement aiming at practical implementation</i> • <i>Involvement of political actors in the process</i>

Table 4: Success factors influencing the political role of PTA arrangements

4.5.5 Conclusions

Often, the debate about PTA attributes to participation the role of helping decision-makers to take a decision. The analysis of the case studies of the EUROPTA project showed that the political role of PTA is far more complex and is related to the whole policy-making process. Moreover, whereas most PTA arrangements seek a direct political role, some try to intervene in the policy-making process in a more subtle manner, for instance by stimulating the public debate on the issue or by raising sensitivity for public participation. But while the discussion of the case studies showed that PTA has an inherent political dimension which can be recognised in the goals set by the organisers, their actual political role remains often short of the expectations.

Many intervening factors influence the political performance of a PTA arrangement. It seems that the “political success” of a PTA arrangement not only depends on one or two favourable factors but is the result of a particular combination of factors. This can be said, for instance, of all the consensus-conference-like arrangement outside Denmark: although the procedures are well tested in the Danish context and proved to be working well, various circumstances and factors led to rather poor results (in political terms) in other countries so far. Nevertheless, we could show that some factors must be necessarily met for every PTA arrangement to be successful re-

ardless of what the particular aim is: *credibility of the institution* and *quality of the process*. Other factors are also important, but they will be more or less crucial depending on the political role an arrangement is aiming at.

From these findings, we can make to general⁵² recommendations with respect to the political dimension of PTA. First, when practitioners envisage the possibility of setting up a PTA arrangement they must be conscious that, in some way or another, they will act within the given policy system. This can be intended or unintended and the intervention can be strong or minor. As a consequence – and independent from considerations related to the institutional setting and the properties of the arrangement – it is important, before starting any PTA, to carefully consider the actual political situation, so as to gain insights on the timing and the political relevance of the issue. The aims of the PTA arrangement should then be *adjusted to this political situation*. This will make it much easier to gain influence on the policy-making process. Moreover, as gaining influence is a matter of communication, it will be much easier for the implementers to communicate the results of the arrangement.

The second general recommendation mostly concerns the addressees of PTA arrangement, that is the politicians. Often, PTA is considered as an instrument to give advice to politicians on which decision is the right one to take. In this section, we were able to show that the influence of PTA on the policy-making process is of a much more subtle nature, as it can, for example, contribute to put an issue on the agenda, sketch the direction a specific policy should follow or overcome blockades. Moreover, it is commonly expected that PTA should create something new or rescue politicians from a “non-decision” situation. But we clearly saw that in many cases, PTA is rather a *catalyst*. Minority proposals are presented as viable solutions and get a chance to be accepted by the majority, too. In still other cases, PTA can bring new ideas which will develop in time and generate further new ideas. In this respect, the role of PTA on the policy-making process is of a very special nature. Finally, when assessing the role of PTA on the policy-making process, we must not forget that the actors intended to take up the results of the PTA do not always agree with its outcomes. PTA is always part of the political game in which power is at stake.

⁵² For more specific hints, please consult our section 4.5.4 in particular.

4.6 Impacts of participatory TA on its societal environment

Leonhard Hennen*

4.6.1 Introduction

Technology Assessment is a procedure that deals with impacts of technologies on society, economy and ecology in order to provide knowledge that is helpful for political decision making. So this could be a kind of a common sense definition of Technology Assessment: TA is occupied with impacts. The impact of Technology Assessment studies itself on decision making, on public discourse or on technology development is an often discussed but scarcely investigated subject. Does TA or PTA matter in terms of "Are there any effects on policy making, on public debate, on technology development?" is of course a crucial question in debates about TA. It cannot come as a surprise that some of the analytical papers presented in this report implicitly or explicitly tackle the question of impacts. Did the PTA arrangements under scrutiny in the EUROPTA project succeed in playing the political role that was intended by the implementers? Has the introduction of a PTA method in a new national political culture been successful or not? What is good management of PTA? Those questions of course touch to the problem of impacts of PTA and in the respective papers it is shown e.g. that PTA arrangements have "impacts" in terms of e.g. playing a specific role in political and social debates on technology (see "The role of PTA in the policy making process") or introducing a new element into such debates and in technology policy (see "Implementing participatory technology assessment"). In this section the question of "impacts" is dealt with explicitly referring to impacts in a more comprehensive way: impacts in the sense of effects on different actors or areas of technology policy, and the problem of measurement and identification of impacts is discussed.

In political debates on Technology Assessment - in particular during the process of institutionalisation of TA offices at the parliament - we can see, that those voices criticising TA - from a left wing perspective - often employ the argument that TA -studies cannot have any impacts on decision making, because the political systems decisions are guided by vested interests that are resistant to information that is not in line with the preferences of the decision makers. On the other hand - from the perspective of those with an interest in implementing technology - it is said that TA will lead to technology arrestment thus supposing an overwhelming (negative) impact potential of TA studies on politics and society. Both perspectives suffer from an unrealistic view of the role of TA in political decision making. TA and PTA are not designed to directly influence political decision making, but to prepare knowledge that is relevant for decision making. PTA is an attempt to include the knowledge and perspectives of social groups normally not involved in technology policy decision making in order to expand the scope of perspectives considered in technology policy.

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4.6.2 Identifying impacts of TA procedures

The reason for over- as well as underestimating the possibilities for TA to have impacts is based in a common understanding of impact of TA following an instrumental model of policy consulting. At the cradle of TA as a concept stood the idea to improve the informational grounds for political decision making by means of science. The expectations of the clients (political decision makers) as well as of the TA practitioners for a long period implicitly have been that scientific advice should deliver a kind of knowledge that could directly guide decision making processes in a way of saying what is right or wrong or what will be the effects of doing this or not doing that.

There are a lot of well known reasons why this model does not work. Just to remember a few of them: First, TA is not - or in the ideal model of it should not be - "mandated science". The client of TA studies usually are not single actors with identifiable or articulated interests or intentions they are looking for support or legitimisation for by TA. TA - at least when carried out by public organisations - refers to a contested field of interests, preferences and values. Science is part of this field and takes part in the selection and description of problems (Bechmann/Frederichs, 1996), and can not deliver one best solution, since there are several solutions for several interests and preferences.

Secondly, given the scope of values, interests and respective problem definitions, as well as the complex interactions of ecological, economic and societal systems that have to be considered, TA often does not meet the expectations of political actors which are looking for instrumental knowledge which immediately can be transferred into "recipes" for political action or which is helpful to legitimise options that are preferred by political actors. TA does not deliver information of the kind of technical instructions for use. TA increases the complexity of decision making, by taking into account different values to assess impacts of technology, by supplying all information and knowledge available and conveying uncertainties or deficiencies of knowledge and open up the scope of possible choices and options.

A third restriction to impacts of TA as well as to PTA on decisions is given by the societal structures that political decision making on technological development undergoes in market economies. Technology development, investment in new technologies, exploration of new markets are merely private decisions that only slightly can be influenced by the political system and public discourse which in most cases are the addressees of TA. Government with regard to technology development in most cases only can establish a regulatory framework in hindsight. The political system is exposed to pressure from technological development as a precondition for economic development, international competitiveness of national economy and social welfare. On the other hand the political system is held to be responsible for avoiding negative consequences and adjusting technology development to social values. So the political system, the client of most TA-studies, in many cases only can search for consensus that might legitimise developments that have been decided on elsewhere.

So talking about impacts of TA, we have to bear in mind that there are serious cognitive, normative and pragmatic restrictions to an direct influence of results of TA processes (in terms of e.g. a change in the political agenda). What TA can provide (and so does PTA) is "background knowledge" that might be used after having passed a lot of filters of modification, simplification and selection according to the needs and preferences of the user (Lau/Beck, 1989). This makes it difficult to identify whether or not results of TA have had any influence on decision making or public debates. Even if e.g. a change in the agenda of the political discourse is identifiable, it is

hardly to tell if it is a result of the PTA arrangement. Arguments, ideas that may have been dominant in the proceedings or in the outcomes of a PTA arrangement seldom are totally new and can be found elsewhere in political and social debate, so that we always hardly can tell whether a change in debates is the result of the PTA arrangement. Even when looking for "impacts" not in terms of a change in the political agenda or in decision making but in terms of use made of results of TA in politics or society it is difficult to identify the "real" influence of TA-processes. Perhaps we can observe that TA results have been referred to e.g. in parliamentary debates several times. Apart from the fact that this does not tell much about the influence of the arguments referred to, actors may have used the results of a TA study to underpin their arguments or points of view without referring to it. These problems of measurement are well known in evaluation research on impacts of scientific policy consulting (see e.g. Beck/Bonß, 1984).

Literature on knowledge utilisation in scientific policy consulting see the conceptual use of scientific knowledge as a more important kind of effect of policy consulting processes than an instrumental use. In the last decades research on the use of knowledge in organisations deconstructed the initial ideal model of rational decision making by taking into account the values and different interests that are guiding decision making processes, thus conceptualising the role of scientific knowledge as being strategically used in processes of negotiation and bargaining according to different interests values and beliefs (Lindblom, 1959). In the so called "garbage-can model" of decision making (Cohen/ March/ Olson, 1972) the model of rational decision making (dominated by objective knowledge and argument) is substituted by a conceptualisation of decision making as an anarchic process in which several actors can put their claims into the process (the "garbage-can") and the outcome of the process is not determined by any kind of rationality like use of knowledge or argument as well as rational bargaining on different interests – it is more or less the unpredictable result of a game. Recent research draws on those insights by taking into account that decision making processes are not striving for the truth in terms of a one best rational solution of a problem, but are games of power, interests and beliefs in which scientific knowledge is used as "political ammunition". This however does not mean that there is no influence or effect of new knowledge perceivable at all, but there might be long term "conceptual" or "enlightenment" effects on the general perception of problems and practicable ways of problem solving. "Knowledge, including scientifically -produced knowledge, flows into the decision making process through obscure channels from many different sources, and this results in a more general awareness of the way the world appears and is structured." (Albaek, 1995 p85).

It is obvious that such long term effects on a rather general level of problem definition or agenda setting are hardly retraceable to single scientific consulting processes or reports being introduced in the political process. Effects of this kind are more or less describable as "political careers" of new paradigms – like e.g. sustainable development – which have to be observed over a long period of time, passing a lot of discussions on different levels of society being shaped and reshaped by different social actors. Results of PTA arrangements in most cases do not introduce totally new paradigms into political or social debate but are part of the ongoing process of problem definition and search for problem solving. The outcomes of PTA may show the preferences of lay people with regard to discussions on risks and benefits of new technologies, or may convey areas of consensus and dissent among different stakeholders with regard to political decisions to be taken, or may open up the scope of problem definitions, interests or values which are relevant for selected areas of technology policy. PTA is a means to either shed new light on concepts of problem solving, evaluation of knowledge claims that are developed in technology policy discussions by integrating new underrepresented groups into the process, or to introduce knowledge claims and perception of problems into the hitherto non attentive wider public.

4.6.3 Impacts as resonance – findings from the case studies

Discussions within the EUROPTA team conveyed some of the difficulties mentioned above. Discussions always came back to the core question "What is an impact?" or shouldn't we make a difference between "real impacts" on decision making or public debates and only some kind of reference being made in debates to the process or the results of a PTA arrangement. It proved to be nearly impossible to draw general conclusions in terms of relations between conditions that positively or negatively influence "impacts" of PTA arrangements. We can of course not give a conclusive definition of "impact" that may give us the possibility to measure impacts in terms of "high" or "low".

How to operationalise impacts?

One option to operationalise "impacts" is to relate the term impacts to the explicit or implicit goals of the PTA arrangement under consideration (i. e. in most cases goals of the institution implementing the PTA arrangement). Such goals in the most cases are articulated in a very general sense. Explicit objectives we can find in the case studies are e.g.: give input to decision making processes, stimulate public debate, initialise social learning processes. An attempt to explore this is made in the paper on the "political role of PTA".

Another option is to give a multi-perspective view of impacts of the PTA and its outcomes by investigating the expectations of different actors involved as well as their evaluation of the procedure with regard to their expectations. To do this would have made a series of in depth interviews necessary, which was not possible in the restricted frame of our project. Most of our case studies only supply information on the expectations of the institution implementing the PTA arrangement.

Given the above mentioned difficulties in analysing impacts of policy consulting processes in general and TA in particular, this would afford detailed evaluation of PTA arrangements for every single case. This would at least include:

- Evaluation research right from the beginning of the PTA arrangement, in order to get a detailed picture of expectations and intentions of any actor group involved in or observing the process.
- Long term observation of the carrier of results of the PTA arrangement, including interviews with representatives of the scientific system, political system in order to follow the paths by which results of PTA may be used as background or conceptual knowledge by different actors.

In none of the case studies this quality of information was available to the EUROPTA team. The case studies are based in most cases on information and material provided by the institution implementing the PTA procedure. With regard to impacts we often have to rely on "impressions" reported by project managers or participants of the procedure. Given this methodological restriction, in the following paragraphs we try to give a structured overview of impacts of PTA procedures of which we have relatively reliable information. In doing so we apply a broad definition of impact, seeing impact as some kind of resonance in the societal and political context of the PTA procedure.

In order to add analytical added value to this description in a second step classes of impacts should be related to possible causes (structures, processes, events) that might be relevant factors

in producing or preventing impacts. Due to the restricted scope of information on impacts this analytical exercise only can intend to find some hints on conditions for PTA arrangements to have effects in the societal and political context, that might be considered in further research.

First we can identify classes of impacts in a structural dimension. An impact of a PTA procedure can be regarded as some kind of resonance in the following systems or social areas:

1. Policy making process (Parliament, Administration)
2. Scientific community (experts, research institutions)
3. Media (reports on the procedure, on outcomes)
4. Public debate (reactions of social movements, interest groups, agenda of the debate)
5. Industry

In order to clarify the term resonance and thus operationalising the term impacts a bit further it is helpful to differentiate between types of impacts, which again can be specified for different kinds of reactions (or resonance) to the PTA procedure.

- a) Knowledge, Information
 - on the issue at stake: (new insights with regard to impacts of technology or options for problem solving)
 - on actors involved (knowledge about their attitudes, preferences)
 - on PTA as a procedure (knowledge about methods, about political role)
- b) Attitudes, opinion
 - Towards the issue at stake (ethical evaluation of problems, evaluation of chances and risks)
 - Towards actors involved (credibility of actors or institutions involved, trust/distrust in institutions competence of problem solving)
 - Towards TA as a procedure
- c) actors behaviour / initiatives
 - with regard to the issue at stake (new initiatives for regulation, further initiatives to explore unresolved problems or to fill knowledge gaps that have been identified)
 - with regard to actors involved (more interaction between relevant actors, climate of communication, new initiatives to involve the public or interest groups)
 - with regard to PTA as a procedure (improve design of PTA procedures, PTA taken up as a method in other fields, by other actors)

When relating these kinds of impacts or dimensions of resonance to the set of structural dimension or areas where PTA arrangements might have resonance in, we get a matrix to fill in the information about impacts we can draw from the case studies (see table 1).

Industry

Representatives of industry have been included in the PTA arrangements as members of the steering committee or on the panel in several of the consensus conference type arrangements we have in the set of our case studies. We do not have particular information on resonance of the PTA arrangement in those cases. We have three cases where industry played a major role as participant and/or addressee of the PTA procedure (Delphi AU, Novel Food NL and Discourse GMP GE). In the case of the Wissenschaftszentrum Berlin Discourse of genetically modified plants we only can assume that the involved representatives of industry get some new knowledge about argumentation and problem perspective of the also involved environmental groups, but there is no information about consequences drawn by industry from the process or results of the PTA arrangement.

In the case of the Dutch project on novel protein food the workshop with consumer representatives on the opportunities to substitute meat by novel proteins showed that consumers are reluctant with regard to products as substitutes for meat but might accept novel proteins as ingredients of food products. This found resonance in the research programs established by involved food industry. This case also was the only one in our set of case studies where PTA was included directly in a process of technology development at an very early stage (research). For the Austrian Delphi resonance is reported merely in the political system. The results of the foresight (new program on sustainable development and the creation of new research competence centres in Austria) as well in the long run might have impacts on research and development activities of Austrian industry.

Scientific community

Resonance in the scientific community (experts, public research institutions) can be expected by the way of personal learning of experts taking part in a PTA procedure on e.g. lay peoples attitudes towards the issues at stake or by a wider change in experts or scientific institutions communication with the public, taking into account fears or demands uttered by a lay panel or stakeholders in a PTA arrangement. Again, not having done interviews with experts attending or observing a PTA arrangement, valid information is missing in our case studies. It is likely e.g. that the Austrian Delphi have had some resonance in Austrian scientific institutions and among scientific communities (thinking about the relevance of the findings of the forecasting procedure for their research agenda), it also e.g. is likely that a change in political problem definition (as is reported as an effect of the Gideon project (NL) on crop protection affect experts and the scientific community (as well as industry), identifying such effects however would afford long term evaluation of PTA arrangements.

Interestingly enough one of the cases whose resonance with regard to the policy making process seems to have been rather low (Plant Biotech UK) seems to have caused remarkable changes in the attitudes at least of parts of the British scientific community towards the general publics (or lay people) role in debates on science and technology issues. It is reported that the UK national consensus conference on Plant Biotechnology supported a change in the British Public Understanding of Science Movement. The predominant so called "deficit model" of public understanding of science, according to which lay peoples understanding of science is lacking rationality, was questioned by the consensus conference, since the lay panel revealed competence in evaluating Plant Biotechnology. An effect on the social scientific community as well as on TA practitioners can be stated for the Discourse on herbicide resistant genetically modified crops (Discourse GMP GE). This PTA arrangement induced a lively discussion on concepts of participa-

tory TA in the Germany.

Media

With regard to the media the case studies suffer from a lack of systematic analysis and documentation of media reports, but there seems to be a general interest of the media in the procedure as such as new elements of public or political debate. In most cases (with the exception of traffic forum AU) the implementers of the PTA arrangement strove for an involvement of media in the process by press releases, press conferences etc. Many of the PTA arrangements had a quite respectable resonance in the media (some not only in press but in TV and radio too), although often a lack of differentiated reports on the issue at stake or the results is reported in the case studies (Ozone AU, traffic forum AU, plant biotech UK, electricity CH). At least in those cases where the PTA method was newly introduced media did merely report on the participatory procedure as such, in some cases appreciating it as a helpful new element in political debate and decision making, in some cases being critical or sceptical with regard to the use of the results of PTA in decision making (traffic forum AU, Biotech BW GE, electricity CH). The three Danish PTA processes succeeded not only to gain the attentiveness of the media with regard to the procedure, but as well with regard to the results or conclusions of the PTA arrangements. This might be due to the fact that PTA procedures and Consensus Conferences in particular can be regarded as being relatively established elements of political and public debate in Denmark.

Public Debate

Direct resonance in the public debate (in terms of reactions of interest groups) can be seen only as far as reflected in media reports. In some cases we have hints on Media reporting comments of representatives of interest groups on the PTA arrangement. Again these are comments on the procedure – supporting PTA as being worthwhile doing it or sometimes questioning its political role. In some cases – especially those dealing with regional planning processes – PTA seems to have been successful in establishing a new co-operative climate of communication (Traffic Forum AU) or could induce processes of joint problem solving of stakeholder groups (Copenhagen Traffic, Urban Ecology DK). There are some hints that PTA arrangement made issues more prominent in public debate and thus had an effect of the agenda of public (and political) debate. The Danish scenario workshop on urban ecology seems to have at least contributed to initialise debates and activities concerning urban ecology on the local and national level (partly due to the active engagement of the Danish Board of technology in supporting local debates on the issue).

It can be expected that one relevant path of influencing public debate might be distribution of result by representatives of stakeholder groups which took part in the PTA arrangement, thus committing themselves to the process and declaring their will to take the results of the process into account with respect to their institution or organisation (so explicitly did the stakeholders in the gene dialogue case, CH). However information about whether results of PTA arrangements have been discussed within relevant social organisations is missing.

Policy making process

Most information we find on resonance in the political system, that is of course because most of our case studies cover PTA arrangements within a political institutional setting, a setting of policy consultation.

In some of the cases it is reported that parliamentary debates or representatives of the political administration showed interest in the procedure and publicly referred to results of a PTA arrangement in expressing the results to be helpful for decision making and being considered in ongoing decision making processes (Gideon NL, Biotech Baden -W. GE, gene dialogue CH) - even in such cases, where the PTA arrangement was not directly linked to the policy making process (citizens GMO UK). Direct references to e.g. lay peoples demands as expressed in a PTA arrangement (consensus conference type) show that PTA for decision makers may deliver new knowledge on actors attitudes. For the case of the citizens forums on Biotechnology (Biotech BW GE) e.g. it is reported that in a parliamentary debate on regulation of novel food the demand for labelling of genetically modified food products as expressed by lay people in the PTA process was used as a reference for decision making. The citizens foresight exercise (citizens GMO UK) caused reactions by the Department of the Environment appreciating the citizens call for a better, more transparent regulation of the food production system, and invited the citizens panel to discuss the panel's findings. It is however in most cases not visible whether this type of resonance (knowledge on actors attitudes) in the political system caused changes with regard to attitudes of the system towards the issue at stake etc.

In some of the case studies we find effects with regard to attitudes expressed or initiatives (action) taken by the political system that can be directly or indirectly related to the results or the process of the PTA arrangement. In the Dutch Gideon project on crop protection e.g. the Minister in charge explicitly in a letter to parliament appreciated recommendations of the PTA procedure (preventing crop diseases instead of looking for better environmentally sound pesticides) (Attitude toward issue). And one of the measures proposed by the minister in a program on crop protection which was set up later (Funding of crop protection measures which can be applied in small scale farming farmers) was at least according to a major recommendation developed by the PTA procedure. Other observations of a change in political action with regard to the issue at stake in the aftermath of a PTA procedure are reported from the Danish projects on urban ecology (national committee on urban ecology was established, that used proposals of the scenario workshop, establishment of a Danish centre for urban ecology), on drinking water (parliamentary debate on the results, new legislation includes elements of the action plan for solving drinking water problems proposed by the PTA arrangement). Political reaction in most of those cases is in the form of initiatives for further investigation into the issue at stake, like setting up a committee or commissioning a study (Drinking water DK). At least in three cases (Gideon NL, urban ecology DK and drinking water, we have hints that the PTA arrangement at least supported a change in the political agenda in terms of bringing a new issue or perspective into the political process.

In some of the cases the cases PTA or a particular method (like consensus conferences) was introduced for the first time in the national political context. Particular in these cases we find reactions of the political system merely with regard to PTA as procedure (Biotech Baden -W., electricity CH, Gene Dialogue CH). It might not be a minor impact in those cases, when political decision makers after the PTA arrangement took part mandated the TA institution to continue organising participatory TA for other issues (electricity CH, Biotech Baden -W. GE). In this respect the scenario workshop on urban ecology (DK) seems to have been a success for the model itself. Scenario workshop as a method was taken up by the EU commission, which commissioned pilot studies to use scenario workshops in local policy making in four European cities. And the method is reported to be widely used in DK in education and research, and by consulting firms.

4.6.4 Factors conducive or obstructive for PTA to produce resonance

A rough classification of causes that may be relevant for the kind of influence PTA may have, can be derived from our research protocol.

Classes of factors that may influence impacts of PTA are:

- Quality of outcome
(concrete recommendations or demands, dissemination of outcome to target groups)
- Procedural setting of PTA
(method, who participates?, intentions expectations of actors involved)
- Nature of issue/conflict/problem at stake
(including history of the debate, state of public controversy and political debate, societal context)
- Institutional and political setting of PTA
(institution organising PTA, "standing" of PTA, political commitment to the process, introduction of PTA.)

Quality of outcome

It is of course important to distribute and present the results of the procedure to all relevant actors. It is obvious that the presentation of the results has to be well designed to fit the informational needs of the client. It is however difficult to say which kind of outcome may be the appropriate one for PTA. Whether PTA should come up with concrete recommendations or demands or whether it should give scenarios on future development which are open to political interpretation depends on the issue at stake. When PTA aims at giving advice to policy making it will fail to have any impact, when not coming up with concrete problem definitions and demands for problem solving. There is one case in the set of our case studies which gives an example of a bad outcome restricting the impacts of a PTA procedure. Due to problems of the participatory design (young peoples panel in a consensus conference) the Austrian Ozone Conference failed to deliver a politically relevant result. The report did not include political recommendations, but very general remarks on the problem at stake. It could not have any resonance in the political system despite a quite strong commitment of government agencies to the procedure.

Procedural setting of PTA

We have some cases where problems during the process appeared that were caused by management failures or the design of the arrangement. For example the reluctance of the lay panel (in the case of the UK consensus conference on plant biotechnology) to cooperate with the facilitator, because they felt to be pushed in a certain direction by his interference, or concrete conflicts between participants in the Traffic forum Salzburg. Different expectations of participants sometimes cause problems for the process, but in most of those cases the reasons for a lack of impact on what level ever can be found in bad timing with regard to decision making, unclear mission of the Institution organising the PTA arrangement (as in the case of the UK consensus conference).

With regard to impacts the credibility of the procedure is of course an important factor. As is dealt with in the paper on management the fairness and openness of the process is a problem that

is steadily dealt with by project managers to make sure that the results of the procedure can be regarded as non biased by the public or political decision makers. To support the credibility of the procedure and its outcome in the case of the Swiss PubliForum on electricity and the Danish conference on drinking water it proved to be helpful to show that the results of the procedure were supported by surveys thus strengthen the representativity of the results.

Support and commitment by relevant stakeholders and representatives of the political system by involving them in the procedure itself or in the advisory board is helpful to strengthen the credibility and the visibility of the procedure, as is shown for example in the Swiss PubliForum on electricity or the Copenhagen traffic forum. This does not necessarily mean that a strong relation of the PTA procedure to the political decision making processes is in any case helpful. Attainment from the policy making process, taking off the pressure of political decisions, may be helpful to create a co-operative climate of problem solving (Gideon NL, Urban ecology DK).

Nature of issue/conflict/ problem at stake

We have some evidence from our case studies that the opportunities for a PTA arrangements results or findings to be processed or referred to in public and/or political debates are relatively good when there is an relatively open political situation, when relevant actors are looking for new ways of problem solving and no immediate decisions are at stake. Typically these are situations when the problem is not politically well defined yet or when relevant actors are searching for common paradigms of problem solving. In our set of cases we have at least four that fit into this type: The Austrian Delphi study, the Dutch case of a project searching for new products in the field of novel food (not been presented in our workshop), the Dutch Gideon -project on environmentally sound crop protection and the Danish projects on urban ecology and on traffic in big cities. In all these cases we can say that crucial results of the PTA process have been taken up by relevant actors. In the case of the Gideon project the problem at stake was the extensive use of pesticides (this was a problem lively debated in the public and in the political system), but the goal was not to look for new legislation on the issue but to develop new visions on how to handle the problem. This was carried out by the Rathenau -Institute organising workshops with representatives of agriculture, chemical industry, consumers and others. One of the visions or the scenarios the PTA arrangement produced stressed the need for prevention of crop disease instead of developing better chemicals. This was taken up in parliamentary debates and in a letter of the ministry of agriculture in which he addressed the parliament to consider the findings of the Rathenau project. For the first time the minister put the goal of reducing the dependency on chemical pesticides in one line with the notion of preventing plagues and diseases. The catalogue of measures offered by the minister included the funding of small scale cultivation as a means to prevent crop diseases (this was not new, but made an old goal of association of small scale farmers more prominent in the political sphere).

The scenario workshops on urban ecology can be described as a learning process without immediate need for political decisions, the workshops organised by the Danish board of technology produced action plans for environmentally sound urban development for local communities. It was more or less a common search for ways to reach a goal that was not contested. The goal was to make the issue of urban ecology more prominent on the political agenda. And in fact the minister of the environment set up a committee on urban ecology that integrated some of the findings of the PTA procedure. Additionally the action plans or scenarios developed have been taken up in discussions in several Danish communities (also due to the follow up activities of the Danish board of technology).

In cases like this – were development of ideas is the focus and the objectives are not highly con-

tested – it seems that results of PTA arrangements (which include all relevant stakeholders in the process) have a good chance to be referred to in the public sphere and in policy making. Of course this is partly due to the fact that the issue at stake is not highly contested and that the results often are rather abstract ones, or open to interpretation with regard to the concrete political measures that have to be taken. As a politician was quoted in the case study on the Gideon project the results may have the character of "a Christmas message like formulated by the queen". But nevertheless PTA may have a good opportunity to initialise learning processes, to establish processes of searching for paradigms and visions (Leitbilder) that can be shared by relevant actors as a kind of common reference for debates.

We have on the other hand several cases where the issue at stake is highly contested, where interested groups hold definite positions with regard to the issue and – this is most important – public debate or political debate has already come to results (in terms of legislative decisions, and/or engagement of the political system in funding of research and development of the technology at stake). In those cases public debate on chances and risks may still go on, but actors (and most decisive politics) already are committed to definite options. This for e.g. applies to the Rathenau - Institutes project on genetically modified animals (GM animals NL) and to the citizens forums on biotechnology organised by the Academy of Technology Assessment in Stuttgart (Biotech Baden-W. GE). In both cases the impacts in terms of media coverage of the results of the PTA procedure as well as the uptake of results by the client (parliament and/or government) where held by the organisers themselves to have been rather disappointing.

The Rathenau project on GMO animals got lost of its political role when during the preparation of the project the parliament took a definite decision on the subject at stake. The project thus failed to having any visible influence on public and social debate, since these by the decision of the parliament already in a way had been settled. The citizens forum on Biotechnology (Biotech Bade-W. GE) obviously has been a well designed and organised exercise in PTA (kind of a consensus conference procedure) but it suffered from the fact that an amendment of the federal genetic engineering law just had passed the parliament and that biotechnology policy in Germany had shifted from debates about regulation with regard to risks and safety to an active policy to promote Biotechnology and genetic engineering industry as a means to foster industrial development in Germany. Also the government of the state of Baden Württemberg (the client of the TA Academy and the addressee of the results of the PTA arrangement) did express its will to promote the regional development of biotechnology industry, and charged the Academy with a project that comprised two parts: a) an expert assessment on opportunities for biotechnology industry in Baden -Württemberg, and b) an assessment of lay peoples attitudes towards chances and risks of genetic engineering, that was carried out as consensus conference like procedure. It turned out that the results of the expert assessment on opportunities to develop biotechnology industry have been taken up at least to support the governments plans to establish a funding program by the foundation of an Biotechnology Agency. The findings of the lay peoples assessment on risks and chances however failed to have any effect. It seems obvious that in a situation like this, where the political discussion on the issue of risks, which was the main subject of the PTA procedure, was closed by the genetic engineering law, and the addressee of the procedure already had decided on measures to be taken (i.e. promoting biotech industry) the PTA arrangement couldn't be more than an annex to the main task (search for opportunities to develop biotechnology industry).

However, when stakes are high and interests are well defined, this does not necessarily imply that it is absolutely unlikely for PTA to have any impact. It might be that relevant actors feel a need for negotiation in order to overcome a deadlock given by the adverse nature of the conflict. PTA then may succeed in establishing a new climate of co-operation by giving the opportunity

of learning about perspectives and problem views of relevant stakeholders and opportunities for shared problem solving. In those cases (like e.g. in the Traffic Forum Salzburg or the Copenhagen traffic case) it might not be the result of the PTA arrangement (in terms of a consensus or new knowledge about the issue at stake) that is important but the process itself. PTA has the opportunity to prepare for a common ground or arena of discussion and Cupertino. Stakeholder TA (as argued in the paper on choice of participatory methods) might be more appropriate than public (lay people) TA. The PTA arrangement then may develop into a conflict mediation kind of process.

Institutional setting of PTA

Aspects that seem to be relevant with regard to the institutional setting of a PTA arrangement are the Commitment of decision makers to the PTA procedure, the standing and mission of the institution organising PTA, and the establishment of PTA as a well known practice within the country.

In the Danish cases we considered in our project impacts on the process of policy making and on public debate seem to be relatively visible. This in part may be due to the fact that PTA is a well known and accepted feature of TA practice here, that the mission of the institution (The Danish Board of Technology) to organise public debate and to give input to the policy making process is quite clear and well known and that the awareness of the public and the political system of PTA in comparison to other countries is high.

We have on the other hand case studies that reveal a lack in commitment of the political system to the PTA arrangement and an unclear mission of the institution, that set major restrictions to opportunities for impacts as well on public debate, the media or policy making. In the case of the Salzburg Forum on traffic e.g. (workshop series to find ways to resolve local traffic problems) it seemed that the procedure succeeded in establishing a better climate of communication between stakeholder groups in a political dead lock situation. Due to the fact however that the PTA arrangement was the result of a personal initiative of the vice major of the city and that the city council publicly announced not to feel committed to the result of the PTA-arrangement results of the procedure obviously failed to have any relevance in the political process after the PTA procedure was finished.

In the before mentioned case of the citizens forums on genetic engineering (Biotech Baden-W. GE) the political commitment to the procedure was only a formal or symbolic one. The case of the Dutch PTA-project on genetic modification of animals (GM animals NL) reveal an unclear mission of the TA institution as being (together with the above mentioned problem of timing with regard to political decision making) responsible for a lack in public and political response to the results of the procedure. The Rathenau-Institute at that time was in a phase of rethinking or redefining its role with regard to the policy making process as well as to the public. The organisation of the public debate on genetic modification of animals was an experiment in public activities for the Rathenau Institute, to make the institute politically and institutionally more relevant. The reasons for starting the PTA procedure more or less have been institutional ones, the mission of the procedure with regard to the political process ended to become unclear because during the preparation of the PTA arrangement a political decision on the issue at stake has been established.

We have several cases where PTA as a procedure is introduced for the first time in order not only to test a new method but in order to give TA or a TA-Institution a voice in technology policy debates. With the exception of Denmark (and meanwhile the Netherlands) PTA is still a new,

not well known, and by no means widely accepted feature of technology policy (neither on the local nor on the national level). So what we find in several cases is that media do not report on the results of the procedure, but on the procedure as such as a new, or interesting or problematic method. And similarly reactions by interest groups or actors of the political system are with regard to the method not to the results.

The case of the Swiss Forum on Energy policy seem to be an example of a successful introduction of PTA into a new context. It had a respectable resonance in the media and in the government, but very clearly the media generally did not touch the problem at stake but showed interest for the method. The federal council encouraged the Institution to go on with organising comparable processes. The TA institution was invited to present the results of the Forum in the commission of energy in parliament. Whatever the effects on decision making may be in the aftermath of the PTA process, the PTA arrangement obviously gave visibility and legitimacy to the rather new Swiss TA program. This is an impact that may be a precondition for impacts on the policy process and public in terms of resonance to the procedures results and stimulating debates in the future. There are good reason for this form of impact: The problem at stake was prominent in the public as well as in the political system, since the end of a 10 year moratorium on nuclear energy was in sight, parliamentary debate on a new energy law were just going on but did not come to a result, and the potential of resistance to nuclear energy in the Swiss public was high. The procedure so to say was perfect in timing, and it was well prepared especially by intensive media contacts.

4.6.5 Conclusions

There seems to be some evidence from our case studies that the issue at stake and the state of public and political debate is an important factor for PTA to have resonance in the societal and political context. It is difficult for PTA to produce impacts or effects of it's results on its own, despite of a non attentive context. Resonance in politics, public, science etc. is above all dependent on the logic or state of debate of those areas itself.

If relevant decisions have already been taken, impacts on the political system and also media are unlikely to appear. Other relevant factors are connected with the institutional setting: It is relevant whether the PTA procedure is carried out in a political setting where the procedure is connected to an expressed political will to involve/hear the public/lay -people. We can also see that in some cases the procedure itself causes the main impact on the media: media often do not merely report new knowledge on the issue stemming from an PTA procedure, but perhaps convey a new attitude to PTA or involving the public: the PTA procedure itself is the message. This fact again can be related to the institutional and the political context: in a political context where PTA is new, or where the mission of a PTA procedure (and or institution) is not clear the "issue at stake" is the legitimacy or credibility of the procedure itself, and impacts can be expected in terms of improving the societal or political standing and visibility of the institution.

The findings from our case studies have of course to be weighted against the fact of the restricted quantity and quality of information about impacts we find in the case studies. There seems to be however some support of the findings of knowledge utilisation research, that a conceptual use of results of scientific policy consulting is more likely to appear than an instrumental use in terms of direct implementation of knowledge into decision making.

What can be added from our case studies to this findings is that opportunities for PTA to have an effect on political or social debate merely are dependent on the issue at stake and on the state of public or political debate. With regard to the theoretical framework of the EUROPTA Project it

appears that the contribution of PTA to the process of dealing with uncertainty and inequality may mainly be in promoting social learning. The framework supposes that social learning include the "adoption of new factual knowledge", "gaining insights into the rationales of other actors", and "development of new strategies". It is obvious that preconditions for all these aspects of social learning are given in an open situation of searching for common problem definition and options of problem solution. Such a situation may be given

- in an early stage of technology development, when searching for feasible and socially sound technical solutions for socially defined problems, as was e.g. the case in the Dutch Novel food project searching for ways of sustainable food products.
- when there is a shared need for a common new paradigm or "Leitbild" of problem definition and solution. This might be due to the fact that relevant actors block each other and none of them is able to steer the situation according to his own interests - as in the two cases on traffic (Traffic Forum AU, Copenhagen Traffic DK), or due to the fact that there is a widely accepted problem where search for shared solutions is necessary (urban ecology DK, Gideon NL).

Cognitive, normative and pragmatic uncertainty in this situation may be "equally distributed" among relevant actors. Pragmatic uncertainty may be particularly important here, because actors are not sure about what might be a successful strategy in their own interest. Due to the restricted material of the case studies this insight, however plausible and not at all new, of course is far from being totally proved or covered by our case studies. In particular it is difficult to come up with a conclusions on the opportunities of PTA procedures to induce processes of social learning with regard to settled debates, conflict situations, where openness for joint problem solving is missing. In long term perspective participatory procedures may have the chance to change the climate of debate and foster an exchange of arguments instead of politics of power. In this respect the "procedural" impact of PTA as a new arena for constructive debate, as an element of an emerging new political culture of political debate and decision making in the field of technology policy might be an important issue in further research on impacts of PTA arrangements. The pure fact that there is a visible growing demand for PTA in recent years in a way supports this hypotheses. Again however, it is up to long term studies, following the different paths of the outcomes of PTA arrangements in different fields of society to clarify the role PTA plays in technology policies and to explore the opportunities of it to make a difference to a more technocratic style of technology policy making.

Talking about impacts of PTA has to abstain from expecting direct political impacts. The grid (or structure) of describing resonance that has been applied in this paper giving an overview on what lays on the surface with regard to impacts of PTA may be seen as a starting point for in depth research on the conceptual use of results of PTA and the political effects of the procedural or cultural change that might be start from introducing PTA in the context of technology policy.

TYPE OF IMPACT	Knowledge/information	Attitude/opinion	actors behaviour / initiatives
IMPACT IN Policy making	<p>On actors involved About attitude of lay people / stake holders (Biotech BW GE, Citizens GMO UK)</p> <p>On issue at stake Concepts/scenarios for problem solving</p>	<p>Towards issue New perspective on problem(Gideon NL)</p>	<p>With regard to issue at stake Further investigation: research, commission (Urban ecology DK) Effect on legislation (Drinking water DK) Change in political agenda (Gideon NL, Urban ecology DK, Drinking water DK)</p> <p>With regard to PTA Willingness to take results of PTA into account, "go on with PTA" (electricity CH, Biotech Baden-W. GE, Urban ecology DK)</p>
Scientific community		<p>Towards actors involved Attitude towards "public understanding of science" (Plant Biotech UK)</p> <p>Towards PTA Scientific debate on participatory TA (Discourse GMP GE)</p>	
Public Debate		<p>Towards PTA Comments on the procedure by interest groups (Biotech-Baden-W., electricity CH, traffic forum AU)</p>	<p>With regard to actors New climate of communication and co-operation (Traffic AU, Copenhagen traffic DK, urban ecology DK)</p> <p>With regard to issue Stimulate debate on new issue (Urban ecology DK)</p>
Media	<p>On PTA Reports with main focus on the procedure in cases where PTA is newly introduced (traffic AU, Biotech Baden-W. GE, electricity CH); Reports on results when PTA is an well established procedure (DK)</p>	<p>Towards PTA In some cases comments on procedure (critical: PTA is instrumentalised; supportive: new element of democracy) (Biotech Baden-W. GE, traffic AU, electricity CH)</p>	
Industry	<p>On actors involved Consumers' preferences (Novel food, NL) Stakeholders views (Discourse GMP, GE)</p>		<p>With regard to issue Change in research and development program (Novel food, NL) (Delphi AU ?)</p>

4.7 Conclusions and recommendations

European participatory technology assessment has over the last ten years or so evolved into a rich, diverse activity, ranging from numerous stakeholder round tables, scenario workshops to lay consensus conferences, and from biotechnology studies, technology foresight to urban transport reviews. One of the objectives of the EUROPTA research project was to 'map' this activity, so as to obtain a more systematic overview of the status of European participatory technology assessment at the close of the 1990s. Apart from individually characterising, in the form of case studies, participatory methods and their particular institutional/national implementations, the EUROPTA research project also sought to analyse comparatively and cross-nationally the various participatory experiences. This was accomplished by using a common research framework for the empirical study and carrying out a transversal analysis of various aspects of participatory technology assessment.

The results and conclusions of the EUROPTA research project presented in this final chapter refer to the theoretical framework, the case studies and the transversal analysis. They should be read with the following qualifications in mind:

- I. because of the considerable diversity of methods and the related intellectual, cultural and institutional traditions featuring under the term of 'European participatory technology assessment', the conclusions are necessarily of rather general nature. What this means is that while these conclusions would seem to hold true for the issue of participatory technology assessment as a whole, at the level of individual participatory arrangements they ought to be considered in close relation to the context-specific factors in play;
- II. the more detailed, issue-specific results and conclusions are to be found in individual parts of this report, notably the research framework and the five analytical papers in chapter 4.2 to 4.6, and are not repeated here;
- III. the conclusions and recommendations in this chapter were reached collectively, thus reflecting on what the EUROPTA research team managed to agree as a whole.

The remainder of this chapter is made up of four parts relating to conclusions and recommendations:

- The role of participatory technology assessment
- Conditions and requirements for the practice of participatory technology assessment
- Future research
- Implementation and supportive actions

On the role of participatory technology assessment

Much of the research undertaken as part of the EUROPTA project dealt with the functional role given to participatory technology assessment. The aim was to achieve a more in-depth understanding, both theoretical and practical, of what purposes participatory forms of technology assessment (TA) may serve in various settings. As the genealogy of participatory TA is inextricably linked to that of policy analysis, the relationship between the two deserves special attention,

as does the relationship between participatory TA and the decision-making processes of representative democratic systems.

Participatory TA as a complementary form of policy analysis

The EUROPTA research shows that participatory TA, as currently practised in Europe, can have one of a variety of distinct roles of 'assessing' socially relevant issues of science and technology. Broadly, this includes:

- I. evaluating public attitudes towards, and expert opinions of, new technologies
- II. identifying and characterising problems
- III. resolving conflicts
- IV. drafting policy options for R&D and/or for technology implementation
- V. creating visions of future policies
- VI. creating (social) networks around technologies
- VII. carrying out strategic planning

A more specific characterisation of the various roles of participatory TA can be extracted from the 16 cases studies and the analytical papers (chapters 4.2 to 4.6).

Arguably, most of the above roles are also part of 'classical', expert-oriented TA and, more generally, policy analysis. However, participatory TA is extending the analytical scope in comparison to classical TA, which in itself lends the outcomes/products of participatory TA a different quality. Firstly, the participatory element increases the information on the social or political acceptability of and agreement on different viewpoints. Secondly, the involvement of social actors other than experts in the assessment processes often has a direct bearing on the credibility of outcomes: where expert analysis alone may not be perceived as credible due to the problematical status of expertise – as is not seldom the case in issues treated in technology assessment – the participation of a wider range of social actors can help induce social credibility of the assessment, for example through their common problem definition and the broad range of social actors they represent. This is particularly the case if participatory TA actively responds to the (cognitive, normative, practical) uncertainties and inequalities found in socio-technological controversies (see the theoretical framework).

Participatory TA should not be seen as competing with classical expert TA, but rather as a necessary complementary element thereof. As classical TA has certain limitations regarding social functions and credibility in comparison with participatory TA, generally TA methodology ought to be complemented with participatory measures.

Social learning as an extended role of TA

In addition to serving as a particular, socially-oriented form of policy analysis, participatory TA is often found to have an extended role linked to debate about science and technology among the participants or among the wider public. This is the role of furthering deliberation, social learning and discourse, - a role which is particularly visible in those participatory methods/arrangements where the wider public has access to the assessment procedures, either directly or through the media. Although less visible, the role is certainly also contained in the more closed expert/stakeholder procedures, as the participating stakeholders learn from, and about, each other and can be expected to utilise their experience of participating in the TA in their everyday life.

Through this role of encouraging debate, social learning and critical political discourse, participatory TA has the potential to enhance social cohesion and strengthen civic discourse. It goes without saying, however, that a pre-condition for this is the credibility and perceived legitimacy of the participatory TA arrangement and its institution.

Although rarely particularly well articulated, this role often is an important motivation behind the establishment of participatory TA. Seen in this light, then, participatory TA is not just an advanced, more sophisticated tool of policy analysis for, and of, experts and decision-makers, but more broadly a means of appropriating technology to the needs and expectations of society. What this means is that participatory TA – both its contents and procedures – effectively becomes more firmly entrenched in social discourse. Compared to traditional expert analyses, participatory TA thus helps broaden the range of actors, and open up scientific-technological analysis to the sphere of discourse, debate and controversy. Out of this, certain tensions may arise within a participatory arrangement, such as when there is a mismatch between the output-oriented policy analysis-aspect and the process-oriented discourse aspect of the arrangement. The ability to combine the two aspects in suitable fashion may be said to be an 'art' of competent participatory TA management.

Where, in the course of identifying issues for treatment in TA, a need for social learning, critical (public) discourse and/or mediation is found to be a key characteristic of a given issue, the use of participatory methods seems appropriate and should thus be given due consideration.

Participatory TA and its relationship with decision-making

One argument often used against participatory TA is that it muddles the water relating to the proper functioning of representative democracy. The reason for this, so the argument, lies in the competing claims for representation between elected politicians and appointed professionals on the one hand, and those involved in participatory TA, on the other. The EUROPTA findings do not support this argument. Although certain social actors may occasionally express – sometimes it would seem for tactical reasons – the fear that participatory TA competes with existing decision-making processes, the participatory arrangements held to date have been found to be complementary of the policy- and decision-making systems in place. There is no evidence from the EUROPTA case studies that participatory TA acts as a new power-base competing with existing political institutions. Quite on the contrary, participation seems to act the same way as classical TA – as a supportive or consultative function for politics. The few projects among the EUROPTA case studies whose aims could be interpreted as 'direct political action' turned out to have effectively played a consultative role only.

These findings correspond with the fact that it has thus far mostly been public institutions (parliamentary organisations, government offices, local governments, independent public organisations) which have been charged with holding participatory TA initiatives on a wide range of socially relevant issues of science and technology. In other words, it seems to be the representative democratic system itself which, in response to public controversy and pressure, wishes to improve and open up the discourse processes of science and technology policy- and decision-making.

Participatory TA should explicitly be established in order to improve public discourse on, and political opinion forming about, science and technology, with the aim of supporting policy-making with relevant processes and inputs. Participants should not expect to get a decision-making power-base from participatory TA, unless the existing power-structure is represented among the participants.

Participatory TA in a national context

Globalisation is an important issue in the fields of science and technology. The technological agenda is increasingly set within an international context, as scientific -technological research and development take place across national borders at a global level. Then again, much of current legislation and regulation remains within the realm of national governments and occasionally limited supranational governments (such as the European Union). The EUROPTA research shows that there is an apparent need for national participatory TA, in spite of – or perhaps because of – the increasing globalisation of science and technology. From a pragmatic point of view, participatory TA at national level makes sense, as the implementation and appropriation of science and technology to suit the particularities of a nation or cultural entity is the prerogative of national or regional governments. National participatory TA also seems to make sense normatively, as national governments seek to clarify and reassert their role within a global context. Not surprisingly, the national context of scientific -technological developments is usually thematised within national participatory TA initiatives, such as when regulatory aspects or the role of a nation in relation to international treaties are considered.

A question at the centre of the development of participatory TA in Europe has been whether a participatory TA method successfully used in one national context can also be used in another, different national context. For long, this has been doubted because of the complex interrelationship between a participatory arrangement and its institutional and wider social setting. The EUROPTA research has shown that while the national and institutional context certainly have an important bearing on the actual role of participatory TA, this does not mean that participatory methods cannot be transferred across national borders to other institutions. Participatory methods, such as the scenario workshop, citizens' jury, future search conference and consensus conference, have been found to work quite well regardless of the type of national/institutional setting. However, the transfer of a method from one country to another often brings about a relative shift of functional role, as the understanding of the role of (participatory) technology assessment and the standing of the institution involved tend to differ from country to country.

As the functional role of participatory TA differs between countries due to variance in national political culture, and – paradoxically - because national politics have to consider the globalisation of science and technology, there is a need for national institutions performing participatory TA.

Towards a pluralistic approach to the theory and practice of participatory TA

There was no overall, comprehensive theory of participatory TA available when the EUROPTA research project was started. The first task of the project, therefore, was to put together a theoretical framework, on the basis of which the empirical research could be carried out. The EUROPTA team opted for a pluralistic approach to the different theories and models that can help explain the multiple aspects of participatory TA. This eclectic approach turned out to be useful

and productive. The most important elements making up the resulting 'research framework', and thus helping explain the need for participatory TA, are:

- I. the inequalities and uncertainties attached to scientific -technological developments, which calls for more inclusive, social policy analysis and decision -making;
- II. the status of expertise as part of the problem of scientific -technological controversy, and 'enlightened' social discourse as part of its solution;
- III. the multifaceted nature of the 'problem situations' tackled by participatory TA, requiring a broad methodology that provides various 'tools' to deal with specific 'problems';
- IV. the (potentially) multiple roles of participatory technology assessment, as seen from different vantage points;
- V. the communication among diverse social actors, which calls for discourse ethical standards that ensure fair and equal representation of viewpoints.

Conditions and requirements for the practice of participatory TA

Institutional impartiality and competence

The institutional setting of a participatory TA arrangement sets certain (limiting) boundaries, but at the same time creates positive opportunities. Given one of the overall objectives of participation - to produce policy options through high -credibility processes - independence and impartiality of the responsible institution are of great importance. How exactly the necessary independence is established is not that crucial, as long as there is a credibility connected to the institution, making it possible for the stakeholders/citizens to engage in the TA and feel assured of the impartiality of project management.

However, building up such credibility takes time. The expert community, the stakeholders, executives, politicians, citizens and the media all have to gain positive experiences of the TA institution and its methodology. This takes many projects with various kinds of participation. Encouragingly, though, this can be achieved, as the EUROPTA project has shown.

The need for independence and the (in the wider sense of meaning) political role of participatory TA suggests that ideally such institutions should be established with responsibilities towards parliamentary debate (parliamentary TA) as one of the obligations. As the credibility of participatory TA is socially and culturally defined, and thus of another kind than the credibility of scientific analyses, it is important not to impose a rigorous demand for scientific working methods on assessment activities, as this would hinder the participatory activities. This in general speaks for formal setting outside the scientific community, or at least for a pronounced profile of practice that goes beyond traditional scientific activities.

It is recommended that independently functioning TA institutions be established within the public domain, with the remit to build up expertise in participation. The institutions should be given permanent status, because of the required expertise and continuity, the time it takes to build up credibility, and the importance of experience with many different methods.

Defining impact goals

Whether or not a participatory TA initiative shows an impact is obviously not only of interest to those who organise it and those who participate in it, but also to those who commission the initiative – often public political institutions.

As the role of participatory TA can be manifold, its outcomes and impacts can consequently be expected to vary. The question of the nature of impacts in relation to participatory TA has thus far been poorly investigated, and the required means of evaluation are not readily at hand. Despite the fact that empirical evidence was hard to come by, the EUROPTA research team devoted much of its time to analyse the role and impact of participatory TA, resulting in the conclusion that there is a need for a multifaceted view of what ‘impacts’ are in connection with participatory TA. Consequently, participatory TA activities should not be evaluated alone in terms of their direct impact on political decision-making. Improvements of the communication between actors (politicians, stakeholders, experts, consumers/citizens), as well as of the cognition of the problems and solutions are examples of other, sometimes more important, impacts.

The expectations of impacts should be realistic. “First-timers” should level their ambitions to their experience, to the status of the project in the wider public, and to the type of their contacts with the various target groups. A project made locally by an *ad hoc* organisation with a minimum budget should not put up national policy changes as their main criteria of success. Even well established TA institutions should, as part of their methodology, develop a communication strategy in order to be able to maintain realistic expectations among their users and customers. If expectations are unrealistic, any initiative will end up disappointing, no matter how satisfactory the actual outcomes are as seen, for example, from a cost-benefit point of view.

Initiators, practitioners and users of participatory TA should develop, communicate and maintain realistic expectations of the impacts of participatory activities. Further they should appreciate the multiple kinds of roles, outcomes and impacts that are characteristic of participation.

In general, expectations should be in level with the given conditions of institutional status, experience, resources, and available time.

Introducing/adapting participatory TA

The introduction of participatory methods into new organisational situations (a national context, a parliament, a TA) should be done carefully regarding the import, modification and/or new development of methods.

An analysis (prior to the implementation of the TA arrangement) should determine whether a well-established method can be imported and used one-to-one, or whether there are good reasons for modifying the method. It should be taken into account that modifying a method may spoil important features of the method.

It is advisable to take a rather conservative approach to the modification of methods, unless a thorough analysis or existing experience with the method speak for adjustments. Especially, it is recommended to try to avoid changing the parameters that make up the specific qualities of the method (such as the search for “common ground” in the future search conference, or the consensus element in the consensus conference.)

Despite the need for caution and experience, the experimentation with, and adaptation of, methods should be encouraged, since there still is a need for new methods and the introduction of participation into new arenas.

Development of new participatory tools might sometimes be the most feasible way of introducing participation in TA. If so, it must be recommended to involve experienced practitioners in the design phase.

Using a 'toolbox'

A thorough analysis of the problem situation (what is at the heart of the issue to be considered and how the institutional setting is characterised) should primarily determine the choice of a (participatory) TA method. Since the problem situation is influenced by a broad set of variables (such as timing, the nature of the technology, the innovation system, the institutional setting of the organiser etc), the set of methodological tools required is equally broad. In other words, there is no such thing as an universal method. Although there are already several methods at hand and new ones are being developed, there is still a need for further participatory methods to suit the different tasks facing participatory TA. Here, one problem is that institutions with no or little experience of participatory TA are often unaware of the range of methods already available .

It takes a full toolbox to be able to pick the right method. Inexperienced organisers do not usually have the toolbox at hand, and consequently may make methodological choices that are sub-optimal for the problem situation at hand. Such choices - of which examples have been seen in the EUROPTA case studies - may result from a decision to pick a method first and only then choose an issue. This may be good for the purpose of introducing participatory TA *per se*, but it may be less ideal and efficient for achieving impacts in relation to the issue at stake.

As the toolbox of existing participatory TA methods is rather well equipped, what seems important is to build up expertise and continuity of using the available methods.

In order to achieve an optimal method selection for the treatment of a given topic in participatory TA, the organiser ought to make use of a comprehensive problem situation analysis and choose the method according to the characteristics of the specific problem situation. It takes a certain insight into the nature of available methods to make such choices competently.

Consequently, it is recommended that institutions be set up that can ensure expertise, experience and continuity relating to participatory methods.

Communicating participatory methods

In many respects, institutionalised TA has been leading in the development of new, interactive methods of participation. Policy analysis fields other than that concerned with science and technology policy have begun to consider using participatory methods. Local authorities, national institutions and international organisations working in various areas of social policy increasingly appear interested in exploring the potential of social actor (stakeholder/citizens) involvement. It would seem important, therefore, to develop strategies for communicating the participation methodology developed in TA to interested parties outside the TA community.

Due to the interest in the issue of stakeholder/citizen participation on the part of various organisations, public institutions and individuals working in the broad field of social/public policy, there is a need for developing the communication of aims, structures, procedures and related 'best practice' of existing methods of participatory TA.

Further research recommended

Following on from the research carried out under the EUROPTA project, there are several aspects of participatory TA that are in need of further investigation. One such aspect concerns the quality of outcomes resulting from participatory TA. There has been a relative lack of analysis of what makes an outcome qualitatively high or low. The issue of outcome quality is obviously linked to the aims and expectations of the related participatory TA arrangement. The analytical paper on management (see chapter 4.3) touches on the issue of quality, but there is a need for a more detailed characterisation of relevant criteria.

Another aspect concerns the impacts of participatory TA. The EUROPTA analysis shows that there is a need for a more sophisticated understanding of what impacts may be and how they should be evaluated. One of the problems facing the EUROPTA project was the relative absence of empirical evidence about impacts (see the relevant sections in the case studies, and chapter 4.6 on impacts). Future research should aim to further develop a typology and evaluation methodology of impacts and investigate the extent to which participatory TA arrangements impact on policy-making, social learning and public debate, and how this relates to the perceived usefulness of the individual arrangements.

Future research should also try to compare 'classical' expert TA with participatory TA. Here, it could be useful to characterise and compare the respective functional role, organisational feasibility, procedural and outcome qualities, strengths and weaknesses of both types of TA. This would help determine the extent to which the two types may be complementary, and clarify the problem situations which should trigger the use of the one or the other TA strategy.

There is a need for further research concerning

- I. quality criteria relating to the outcomes of participatory TA;
- II. the characterisation of the various types of impacts resulting from participation, and the development of impact evaluation tools;
- III. the comparative analysis of the aims, function and impacts of classical *versus* participatory TA.

Practical implementations and support actions

Implementations at European level

The EUROPTA team would like to propose a number of practical actions aimed, among other things, at developing new participatory methods for use in novel situations. In particular, it is proposed that participatory TA be explored at European transnational level, in line with the pan-European developments of, and public debate about, science and technology. Given the existing experience of participatory TA at national level, such transnational TA should be able to be implemented on the advice of a team of national experts at reasonable costs and within a feasible period of time. In order to induce a learning process beyond the actual participatory arrangement itself and achieve active co-operation, it may be advisable to start with stakeholder participation.

Transnational implementation of participatory TA is recommended in line with the transnational development in science and technology policy. The following actions are suggested:

- I. pan-European participatory TA. Modified versions of existing methods (for example the consensus conference) could be developed to instigate pan-European citizen and expert panels;
- II. simultaneous national participatory activities among the European Union member states. Existing methods could be used nationally, and the outcome of the national projects could be compared and/or aggregated at European level.

“White spots on the map”

There is a case for designing new methods that allow for the active involvement of political decision-makers at various stages of the participatory procedures, so as to achieve better integration of participatory TA into the policy- and decision-making processes. Some existing methods make it possible for politicians to involve themselves in TA, but our case studies leave the impression that such participation does not (yet) bring enough added value to this target group in proportion to the considerable amount of time required for their participation. Methods and procedures are required that more directly address the needs of decision-makers in the course of the TA process.

Social learning among the participants of a participatory process is an important outcome. In some instances it is possible to embrace “the whole system” of social actors within one participatory arrangement, and the effect of social learning may subsequently result in a significant change of the roles of, and interaction among, the social actor groups. But in other situations, existing methods are only able to involve a fraction of the relevant social actors, and consequently the resonance of the process may be relatively low. Most of the existing participatory TA methods limit the number of participants to typically between 20-40, and therefore there may be a point in exploring new methods suitable for larger scale participation (several hundreds). There are existing methods that involve large group participation (for example deliberative poll or the voting conference), but the applicability of these methods is limited. A more complete array of large-group methods would serve an important purpose.

There is a need for the development of new participatory methods for the purpose of

- I. involving decision-makers directly in the participatory process;
- II. involving large groups of social actors.

Follow-up on the EUROPTA project

The EUROPTA research has generated considerable interest in the relevant research community and beyond. There has been a steady demand for information on the results emerging from this research. It is, therefore, recommended that a series of dissemination and training seminars be held to make the findings of this study accessible to a wider audience, and in particular in order to encourage countries with no existing participatory TA experience to consider taking up participatory methods.

To this end, it would be useful to compile a handbook of participatory TA methods, containing information on their relative strengths and weaknesses and giving guidelines as to how to put them into practice. This, however, would require an additional follow-up research activity.

Finally, it is proposed that a participatory TA network be set up and centrally maintained, for which a World-Wide-Web site may act as a main means of communication. The EUROPTA team and the extended network created as part of the EUROPTA project would serve as a natural starting point for such a venture.

The EUROPTA project may best be seen as the starting point for additional support activities, for which a demand has been expressed in various quarters, including:

- I. running dissemination and training seminars that build on the EUROPTA research outcomes;
- II. developing a methodology handbook on participatory TA;
- III. setting up a participatory TA network.

V. Dissemination and exploitation of results

The EUROPTA project have had the following dissemination and communication activities as part of the project work-plan:

- A EUROPTA website www.tekno.dk/europta, holding a general project presentation, workshop programmes and invitations, and drafts for the report and case studies. It has been the intention with the website to make our progress of work available to all interested parties, but especially to the experts who took part in the two international EUROPTA workshops.
- An international workshop in Copenhagen, Denmark, September 1998. The workshop had participants from many member states of the European union, as well as from countries outside the Union. 75 persons took part in the two day workshop. The workshop concentrated on the theoretical and the analytical framework.
- The second international workshop in den Hague, Netherlands, October 1999. 50 international experts took part in the workshop, giving feedback to the project team, presenting themes and cases, and debating PTA across national cultures. The workshop focuses upon the case studies and the five analytical chapters 4.2 to 4.6.
- At presentations nationally and internationally – for example among the members and observers of EPTA (European Parliamentary Technology Assessment network) – the project partners has communicated the aims and progress of the EUROPTA project.

Possible further dissemination will be:

- Distribution of the EUROPTA report as hardcopy and as web-publication.
- Direct information about the report to a broad range of interested parties – participants of the workshops, EPTA, the national technology assessment networks, and through the information channels of the European Commission.
- Production of a book on the basis of the work of EUROPTA. The book is projected to be published at the end of year 2000.
- Continuous communication to the technology assessment experts world-wide, mainly through conference contributions, the webpage and the technology assessment methodology listserver ta-method@list.tekno.dk.
- Depending on the necessary funding, the EUROPTA partners will seek to make a yearly international workshop on participatory technology assessment. The workshop is thought as a larger event than the EUROPTA workshops, and being based upon targeted research activities, new cases and new experience. By this initiative we hope to ensure an on-going discourse in the field of participatory methods in technology assessment.

As most partners in the EUROPTA project are practitioners of technology assessment, it is expected and foreseeable that the EUROPTA results (mainly the theoretical and analytical framework, and the transversal analysis) will make up part of the internal training, and be a valuable supplement to the development and understanding of the methods used. The EUROPTA project has supplied these institutions with a unique sample of cases, all representing new or alternative ways of performing participatory technology assessment, which will influence their modes of work.

At the beginning of this millennium, many technology assessment institutions are being set up in Europe and world-wide. These institutions are beginning to establish a methodology, experimenting and importing methods from the already established institutions. It is our hope that this report can contribute to the process of methodological clarification in the new technology assessment institutions.

The EUROPTA project has produced conclusions and recommendations directed towards action that has to be taken by others than the partners of EUROPTA. The considerations about future activities to further enhance the international development of technology assessment methodology mainly points at transnational research funding. It is our hope, that these policy advises will be heard and that they will result in further activities in the line of the EUROPTA project.

VI. Acknowledgements and references

6.1 Acknowledgements

The present EUROPTA report is a result of the engagement and visions of the staffs at the involved technology assessment institutions and research institutes. It took its beginning as a vision of gathering the many cases we had heard of, and trying to learn from them across national differences and despite the methodological preferences. We would want to thank our colleagues at our institutes and our network for the support they have given the idea of this report.

Without the pioneer work done by many inventors and initiators of participation there would have been nothing to analyse and write about. From the EUROPTA project we have learnt much, and we have registered the most important lessons and conclusions in chapter 4.7. But maybe the most important conclusion lies in the impression that we have got through our work with the case studies; That nearly all these cases are examples of individuals or institutions trying to break new ground, despite the many barriers and thresholds they had to cross. We would like to thank these pioneers for their enthusiasm, courage and wisdom.

During the project, we have drawn on persons outside the team. Some of the case studies have been done by external researchers, and the two international workshops have included more than a hundred participants from all over the world. The feedback, ideas, visions and insight brought into the process by these people have been extremely valuable to our work, and we would like to thank all of you for your participation and the support you have expressed for the EUROPTA project.

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Finally, we would like to thank our home institutions for the support we have got from our colleagues and executive bodies. The EUROPTA project has been heavily supported with time and money from our institutions, which underlines the fact that participation in technology assessment is a development that we have only seen the beginning of.

6.2 References

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EUROPTA

European Participatory Technology Assessment

Participatory Methods in Technology Assessment and Technology Decision -Making

Annexes

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Annex 1: Research Protocol

The Research Protocol presented here is the original version used by the researchers in the course of making the 16 EUROPTA case studies.

The protocol consists of 1) an introduction on the use of the protocol, 2) the research questions, and 3) specifications for some of the concepts and models behind part of the research questions. The structure of the protocol is mirroring the structure of the Analytical Framework.

The EUROPTA team sees the Research Protocol as an important “product” of the EUROPTA project, since the protocol makes up a most comprehensive tool for describing the relevant aspects of participatory technology assessment projects. However, it is the intention of the EUROPTA team to refine the protocol on the basis of the experience gained in the EUROPTA project.

How to use the EUROPTA -project’s research protocol

As part of the EUROPTA project, 2-4 case studies will be carried out in each of the six EUROPTA partner countries. To ensure the comparability of these studies a joint research protocol has been set up, which brings to the attention of the various researchers the questions and issues that the EUROPTA team would like to see addressed within each case study and description.

The research protocol should be seen as a structured checklist for doing the research. Each researcher should pay attention to each item on the list. The EUROPTA team expects that by following the research protocol an insightful and reasonably complete picture can be achieved of the various PTA arrangements under study. To achieve this you should try to answer the questions as much as possible on the basis of available information and make reference to documents, literature etc. Please try to answer all questions. If you can’t, say so (e.g. if you have no access to the necessary information). If you are using this research protocol to carry out comparative analysis certain questions may be answered in summary of several case studies, where the case studies took place in the same societal/institutional context. This kind of questions are indicated through out the research protocol.

The case studies are supposed to be structured like the research protocol (with all the headings). For easier reading it is possible to build text blocks for the “describe” issues. But be aware of mentioning all of them within the text!

The team hopes that based on the information collected via the research protocol, the various researchers will provide vivid and comprehensive descriptions of the stories *of* and *behind* the PTA arrangements under scrutiny. Sometimes you may have difficulty of knowing how much investigation is necessary, be aware of it. Base it on the institutional/personal experiences and literature if available. Don’t go too far into primary empirical work.

Only a guideline concerning the number of pages exists. Each case description should contain about 25 pp.: societal context 5 pp., institutional context 5 pp., and PTA arrangement 15 pp.

Figure 1 presents a general overview of the research protocol. On the left side are two sets of variables that affect the constraints and opportunities of the various actors that are involved in defining and organising the PTA arrangement: societal and institutional context. Within each of these dimensions several important aspects have been distinguished. Under every aspect a number of questions have been formulated within the research protocol.

On the right side the focus of the EUROPTA project – the PTA arrangement – is depicted. The PTA arrangement box consists of three parts. Part A “Set-up and process” describes why certain choices were made with respect to the design of the PTA arrangement and how the PTA arrangement actually worked out. Part B “Values, assumptions and goals” describes how various actors perceived the societal problem at stake, how the organisers translated this into a PTA-research problem, and what role and function participation had within the PTA arrangement for the various actors.

Finally, Part C “Outcomes” describes the results of the PTA arrangement in terms of its products, its media coverage and the impacts it had.

Finally there is an annex to this research protocol in which some theoretical background information on terms used in the research protocol is given. It may be used either as an information tool before starting the research (like the analytical part of the Theoretical Framework) or as a helping guide during the research.

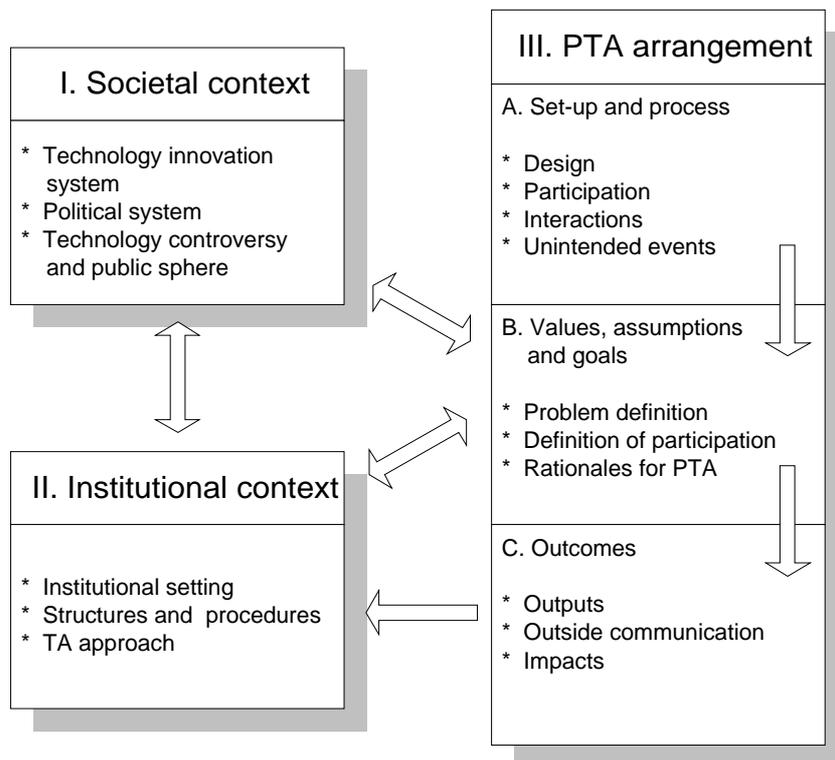


Figure 1: Structure of the research protocol

EUROPTA-project Research Protocol

I Societal Context

Technology innovation systems

I.1 What was the issue at stake?

This context description shows the technology-related theme in general. The PTA problem definition (part III) is the focus of the issue as done by the organisers. You should start here with the case and then describe the context perspectives to this case. What themes were relevant for the problem defined later in part III? In several cases you may have to deal with a more complex issue than a single technology, so be open for multiple technology problems as well as problem-oriented approaches. Further explanations and theoretical background may be found in the specification “Complexity of Technology Policy”.

Describe whether the focus was on a specific artefact (e.g., a car), or a technological system (e.g., traffic system), or the interaction between different technological systems (e.g., train versus aviation system) or a wider techno-political issue.

Describe the history of the development of the issue at stake.

Describe the phase in development of the technology and related political issues: e.g., R&D phase (technology shaping according to societal needs), commercial phase (regulation and fair allocation of benefits and risks), strongly institutionalised phase (was there a need for a system shift?).

Further explanations may be found in the specifications under “Organisational Complexity”.

I.2 What was the structure of the involved innovation systems?

Further explanations may be found in the specifications under “Innovation System”.

Describe the main actors and their interactions within the innovation system: e.g., interactions between R&D institutes, firms, governmental bodies, interest groups, consumers, etc.

Specification in terms of the concept of innovation network: The main actors within each pole have to be described as well as their most important relationships.

Describe the mechanisms within the innovation system that drove the development of the technology: e.g., to what extent is the development technology-, demand- or policy-driven?

Specification in terms of the concept of innovation network: It has to be described which poles play the motor role within the innovation process. If the technology pole plays a dominant role one could say that the development is technology driven. If the consumer pole is dominant, the development is demand-driven. If political needs and programs are dominant one could say that the development is policy-driven.

Describe what the interests were of the various actors within the innovation system with respect to the technology.

Describe in what way and to what extent the various actors within the innovation system were involved within the social debate around the technology.

Specification in terms of the concept of innovation network: Describe to what extent the various actors in the S, T, B, and C poles are active within the political debate around the innovation, i.e. the P pole

Political system

I.3 and I.4 are general parts, only to be answered once per country, please make reference in the other case studies.

I.3 Was there a political tradition of involving the public/citizens in decision-making processes?

Describe how public authorities traditionally interacted with other actors: e.g., consensual versus impositional, policy style of appeasement versus authoritative administration.

By “public authorities” we mean decision makers of different branches of government – executive, legislative, judiciary – on different levels (local, regional, national)

Describe the elements of direct/participatory democracy within the political system at the local, regional and national levels: e.g., public consultation (citizens’ boards, formal mechanisms (referenda, initiatives), etc.

I.4 Was there a tradition of involving the public/citizens in policy making processes in “technology related issues”?

Describe whether corporatist arrangements prevailed (policy decisions made in co-operation with organised interest groups and experts), or involvement of the public and/or social movements was common.

Describe to what extent PTA has been carried out and if so how this has impacted social debate and policy making.

I.5 What was the role of public authorities with respect to the decision making on the technology involved?

Describe the public authorities’ focus with respect to stimulating and regulating the technology: e.g., R&D policy, business policy, implementation policy, use or impacts, mitigating side effects, etc.

Describe the regulatory instruments of dealing with the technology were already in place: e.g., safety or health regulations, formal approval, right for citizens and interest groups to appeal, etc.

Describe the way in which the public authorities co-operated with scientific experts and industry.

I.6 What was the role of public authorities with respect to the social debate/controversy?

Please specify and describe briefly what kind of debate in different “publics” Further explanations may be found in the specifications under “Specification of Social Debate”.

Describe in what way public authorities was involved in the social debate: e.g., did it ignore the social debate, did it publicly support activities to promote the social debate, did it subsidise activities to support the social debate, did it launch an information campaign to moderate the social debate, etc.

Describe the different actor’s demands for governmental action: e.g., was there a strong public demand for regulating the technology at stake, were there demands of industry for a good climate for innovation, etc.

Describe whether the social debate was mirrored at the political level, in other words, describe whether in the political arena similar arguments were used as in the social debate.

Technology controversy and public sphere

I.7 What was the social debate/controversy around the issue at stake (in the PTA arrangement) about?

Describe the general public attitude towards scientific and technological progress at the time the PTA arrangement was held: e.g., societal climate characterised by mistrust versus faith in progress.

Describe the history of the social debate/controversy: main events, phases and issues, role of different actors (individuals, groups or organisations) and their influence on the social debate.

It is up to the researcher to define how far s/he has to go back into the past. S/he has to define the “relevant history”.

Describe the various characteristics of the issue at stake: e.g., uncertainty of knowledge, conflicting values, manifestation of various interests

Describe what was at the centre of the public controversy/debate.

Here, you should describe the content of the social debate, which can be related to a technological development but also to other types of questions. There might be a relationship between social debate and the development of the technology, but it is a matter of interpretation. Examples for possible answers may be: e.g. stop or go decision for the whole technology at stake, the socially/environmentally sound shaping of the technology, specific problems of application, questions of implementation (e.g. siting), search for common values and goals to guide politics, unclear public attitudes to the technology etc.

I.8 Was there public awareness on the issue at stake at the time of the PTA arrangement taking place?

Describe how widespread the discourse on the societal impacts of the technology at stake was: e.g., trend-watchers, opinion makers, media coverage, initiatives of social interest groups, grassroots movements (protest activities), broad public, etc.

I.9 Were demands for more participation/democracy expressed in the social debate?

Describe demands relating to criticism on experts and/or decision-makers (trust) and relating to the decision-making process (decision competence).

I.10 Was the public controversy/debate politicised in a way that pro and con positions could be identified according to political party positions; or did it cut across party positions?

II Institutional Context

This is a general part, only to be answered once per institution, please make reference in the other case studies. But be aware of the effect that institutions may change. So if the time period between the cases is rather long, please mention any relevant developments within the institutional context.

Institutional setting

II.1 What was the formal setting of the (TA) organisation responsible for organising the PTA arrangement?

Describe links to e.g. parliament, government agencies, committee(s), academic institutions, interest organisations (both public and private), etc.

Describe the formal role of the (TA) organisation in the political decision making process on science and technology?

II.2 What was the external perception of the (TA) organisation?

Describe the standing of the (TA) organisation relating to political authorities and parties, the general public, social movements, industry, the scientific/expert community.

Describe the status of the (TA) organisation's output(s) relating to social debate and public policy and decision making. (to clarify "status": use "reputation" and "renommee" and distinguish between formal and effectual status)

Structures and procedures

II.3 What were the financial and human resources available to the (TA) organisation?

Describe the financial and human resources of the (TA) organisation, in particular, the number of staff involved in the PTA arrangement.

Describe who funded the (TA) organisation.

II.4 How were TA projects selected and designed?

Describe to which extent the (TA) organisation was independent in its choice of issues and methods.

Describe the characteristics of project selection and design (how was it done and who was involved in selecting issues and methods?)

Describe whether the institution uses different sets of PTA in order to match different timing?

Further explanations may be found in the specifications under “Options for Timing through Method Selection”.
--

TA approach

II.5 Did PTA constitute an integral part of the organisation’s understanding of TA?

Describe whether the formal mission of the (TA) organisation hinted at, or called for, participation within TA arrangements.

Describe the organisation’s understanding of TA in terms of the function of TA: e.g., stimulating social debate, policy advice, etc.

Describe whether the organisation had experience with involving the public or stakeholders in the process of producing expert analysis of policy problems.

Describe whether the organisation had experience with forms of TA in which TA experts help citizens or stakeholders to collect inputs and transform them into advice.

Describe whether the organisation had experience with forms of TA in which TA experts play a mediating role between policy makers and stakeholders or citizens.

III PTA arrangement

III.A Set-up and process

Design

III.A.1 What were the overall characteristics of the PTA arrangement?

For some background information see specification “Characteristics of PTA arrangement”.

Describe the general set-up (parts and techniques) of the PTA arrangement: e.g., type of workshop, moderation techniques, groups discussion, etc.

Describe the role of participation within the PTA arrangement. (Was participation a fundamental part of it or just a little amendment?)

Describe when (e.g., one time event, series of events or permanent endeavour) and where (physical environment in which) participants met.

Describe what kind of timing demands the PTA method had to live up to; e.g. the PTA had to be finished before the political issue at stake would be debated within Parliament, etc.

Describe the (formal and informal) role of the advisory committee (if there was one) within the PTA arrangement.

Describe the kind of information inputs (e.g., research papers, scenarios, newspaper articles, outside expert presentations, etc.) the organisers collected or generated to feed into the PTA process at what moments.

Participants

III.A.2 What kind of and how many participants were involved at what times during the PTA arrangement?

Describe how many of which type of participants were involved in the PTA arrangement and why this choice was made.

Different types of participants are: knowledge carriers (experts), interest groups, decision makers, people affected by the technology, general (non-affected) public, etc. Reasons for choosing a (in)definite number of participants can be e.g., limited budget, organisational capacity, or space, open participation process, etc.

Describe in which phases of the PTA arrangement these participants were involved.

Further explanations for the different phases may be found in the specification under “Stages of the PTA Arrangement” .

III.A.3 How were participants selected?

Describe the kind of selection principles that were used: e.g., representativity versus balance.

Describe how participants were selected (e.g., random selection, volunteering, categorical self-selection, selection through networking, co-nomination, balancing of interests, mixed composition based on demographic parameters etc.)

Describe for what reasons participants were selected in this way and how biases were avoided.

III.A.4 Which participants took what kind of decisions?

Describe which participants played either a consultative or decisive role in the selection of other participants.

Describe which participants played either a consultative or decisive role in agenda setting.

Describe the kind of information inputs (e.g., research papers, scenarios, newspaper articles, outside expert presentations, etc.) the participants collected or generated to feed into the PTA process at what moments.

Describe which participants initiated new information gathering or new investigations.

Interactions

III.A.5 What were the rules of communication of the PTA arrangement?

Describe who was allowed to speak when during the PTA process.

Describe who could address whom during the PTA process.

Describe to what extent the various participants had equal opportunities to express themselves and had equal access to information within the PTA arrangement.

III.A.6 How did the process of communication develop during the PTA arrangement?

Describe what kind of interaction was prevalent during the PTA arrangement: e.g., bargaining on interests, arguing on cognitive claims, looking for win-win situations, etc.

Describe what kind of apparent strategies the various participants had in order to achieve their objectives.

Describe what kind of conflicts on agenda, on knowledge claims, on values and interests, and on rules of the PTA procedure did show up during the PTA arrangement.

Unintended events

III.A.7 What kind of unintended events occurred during the PTA arrangement and how did they affect the PTA process?

Describe the unintended internal events that happened: e.g., some participants left the PTA, parallel campaigns by actors, boycott by interest groups, emergency design, etc.

Describe the unintended external events that took place: e.g., change of government, press campaigns by non-involved stakeholders, new technological development, etc.

Describe how these internal and external events influenced the PTA process.

III.B Values, assumptions and goals

Problem definition

III.B.1 How did the various involved actors (implementers, participants, and other involved actors (e.g. members of the steering committee, board members, advisors, researchers, project team members, client, etc.)) define the issue at stake?

For further background information see specification “Values assumptions and goals”.

Describe what exactly did the implementers, participants and other involved actors see as the issue at stake in a given situation (describe what is going on in the eyes of these actors).

Describe why the implementers, participants and other involved actors defined the problem as they did (describe on what kind of experiences or world-views their problem perception is based).

Describe how the implementers, participants and other involved actors estimated the costs, benefits and side effects of the various solutions to the problem as they saw it.

III.B.2 How did the implementers, participants and other involved actors (e.g. members of the steering committee, board members, advisors, researchers, project team members, client, etc.) wanted the problem to be treated within the PTA?

For further background information see specification “The model behind III.B.2”.

Describe whether the implementers, participants and other involved actors promoted a more focused or a more synoptic treatment of problem scope.

Describe whether the implementers, participants and other involved actors promoted a more simplifying or a more elaborating treatment of the problem.

Describe whether and in what way the implementers, participants and other involved actors paid attention to the political and/or institutional (network) context of the problem

Describe what kind of demands the implementers, participants and other involved actors expressed with respect to the problem at stake: e.g., demand for more information etc.

Describe whether the implementers, participants, and other involved actors promoted a more solution-driven (problem-solving) approach or a more problem-driven (problem-finding) approach.

Describe what kind of demands the various actors expressed with respect to the problem at stake: e.g., demands for more information (need for studies, surveys, etc.), demands for clearer objectives (need for clarifying aims and values) and for more coordination (need for planning, negotiation, interaction).

Describe whether the various actors paid attention to the political and/or institutional context of the problem.

Definition of participation

III.B.3 What kind of participatory processes did the implementers and other social actors expect within the PTA arrangement?

Describe how various actors viewed their own level of participation and that of other actors within the PTA arrangement.

Possible answers are: e.g., actors expected to be informed, actors expected to provide the TA analyst with information, actors expected to go into dialogue with other actors, actors expected to have influence on the political decision-making process, actors expected to have their own problems solved, actors expected to have political decision-making power, etc.

Describe in what stages of the PTA arrangement the various actors expected themselves and other actors to have a say.

For further information on the definition of different phases see specification “Stages of PTA arrangements”.

III.B.4 Why did the various actors engage themselves in the PTA arrangement?

Describe the perspective of the implementer and other actors on the PTA arrangement.

Possible answers are e.g., PTA as a way to bring ideas of marginal interest groups under the attention of policy makers, PTA as a way to bring the ideas of ordinary citizens under the attention of policy makers, PTA as a way to clarify one's political stand, PTA as a way to negotiate with other actors, PTA as a way to learn from other actors, PTA as a way to explore and develop win-win situations among strategic actors, etc.

Describe the expectations/goals various actors had with the PTA arrangement: e.g., develop new visions, clarify policy objectives, develop policy options, construct strategies, exercise action, etc.

Rationale for PTA

III.B.5 What were the main reasons for selecting and setting up this PTA arrangement?

Describe why PTA was an option, and for what reason(s) the organizers chose to set up a PTA arrangement: e.g., for reasons of democracy or legitimacy, to induce a learning process, because knowledge was contested or expert knowledge was thought not be enough, etc.

Describe for what aim the organisers chose this particular PTA method: e.g., to generate information, to clarify the various viewpoints, to attract attention to alternative ideas, to visualise various important aspects, mediation, to give critical or creative solutions a voice, to increase participation, to stimulate and organise interaction between various stakeholders, etc.

Describe by whom and by which procedures the PTA project was launched: e.g., board or staff of the (TA) organisation, the political arena.

III.C Impact

Outcome/Output

III.C.1 What products did the PTA arrangement produce?

Describe the type of product(s) that were generated in the different phases of the PTA arrangement: e.g., written/oral report, action plan, vision, recommendation, no formal product, changed problem perception, etc.

Describe the producer of the final product: e.g., assessment by participants themselves; analysis and interpretation of the proceedings by the TA institute.

Describe the intended audience of the final product: e.g., participant groups (and their wider representations), politicians, expert communities, media, public at large, etc.

Describe the review process of the final product: e.g., internal review process within the TA organisation, some form of peer review, etc.).

Describe why and when during the PTA arrangement texts were transformed, e.g., in order to serve the participants need, in order to translate the results of the PTA arrangement for politicians, etc.

Describe the type of problems that were encountered with respect to the (final) product: e.g., textual transformation, language, not all-encompassing, reliability of scientific facts, etc.

III.C.2 How did the communication with the outside world take place?

Describe to what extent the media were associated with the PTA arrangement, or in other words, describe whether the media were an in-built characteristic of the PTA process.

Possible answers are e.g., media were an integral part of the arrangement, journalists were invited as participants, media were involved alongside the process (TV cameras present, via press releases), media were only exposed to the final outcome of the PTA arrangement, etc.
--

Describe what kind of communication strategy and activities or "events" with the outside world took place: e.g., alongside the process via newsletter, Internet site, end-of-pipe event (e.g., the audience at the last day of a consensus conference, a special conference to disseminate the results of the PTA arrangement, etc.)

III.C.3 How was the PTA arrangement covered in the media?

Describe the media coverage in various types of media (radio, TV, Internet, web-sites, newspapers, periodicals, public documents) in a time-perspective (before, during, short after, and long – more than one month – after the PTA arrangement).

Describe the general focus of the media coverage: e.g., Was the participatory element touched upon in any of the media? Did the media picture the PTA arrangement as a contribution to the social debate? Did the media discuss the organiser's role in the social debate/controversy?

Results

III.C.4 How were the PTA arrangement and the policy making process related?

Describe the formal link between the PTA arrangement and the political decision making process.

Possible answers are e.g., no formal link; political decision making was suspended during PTA; product of PTA was formal input to the political decision making process; PTA result was actually a formal political decision, etc.
--

Describe the informal relationship between the PTA arrangement and the political decision making process.

Possible answers are e.g., involvement of political actors as participants/experts/stakeholders in the PTA arrangement; policy actors were kept informed during and after the PTA process; there was some kind of commitment by some policy actors to take into account the results of the PTA arrangement; the link to politics was only established after the PTA process had come to a conclusion, etc.

Describe the relationship between the PTA arrangement and the societal and political processes.

III.C.5 What was the impact of the PTA arrangement?

Describe whether as a consequence of the PTA arrangement there has been any change in legislation, funding, regulation, or any other concrete consequence to any authoritative public decision.

Describe whether as a consequence of the PTA arrangement there has been any change in market conditions, consumer behaviour or any other concrete consequence in the economic sphere.

Describe whether as a consequence of the PTA arrangement there has been any change in relevant vocabularies, agendas, problem statements or any other political aspect regarding the substance of the policy issue discussed, the process or role of the PTA arrangement.

Describe whether as a consequence of the PTA arrangement there has been any learning by the various actors regarding the substance of the policy issue discussed, the process or role of the PTA arrangement, the participants' own knowledge, role, organisation, civic engagement, etc.

Describe what did the institution learn?

Specifications for the EUROPTA-project Research Protocol

In this annex to the EUROPTA-project Research Protocol you will find some theoretic background information on specific terms used in the research protocol. In the research protocol itself you will find references to this paper. It may be used either as an information tool before starting the research (as the analytical part of the Theoretical Framework – into which it should be integrated later) or as a helping guide during the research.

The Complexity of Technology (Policy)

For I.1:

Technological issues are often complex, so describing what issue was at stake may seem a very big challenge. Two ways of taking a momentary view on technological complexity is a hierarchical view on the organisation of technology (the Substitution Ladder) and a “Chinese box” approach (Technological Order). But complexity can even grow during time, as technology gets embedded in the social systems (Organisational Complexity). None of the models covers the full range of complexity alone therefore we present all three to give you some hints how to look at. Like models are, they are simplifying: so please don’t cling too narrow to the terms used here e.g. of course there are more dimensions than just “technology” and “organisation” but these models are just to help you to structure your thinking.

“The Substitution Ladder”

The Substitution Ladder has been characterised in SIIEST A report, with focus on issues of sustainability. The description below is an elaboration by the EUROPTA team of the thought presented in the SIIESTA report.

Technology decisions and the assessments behind them can be seen as a matter of substituting one solution with another. An organisational solution (meeting and talking at the pub) can be substituted by a technological solution (talking by telephone). A technological solution (flying domestic flights) can be substituted by another technological solution (riding high-speed trains). Or a technological solution (the use of conception) can be substituted by an organisational solution (building up anti-sexuality morals).

Moreover, technology can be seen as organised in different complexity levels. The SIIESTA report gives these examples (direct citation):

The process level

This is the normal level in which the production process is rearranged in order to provide a more environmentally sound technique, e.g. in terms of increased restriction of waste to outside recipients as water and air.

The materials level

This is the case in which you substitute one element in the product for another of hopefully more “benign” character. The substitute of e.g. mercury in batteries for other substances is such an example.

The component level

A new technical design could provide a new plug in function without changing the overall feature of the “old” technical solution. The use of catalytic emission control of automobile exhaust could fall in this category.

The subsystem level

If the “car” is the system then the varying engine solutions could be seen as subsystems. The substitution of the old gas -motor to an electric one could serve as an example.

The system level

Given the strategy (e.g. that people in a big city setting shall be able to move everyday between their homes and workplaces, wherever these might be situated) the substitution (or shift of emphasis) between a private car solution as systems design and that of mass -transportation exemplifies this level.

The strategy level

The manipulation of the structural design in town planning in considering closer affiliation between homes and workplaces provides a substitution from a solution built more on a random distribution. Such a change could result in reduced transport loads overall and in certain energy reductions of benefit for the urban environment. Still the goal of getting people between point A and B is valid at this level.

The value level

This level could be exemplified by a total questioning of the need for physical transport as a part of societies goal structure. At the value level different basic demands as they have been conceived are under scrutiny. At a more modest level of change already emphasising more local or regional production of agriculture products connecting production and consumption geographically belong to this realm.”

It is the idea of the authors of the SIIESTA report that at all these different levels specific “analytical tools” are needed in order to find proper substitutions for known technologies.

It is therefore needed to consider with which level(s), the issue of a TA case works.

The Technological Order

Another way of looking at technological complexity, that includes the social activity of using and organising technology, is presented by Richard E. Sclove in “Technology and Democracy”. Sclove presents the “hierarchic relationship among basic technological concepts” as seen in the figure below.

This approach differs from the Substitution Ladder in its system approach. Sclove sees the artefact and its use as two sides of the same hierarchical level. The result is a picture that can be compared to Chinese boxes.

Again, a hypothesis may be that it might take different analysis tools to work with different levels of technological complexity.

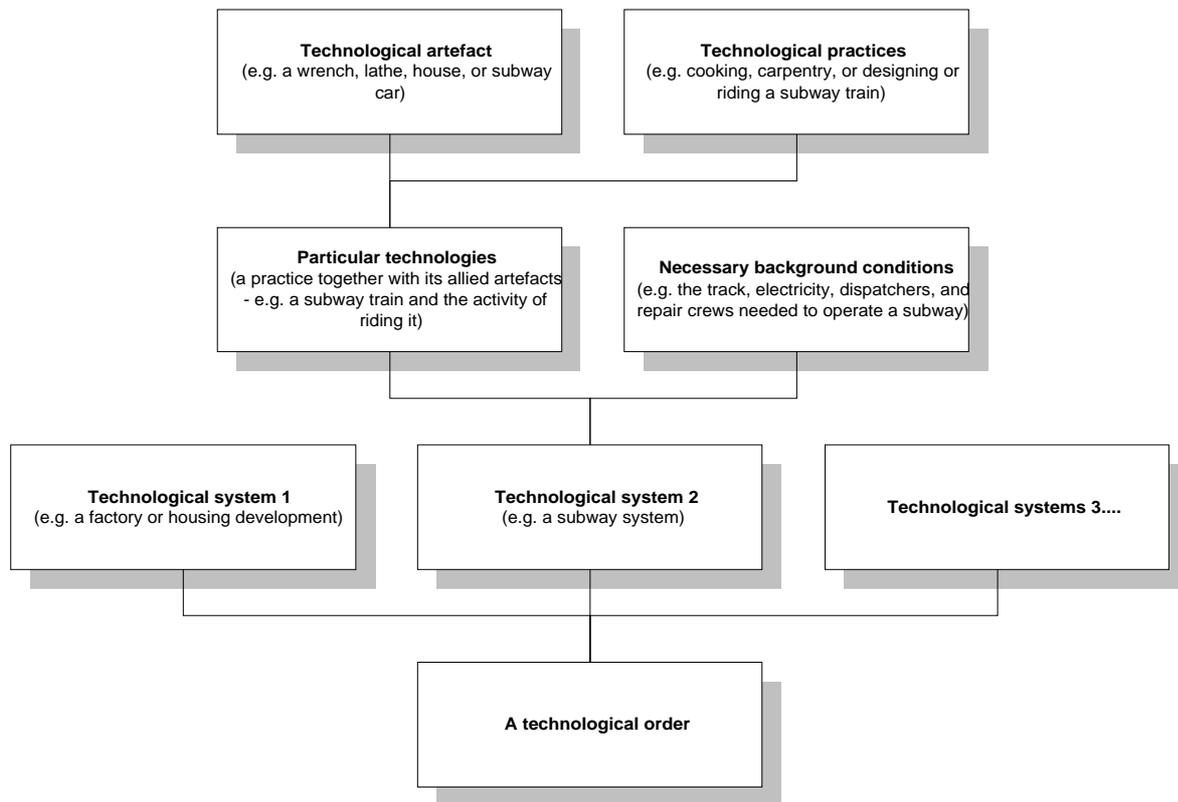


Figure 2: Hierarchic relationship among basic technological concepts
(Source: Richard E. Sclove “Technology and Democracy”)

Organisational Complexity

The level to which a certain technology is embedded in the social organisation is to a large extent a matter of time. For example:

- An energy producing machine (e.g. the fuel cell) may at the development of its basic technologies be outside direct influence from society and politics as such.
- When it begins to be developed into a product, politics comes nearer, defining standards that makes it possible to integrate the fuel cell into existing energy systems.
- At the time, when the fuel cell is ready for marketing, and the first products are introduced, the introduction will be hindered by producers of competing technologies (e.g. combined heat/power turbines)
- And at a time, when the fuel cell has been introduced and is a standard technology, it will be so embedded into society, that changing it will be hard, because big organisations are build upon the existence of a well-known widespread fuel cell technology. The fuel cell has become strongly institutionalised, and thus hard to change.

Innovation System

For I.2

Innovation has long been modelled as a linear process going through a number of successive phases (research, development, demonstration, diffusion, and utilisation). The initiation could either come from the engineers (technology push) or from demand (market pull) (e.g. Pavitt 1971, Freeman 1974). In the case of "market pull", a perceived demand plays the motor role in engendering and orienting technology. In the case of "technology push", innovation is based on expectations concerning the technology's potential.

The gap between these two extreme theses has progressively narrowed (Freeman 1982, Mowery and Rosenberg 1979, Nelson and Winter 1977). Nowadays there is a general consensus that innovation is born of a narrow coupling between science and technology on the one side and the market on the other (Callon et al. 1992: 215). Case study research has underlined that innovation involves a lot of backing and forthgoing between demand and supply side considerations. Consequently, the linear model of innovation has been replaced by an interactive, network perspective on innovation.

To include and study the iterative dimension of the innovation process, Callon et al. (1992) introduced the concept of *techno-economic network*. A TEN is defined as "a co-ordinated set of heterogeneous actors – public laboratories, technical research centres, industrial companies, financial organisations, users, and public authorities – which participate collectively in the development and diffusion of innovations, and which via many interactions organise the relationship between scientific and technical research and the marketplace." (ibid. 220)

Techno-economic networks are organised around five major poles, three of which are the supporting pillars: a scientific, a technical, and a market pole. Poles can be distinguished both by the actors constituting them as well as by the nature of their production. Within the *scientific pole* (S) certified scientific knowledge is produced by scientists and researchers, who work within universities and public or private research centres. The main actors within the *technical pole* (T) are engineers and technicians working in technical laboratories in companies, co-operative research centres, or pilot plants, where they conceive of, develop or transform artefacts destined to serve specific purposes.

In the terminology of Callon *et al.*, the *market pole* corresponds solely to the universe of users. In our discussion "market" will be used in the classical sense as a place where supply meets demand. Thus, it seems elegant to rename the "demand -side-oriented" market pole that Callon *et al.* use. That pole will be called the consumption pole. In addition, the supply -side of the market will be named the business pole. The business and consumption poles jointly cover the market. Within the *business pole* (B), general managers either try to anticipate new consumer demands or translate demands expressed by users into products. Moreover, they organise the production, distribution and marketing of these novel products. The *consumption pole* (C) corresponds to the universe of the consumer, who ultimately buys, uses, and thus economically values the artefact. Although by definition (see above) "public authorities" are assumed to play a role within techno-economic networks, their role is not properly integrated within this concept. To emphasise the role of politics, Van Est (1999) proposes to add a fifth *political pole*. The political pole is almost similar to a regulation pole. It is however a somewhat broader concept which refers to the whole policy subsystem (as part of the innovation network). A policy subsystem can be defined as the set of actors who are involved in dealing with a policy problem such as air pollution control, mental health, or energy." (Sabatier 1993: 24) These actors may stem from a variety of private and public institutions at all levels of government. The political pole thus involves the whole political debate related to techno-economic innovation, including regulation. Because of the need for introducing a political pole and a broad conceptualisation of innovation, we, instead of employing the concept of techno-economic network, prefer to speak of an *innovation network*. As indicated, innovation networks will be described as organised around five poles: a scientific (S), a technical (T), a business (B), a consumption (C), and a political pole (P). Technologists play a

dominant role within the science and technical poles, firm managers are the main players within the business pole, users reside in the consumption pole, and policy makers occupy the political pole.

Pole	Science	Technicians	Business	Consumption	Politics
Actor	Scientist, Researcher	Engineer, Technician	Manager	Consumer	Policy maker
Role	Production of scientific knowledge	Design and development of an artefact	Production and marketing of a product	Consumption and economic valuing of the artefact	Stimulation and regulation of innovation

Figure 3: The structure of the innovation network (Source Van Est 1999: Fig. 7.1).

The notion of innovation network involves the idea that innovation can come into being at any point along the network. For example, in some cases science acts as the leader and gives rise to new technology, and in other situations technological developments may take science in tow (cf. Nelson and Rosenberg 1993: 6). In their search for profit companies often play a leading role in the innovation process, but in some cases the innovation pattern is user-dominated (Von Hippel 1976).

Specification of "Social Debate"

For I.6

Social debate is not a clearly defined concept. Like any type of debate a social debate implies an exchange of ideas and viewpoints between actors. However, this exchange does neither have to take place face-to-face nor simultaneously (cf. Mayer 1997: 150). The distinguishing characteristic of social debate is that it goes beyond private interest and is concerned with the public interest at large (cf. Rathenau Institute 1994).

A social debate is to a large extent an elusive phenomenon. It cannot fully be institutionalised, and is in principle unlimited in time, space and content. Also the number and range of actors involved within social debate may vary widely. People may be involved who are directly involved in the technology issue at stake, but also people not directly involved may join the social debate. While social debate is often dominated by specialists and has elitist features, also interested ordinary citizens may be involved. Finally, the nature of social debate may take on many forms. On the one extreme, the social debate may evolve into a national public controversy leading to mass demonstrations. On the other extreme, it may also be contained within small academic circles. A social debate around a certain issue now and then booms, resulting in direct consequences, for example in terms of political decisions. One aim or impact of a (p)TA project can be to put an issue upon the public agenda for a while.

Options for Timing through Method Selection

For II.4

Timing-needs can be coped with at an institutional level by making use of a set (a toolbox) of TA methods, some of which may give a response to a problem in a few weeks, others in a year or more. The need for a certain kind of participatory process may in other words be neglected, as a pragmatic solution to timing needs. An important question is of course if the institution has a set of (participatory) methods, so nearly any timing -need can be fulfilled – maybe on the expenses of for example the comprehensiveness of the project.

The need for readiness to fulfil different timing needs may, as a hypothesis, more often appear, when an institution is serving the parliamentary level directly, as this could result in a pressure upon the institution to fulfil the here -and-now needs of MP's? At the other end of the scale, other methods might, so to say, establish their own timing by having the potential to put an issue on the public agenda.

Characteristics of PTA arrangements

For III.A

The arrangement character of PTA relates to three interrelated features.

- First, the term arrangement implies that a certain participatory TA method is normally embedded within a project management structure, of which it only represents a certain phase (see text on phases of a PTA arrangement).
- Second, the arrangement character of PTA points at the possibility that it constitutes several interrelated consecutive or simultaneous participatory and/or non -participatory events. A PTA arrangement may both be a single event as well as a trajectory of events which might involve different actors and possess distinct participatory features.
- Third, it relates to the political and institutional setting in which the PTA process takes place. This means that the PTA arrangement will likely reflect the political and institutional conditions under which it is set up.

Values, assumptions and Goals

For III.B.1

For long it has been assumed that actors' interests provide a self -evident starting point for understanding purposive behaviour. Such an approach, however, fails to address the question of origin of interest. Recent approaches use frames of meaning, rather than interests, as their focus, since these are more inclusive and more verifiable. Following in particular the work of Fischer (1980, 1985, 1994) and Schön (1983), Grin and van de Graaf (1996) distinguish between four types of elements within the action theory of an actor. The action theory of an actor being "the whole of the beliefs of that actor, both the more generic ones and those pertaining to a specific case." (Grin et al 1997: 33)

"Specific notions regarding a given situation (*first order beliefs*):

- How does the actor assess the costs, effects and side effects of various solutions to the problem as he or she sees it?
- What exactly does the actor see as the problem in a given situation (the challenge, the opportunity)? This problem definition indicates what is going on in the eyes of the actor.

Underlying, more generic notions (*second order beliefs*):

- What *background theories* (ways of thinking and acting) does the actor employ?
- What deeper preferences does the actor eventually want to satisfy?" (Grin et al. 1997: 32-33)

The model behind III.B.2

Most of the describe-questions under III.B.1.2 are inspired by the work of Friend and Hickling (1997) on collaborative decision making in conditions of uncertainty. They present five broad dimensions in which difficult choices of *balance* tend to arise in the management of a continuing process of strategic choice. According to Friend and Hickling (1997: 8) there is a choice between:

A more *focused* and a more *synoptic* treatment of *problem scope*;

A more *simplifying* and a more *elaborating* treatment of *complexity*;

A more *reactive* and a more *interactive* treatment of *conflict*;

A more *reducing* and a more *accommodating* treatment of *uncertainty*;

And a more *exploratory* and a more *decisive* treatment of *progress* through time.

The first two dimensions are more or less self-explanatory. For example, a synoptic treatment of the problem implies a comprehensive and broad approach, while a focused treatment implies a narrowly defined problem.

The third dimension relates to the dynamics of the actor network around the issue at hand (cf. Hecló 1978, Sabatier 1987). According to Mayer (1997: 248) the key issue for network management is "how to manage the institutional relations and interdependencies involved in acting with regard to the issue at hand." With respect to the approach taken within the PTA arrangement it is relevant to describe in which way the PTA strategically deals with the network. Does it react on or try to prevent within the network? In other words, is the PTA reactive or proactive with respect to (potential) conflicts within the network? Does it try to open up the network by introducing new actors? Does it try to develop new informal relationships between relevant actors? Etceteras.

With regards to the uncertainty dimension, Friend and Hickling (1997: 8-11) identify three forms of dealing strategically with uncertainty. Uncertainty about the factual situation may lead to a quest for more information, that is, a need for studies, surveys etc. to collect information. Uncertainty about guiding values demands for clearer objectives, that is, a need for clarifying aims and values. Uncertainty about related fields of development may lead to a demand for more coordination between (until then) separate domains, that is, a need for planning, negotiation and interaction.

In framing the describe-question concerning the progress dimension, we have relied on theories of learning, which often contain two basic types of learning: single-loop learning and double-loop learning (Argyris 1976, Argyris and Schön); first-order and second-order reflection (Schön 1983); instrumental and political learning (Van de Graaf et al. 1996); and instrumental and conceptual learning (Eberg 1997). The first type of learning is concerned with finding and optimising a solution for a given problem definition. The second type of learning is concerned with finding the proper problem definition.

Stages of the PTA arrangement

For III.A.2 and III.B.3

A PTA arrangement consists of a series of activities structured in time. In principle, numerous ways exist to phase such a process. A straightforward way would be to list all activities that characterise the PTA. With respect to the consensus conference, one might, for example, distinguish between a phase in which the members of the lay panel are recruited, a phase in which the lay panel is being informed, a phase in which the lay panel publicly interrogates experts, etc. To give the reader an impression of the design and set-up of the PTA method it is crucial that the researcher gives a schematic sketch of the various activities within the PTA arrangement. This straightforward approach is only part of the story. Namely, the concept of PTA arrangement does not only relate to the set of (non-)participatory events that constitute some methodological set-up. The term also implies that a certain participatory method is part of a project management structure, of which it only presents a certain phase. In project management literature phases are characterised by a specific task. Groote et al. (1995: 20-21) come up with an approach that contains six phases:

- The *initiation phase*, in which the still vague ideas around a project are being crystallised and a first rough result is described. It is also decided what is not going to be dealt with in the project.
- The *definition phase*, in which a thorough analysis of the problem and/or the goals of the project is started. In this phase the quality criteria for the end result are being formulated and the work structure of the project is set up.
- The *design phase*, in which on basis of the demands formulated in the former phase alternative solutions are being developed and prepared in order to come up with the best approach.
- The *preparation phase*, in which the realisation is being prepared.
- The *realisation phase*, in which the project result is indeed being realised.
- The *follow-up phase*, in which the result is being used and maintained.

The phasing of a project is determined by the nature of the project. For example, technical projects often get phased in a different way than research projects. If we try to implement the above model the following standard picture arrives with respect to PTA arrangements:

- The *initiation phase*, in which a decision is made about starting up a TA around a certain loosely articulated problem issue. This decision is often made at the management level of the TA institute, and there might be a large gap in time between this decision and the actual start of the project.
- The *definition phase*, in which it is specified what problems the TA should and should not deal with. Sometimes preliminary studies are initiated, experts interviewed or workshops organised in order to get the focus right and examine what kind of answers can be expected from the TA.
- The *design phase*, in which, based on the structure and delimitation of the problem, a certain (p)TA approach is chosen, the design of the (p)TA arrangement is made, and the various activities within this arrangement are planned.

- The *preparation phase*, in which the various activities within the PTA arrangement are being prepared. For example, in case a workshop is part of the PTA, an appropriate place to organise the workshop is arranged during this phase, selected participants are invited and a workshop leader is hired.
- The *realisation phase*, in which the various activities (studies, workshops, conferences etc.) within the PTA arrangement are carried out and reports are written. It is often in this phase, participants become involved in the PTA. In the realisation phase a lot of the participatory and non-participatory events are carried out, and it is in this phase that the methodological set-up of the PTA gets its particular form. The above natural way of listing various activities thus covers mainly the project management activities within the realisation phase of the PTA arrangement. But in this phase we also have to look at keywords like “Interpretation” and “Option Formulation” – the politically relevant outcomes of any PTA arrangement.
- The *follow-up phase*, in which the results of the PTA arrangement are published and disseminated by the TA organisation. Dissemination can be done in several ways, for example, by means of sending out reports, organising a conference around the theme of the PTA, giving lectures, briefing politicians, etc. Keyword here is: “Communication”.

In principle, the PTA arrangement is finished when the results of the PTA are produced and disseminated by the TA organisation. However, from now on the products delivered by the TA organisation will lead their own life and will (hopefully) have an impact on the "outside world." Although the PTA project is now out of the hands of the TA organisation, an important phase comes, which may be called the *impact phase*. Keyword here is: “Action”.

- The *impact phase*, in which the results of the PTA are being used either inside the TA organisation, for example, in order to improve its methodology, or outside the TA organisation, in particular, in the political sphere.

So in this context it should be stressed, that there are different “meta-phases” within each PTA arrangement: phases 1-3 are “strategically” relevant because the direction of the PTA arrangement is structured there. Phase 4 is organisational work, phase 5 is the “core element” of the PTA arrangement and phases 6-7 are “politically” relevant. In these phases we may see some strengths and weaknesses of different PTA arrangements in respect to the political process.

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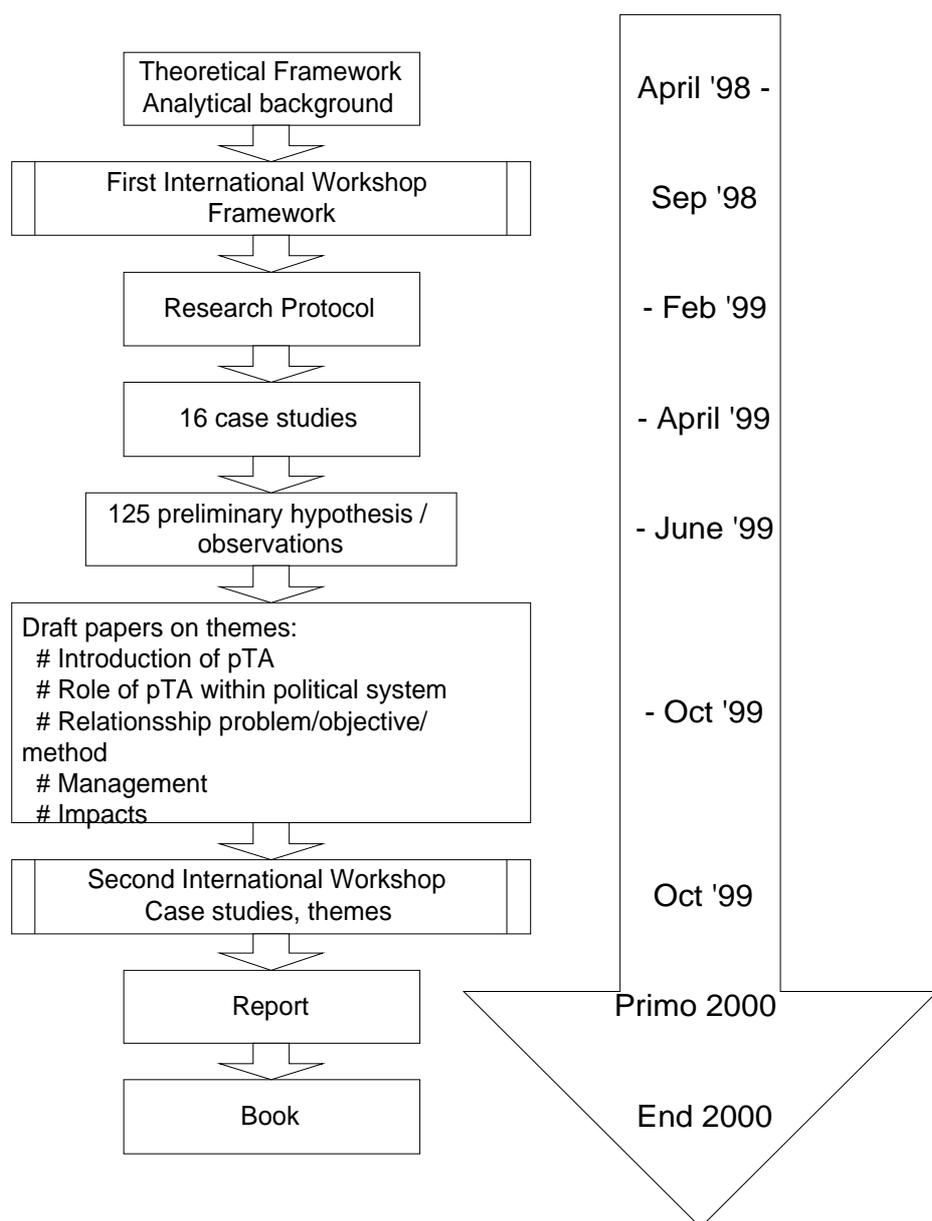
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Annex 3: Project Timeline and tasks

Task and timing of the EUROPTA project.



Annex 4: Copenhagen workshop, program and list of participants

First EUROPTA workshop 1998 - Programme

Participatory Technology Assessment - A Theoretical Framework Proposed

September 3-4 in Copenhagen, Denmark

Eigtveds Pakhus, Asiatisk Plads 2 G, 1448 Copenhagen K

Thursday, September 3

9.30 Registration and coffee

Plenary session

10.00 Opening of the workshop by Lars Klüver, Director of the Danish Board of Technology

10.15 Presentation of EUROPTA draft theoretical framework

11.30 Responses from three expert speakers (Ortwinn Renn, Brian Wynne,)and other participants

12.30 Lunch

Workshop Sessions

13.30 Three crucial elements of theoretical framework:

- A Societal context (chair: Brian Wynne)
- B Institutional setting (chair: Norman Vig)
- C The participatory arrangement (chair: Ortwin Renn)

Each workshop will focus on one of the dimensions presented in the proposed framework. The dimension in focus will be discussed in relation to individual participatory arrangements.

15.30 Coffee break

Plenary session

16.00 Summary of workshop discussions A - B - C

16.30 End of session

Fringe Meeting

16.30- Individual presentations. All participants in the workshop are invited to make individual presentations on projects, research or other results relevant to the notion of participation in technology assessment. Detailed program to be presented on arrival in Copenhagen.

Friday, September 4

Workshops, continued

9.30 Coffee

10.00 Three crucial elements of the theoretical framework:

A Societal context (chair: Brian Wynne)

B Institutional setting (chair: Norman Vig)

C The participatory arrangement (chair: Ortwin Renn)

12.30 Lunch

Plenary session

13.30 Summary of workshop discussions

14.00 Concluding discussion

15.00 Coffee break

15.30 Reactions from EUROPTA -team

16.00 End of program

List of Participants

Andrew Jamison	Aalborg University, DK
Anne Loeber	University of Amsterdam, NL
Arne Remmen	Aalborg University, DK
Arne Thing Mortensen	Roskilde University, DK
Arthur Fleiss	The Wellcome Trust, UK
Bill Doolin	Lancaster University, UK
Claire Marris	Universite de Versailles, F
Daniel Boy	Cevipof-Fondation des Sciences Politiques, F
Danielle Bütschi	Conseil Suisse de la Science Programme TA, CH
David Cope	Parliamentary Office of Science and Technology, UK
Deborah Eastlick	University of Calgary Social Sciences, CDN
Dominique Donnet-Kamel	Inst. National de la Sante et de la Recherche Medicale, F
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John Grin	University of Amsterdam, NL
Jon Fixdal	Centre for Technology and Culture, University of Oslo, N
Josée van Eijndhoven	Rathenau Instituut, NL
Konrad Ott	Universität Greifswald/Universität Zürich, CH
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Lars Klüver	The Danish Board of Technology, DK
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Oluf Danielsen	University of Roskilde, DK
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Robert Hoppe	Faculty of Public Administration, Twente University, NL
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Steffen Stripp	The Danish Board of Technology, DK
Søren Gram	The Danish Board of Technology, DK
Takao Kiba	NISTEP, National Inst. of Science and Technology Policy, J

EUROPTA – Annex 4: Copenhagen workshop

Thomas Breck
Thomas Saretzki
Tom Wakeford
Ulrik Jørgensen
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Annex 5: The Hague workshop, program and list of participants

Second EUROPTA workshop 1999 - Programme

Evaluation of Participatory Technology Assessment Methods

4-5 October 1999, Bilderberg Europa Hotel, Scheveningen

Monday, october 4

Chair: Josée van Eijndhoven, Director of the Rathenau Institute

9.30 **Registration**

10.00 **Plenary session**

Opening of the workshop by Josée van Eijndhoven,
director of the Rathenau Institute

10.15 Presentation of the EUROPTA project by Lars Klüver,
director of the Danish Board of Technology

11.00 Coffee break

11.30 **Workshop sessions**

Presentation of case studies (Round 1)

A PubliForum Electricity and Society (Switzerland)

B Traffic Forum Salzburg (Austria)

C Citizens Forum on Biotechnology / Genetic engineering
(Germany)

12.20 Lunch

13.20 **Workshop sessions**

Presentation of case studies (Round 2)

A Citizens Foresight (United Kingdom)

B Crop protection and environmental concern: the GIDEON project (The Netherlands)

C Future search conference on traffic in Copenhagen (Denmark)

14.10 Workshop sessions
Presentation of case studies (Round 3)

A Discourse on genetically modified plants (Germany)

B Voting-conference on drinking water (Denmark)

C Dialogue in genetic testing (Switzerland)

15.00 Coffee break

15.30 Workshop sessions
Presentation of case studies (Round 4)

A The Austrian Technology Foresight (Austria)

B Consensus conference on plant biotechnology (United Kingdom)

C Public debate on genetic modification of animals (The Netherlands)

16.20 Break

16.30 Fringe meeting (see program)

17.50 End of program

20.00 Dinner at La Galleria at Scheveningen Boulevard

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Annex 6: Glossary

The Glossary points at sections of the main EUROPTA report, where certain important definitions can be found.

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