

# **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 consist 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.

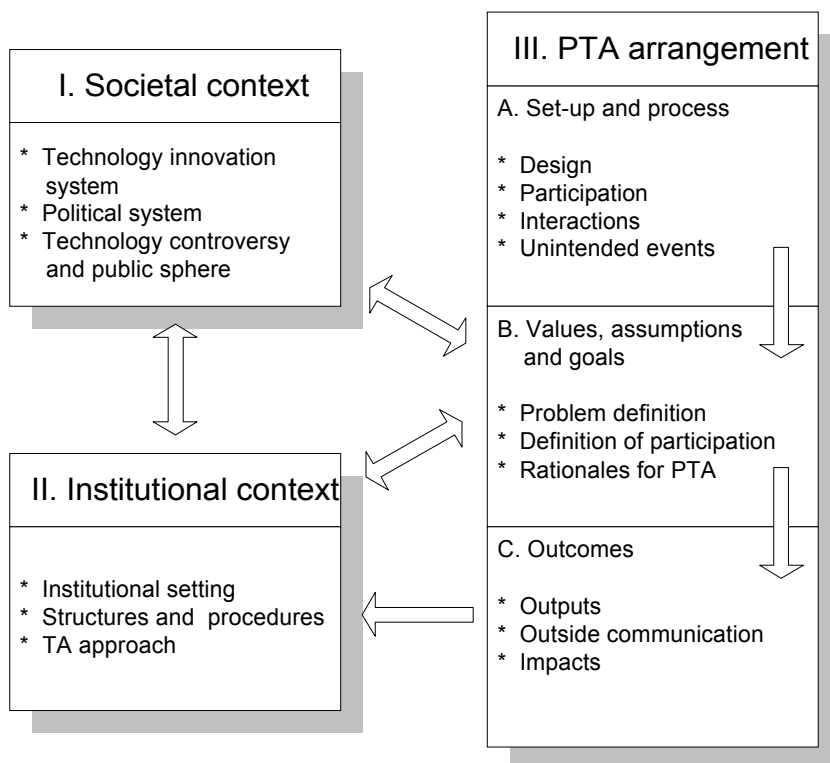


Figure 1: Structure of the research protocol

## 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 extend 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”.
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## 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 co-ordination (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 to 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 SIIESTA 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 “beneign” 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 SIESTA 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.

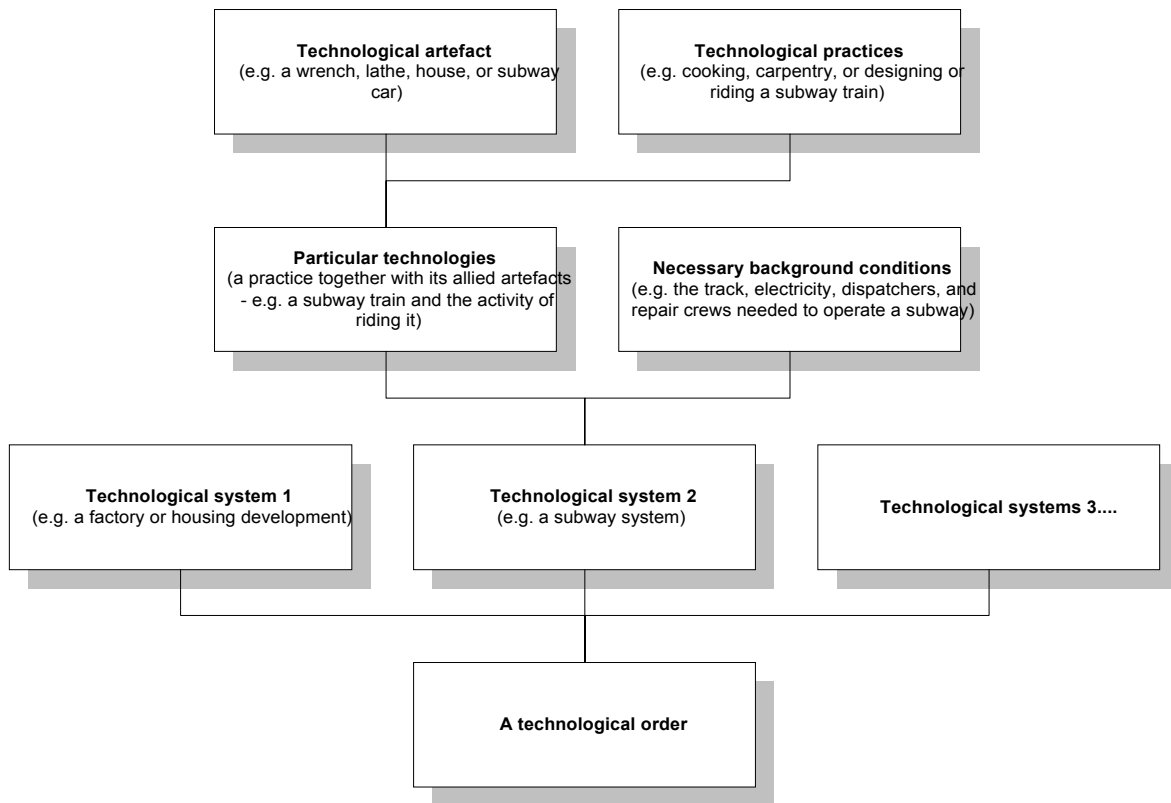


Figure 2: Hierarchic relationship among basic technological concepts  
(Source: Richard E. Sclove “Technology and Democracy”)

### 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 forthing 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.

<b>Pole</b>	<b>Science</b>	<b>Technicians</b>	<b>Business</b>	<b>Consumption</b>	<b>Politics</b>
<b>Actor</b>	Scientist, Researcher	Engineer, Technician	Manager	Consumer	Policy maker
<b>Role</b>	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 co-ordination 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.

## **Annex 2: Experts and partner organisations of EUROPTA**

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Mr. Jan Ejlsted (project administrator until December 31, 1999)

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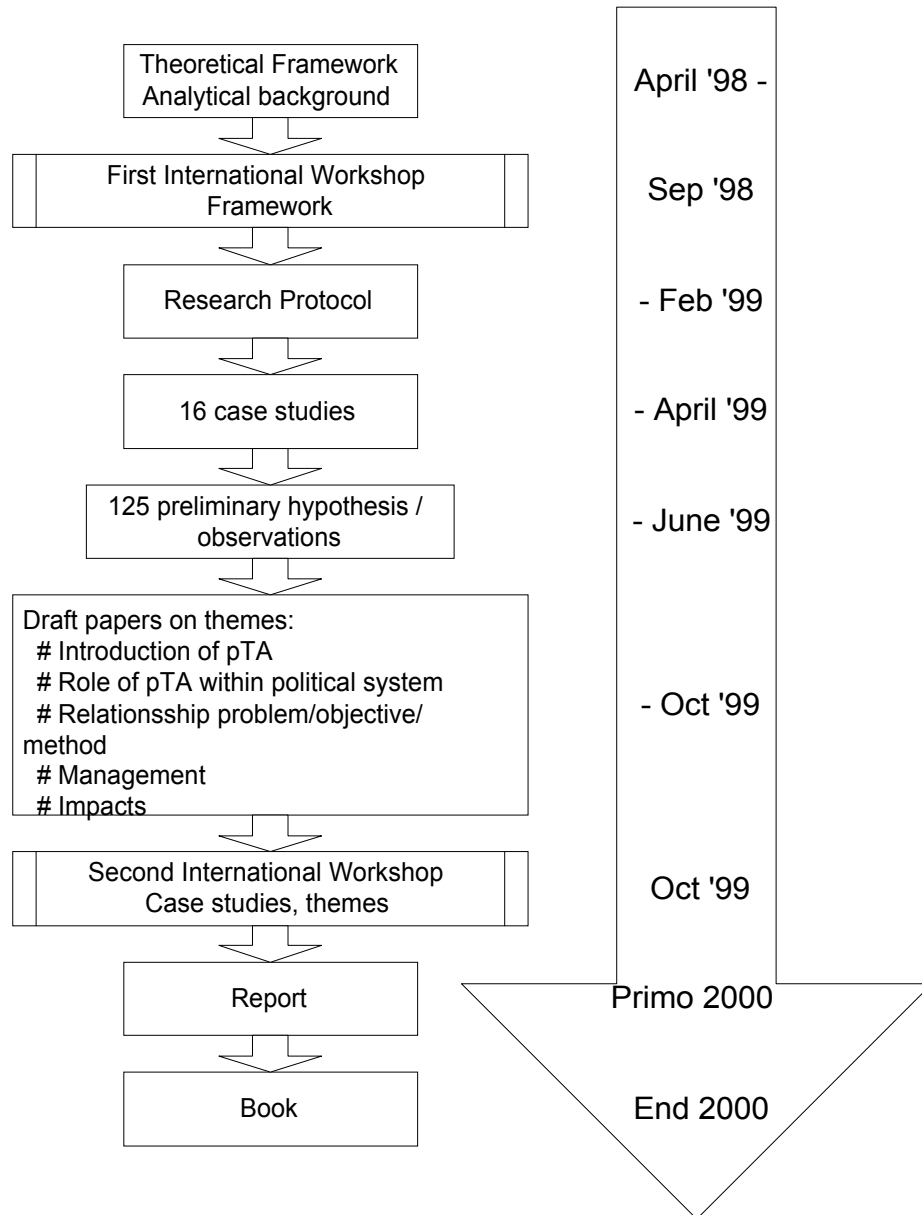
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### Annex 3: Project Timeline and tasks

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
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Jan Ejlsted	The Danish Board of Technology, DK
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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
Lars Frelle-Petersen	The Danish Board of Technology, DK
Lars Klüver	The Danish Board of Technology, DK
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Lydia Sterrenberg	Rathenau Instituut, NL
Mary T. Kelly	University of Calgary, CDN
Michael Nentwich	Austrian Academy of Sciences, AU
Nanne van de Poll	Rathenau Institute, NL
Norman Vig	Department of Political Science, Carleton College, USA
Ole Andreas Brekke	LOS-Centre, University of Bergen, N
Oluf Danielsen	University of Roskilde, DK
Ortwin Renn	Center of Technology Assessment in Baden-W., D
Rinie van Est	Rathenau Institute, NL
Robert Hoppe	Faculty of Public Administration, Twente University, NL
Sergio Bellucci	Swiss Science Council, TA Programe, CH
Simon Joss	Centre for the Study of Democracy, UK
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
Thomas Breck	Roskilde University, DK

EUROPTA – Annex 4: Copenhagen workshop

Thomas Saretzki	Institut für Politikwissenschaft, TU Darmstadt, D
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Ulrik Jørgensen	Department of Technology and Social Sciences, DK
Urs Dahinden	Swiss Federal Inst. for Envir. Science and Technology, CH
Walter J. V. Vermeulen	Universiteit Utrecht, Dept. of Environmental Sciences, NL
Walter Peissl	Austrian Academy of Sciences, AU
Yukio Wakamatsu	College of Science and Engineering, J

## **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	<b>Registration</b>
10.00	<b>Plenary session</b> Opening of the workshop by <u>Josée van Eijndhoven</u> , director of the Rathenau Institute
10.15	Presentation of the EUROPTA project by <u>Lars Klüver</u> , director of the Danish Board of Technology
11.00	Coffee break
11.30	<b>Workshop sessions</b> <i>Presentation of case studies (Round 1)</i>
	A            PubliForum Electricity and Society (Switzerland)
	B            Traffic Forum Salzburg (Austria)
	C            Citizens Forum on Biotechnology / Genetic engineering (Germany)
12.20	Lunch
13.20	<b>Workshop sessions</b> <i>Presentation of case studies (Round 2)</i>
	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 <i>Presentation of case studies (Round 3)</i>
	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 <i>Presentation of case studies (Round 4)</i>
	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

## Tuesday, October 5

Chair: Nanne van de Poll, Co-ordinator Platform of Science and Ethics

- 9.00                    **Plenary session**  
Presentation of EUROpTA's findings on "Introduction of pTA" and "Role of pTA in (political) decision-making"
- 9.45                    **Workshop sessions**  
9.46
- A                    Introduction of pTA (chaired by Sergio Bellucci)
- B                    Role of pTA in (political) decision-making,  
chaired by Jan Ejlsted
- 10.45                  Coffee break
- 11.15                  **Plenary session**  
Presentation of EUROpTA on "Relationship problem situation, objectives and method", "Management of pTA", "Impacts of pTA".
- 12.15                  Lunch
- 13.15                  **Workshop sessions**
- A                    Relationship problem situation, objectives and method,  
chaired by Walter Peissl
- B                    Management of pTA, chaired by Sergio Bellucci
- C                    Impacts of pTA, chaired by Jan
- 14.15                  Coffee break
- 14.30                  **Plenary session**  
Summary of workshop discussions
- Keynote speakers**
- 15.00                  Rob Hoppe, University of Twente, Department of Policy Sciences
- 15.30                  Arie Rip, University of Twente, Department of Philosophy & Society
- 16.00                  End of program

## List of Participants

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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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