



EUROPEAN PARLIAMENT

*Science and Technology Options
Assessment*

S T O A

TECHNOLOGY ACROSS BORDERS

**Exploring perspectives for pan-European
Parliamentary Technology Assessment**

STUDY

(IP/A/STOA/FWC/2008-096/LOT8/C1)

PE 482.684



DIRECTORATE GENERAL FOR INTERNAL POLICIES
DIRECTORATE G: IMPACT ASSESSMENT
SCIENCE AND TECHNOLOGY OPTIONS ASSESSMENT

Technology Across Borders

Exploring perspectives for pan-European Parliamentary Technology Assessment

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Abstract

Parliamentary Technology Assessment (PTA) in Europe has been initiated and developed first in countries in northern and western parts of Europe and later also in Southern Europe. The main objective of this study is to trace the evolution of PTA from the Office of Technology Assessment in the US to a future pan-European participatory PTA and to deliver images of PTA future.

Overall, the main type of effect of PTA on parliaments is raising their knowledge on specific technology or societal problems and their technological solutions. However, the institutional settings of the PTA organisations shape the type of influence these PTA organisations have on parliamentary decision-making.

In order to ensure successful pan-European PTA cooperation, several conditions have to be fulfilled. These comprise having a PTA structure in countries all over Europe, an interface between scientists and politicians by creating a mutual language, the inclusion of the public and civil society organisations, the creation of a meeting place where all stakeholders have an easy access and, last but not least, the need for PTA to be mainstreamed within regional, national and European parliaments.

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LINGUISTIC VERSIONS

Original: EN

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Manuscript completed in November 2011
Brussels, © European Parliament, 2012

This document is available on the Internet at:
http://www.europarl.europa.eu/stoa/default_en.htm

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Table of contents

Executive Summary	i
1. Introduction	1
1.1 Background and objective of the study	1
1.2 Part 1: Review of existing PTA practices in Europe	3
1.3 Part 2: Explore future pan-European PTA	5
2. Overview of Parliamentary Technology Assessment in Europe	8
2.1 History of PTA in Europe	8
2.2 Institutionalisation of PTA in Europe	12
2.3 PTA practices in Europe: methods and topics	14
2.4 Effects of PTA in Europe	19
2.5 Conclusions	20
3. Exploring future pan-European PTA cooperation	22
3.1 Themes and methods of pan-European PTA projects	22
3.2 Role of different stakeholders in pan-European PTA projects	26
3.3 Conditions for a successful pan-European PTA approach	27
3.4 Conclusions	30
Appendix A Interviewees (Parts 1 and 2)	32
Appendix B Conference programme	33
Appendix C List of conference participants	34
Appendix D References	37

Table of Figures

Figure 1 EPTA members	11
Figure 2 Classification of PTA organisations	14
Figure 3 Overview of PTA methods used in Europe	16
Figure 4 Stakeholders' involvement in PTA activities.....	18
Figure 5 Important current topics for the national/regional PTA organisations	19

Executive Summary

Scientific and technological developments play an important role in the progress of European economies: they contribute to increased industrial competitiveness, environmental sustainability, better health care, improved labour conditions, higher welfare, and solutions for many other societal issues.

Based on the idea that technological development requires specific policies, Technology Assessment (TA) started in the late 1960s as a tool to inform members of parliaments about possible unintended negative effects of new technologies. Since then, the role of TA for parliamentary decision-making has developed from having a general 'watchdog' function to a tool for policy analysis of emerging technologies. It now is in several European countries an instrument that supports parliament - but also many other actors - in decision-making and strategy development on science, technology and innovation. TA is defined as a scientific, interactive and communicative process, which aims to inform and contribute to the formation of public and political opinion on societal, ethical, legal and economic aspects of science and technology. Parliamentary Technology Assessment (PTA) is technology assessment specifically aimed at informing and contributing to opinion formation of members of parliament.

PTA in Europe has been initiated and developed first in countries in northern and western parts of Europe and later also in Southern Europe. For those European countries where PTA is now being initiated or is in its first development stage it is very relevant to learn from the lessons of other European countries on how PTA can best be institutionalised given their specific national contexts (institutional, political and cultural). Pan-European cooperation is an important tool for getting together and learning from each other. For that reason STOA - the European Parliament's Science and Technology Options Assessment Panel - has commissioned this study, which has as its main objective to trace the evolution of PTA from the OTA model to a future pan-European participatory TA and to deliver images of PTA future.

The study consisted of two parts: a review of the different existing PTA practices within the EU Member States and an exploration of the possible ways to develop and perform pan-European PTA.

Review of parliamentary technology assessment in Europe

The review of PTA in Europe was made along the lines of three types of characteristics that cover the most relevant aspects of PTA in Europe: institutional settings of PTA, PTA practices and effects of PTA. These three interrelated characteristics refer to what PTA organisations are, what they do and what their main effects are on parliament. The overview was made on the basis of desk research and interviews with national and regional PTA organisations and members of national and regional parliaments.

Organisations that are active in PTA in Europe have been clustered under three different models:

- The Parliamentary Committee model: A dedicated parliamentary committee is in the lead of PTA. The governance model is closely linked to the internal organisation on the functioning of the parliament. This includes the parliamentary committees in France, Finland, Greece and Italy.

- The Parliamentary Office model: Parliament has its own office or support unit for TA studies on request of parliament. Usually, these offices are inside parliamentary structures (such as in UK, Sweden, Catalonia, European Parliament), but sometimes the office is contracted out to an external research organisation (Germany).
- The Independent Institutes model: The TA institute operates at a distance from parliament, but parliament is its main client. In most cases also other target groups are considered as client. Typically, these institutes have missions that go beyond informing parliament and also include stimulating public debate on S&T issues. This type of PTA organisation can be found in Denmark, The Netherlands, Switzerland, Norway and Flanders.

Within each of these three groups there still are considerable differences between the PTA organisations. It can be expected that in the next period this richness of PTA institutions will even be enlarged when new countries will institutionalise PTA.

The PTA methods includes scientific methods (mostly in terms of academics providing expert information on the specific S&T developments and their societal, ethical, legal and economic aspects) and participatory methods (bringing together the different stakeholders involved in and affected by a technology - in for instance consensus conferences, expert hearings, focus groups, citizens' juries - for providing information, discourse and decision-making). Most engaged in participatory methods are the countries with independent PTA institutes. This relates directly to the mission of these organisations as they not only inform parliament, but also stimulate public debates. Typical for the PTA organisations that follow the Parliamentary Committee model is that they apply scientific methods and combine this with a workshop, hearing, or seminar in which experts and stakeholders are invited to inform parliament. This gives the PTA activity an interactive character. The Parliamentary Offices mainly use scientific methods.

Overall, the main type of effect of PTA on parliaments is raising their knowledge on specific technology or societal problems and their technological solutions. However, the institutional settings of the PTA organisations shape the type of influence these PTA organisations have on parliamentary decision-making. PTA organisations that are inside or closely linked to parliament have a direct access to members of parliament, which helps to get their message across to individual parliamentarians and parliamentary committees and to raise their knowledge on S&T issues. In turn, this creates conditions for changing attitudes and opinions, which might lead to changes in policy-making or legislation. Independent institutes lack a direct formal access to parliament, but have the advantage that they have more freedom in terms of the questions and target groups they want to address and the methods they can use. This implies that they have also been able to add new issues on the parliamentary agenda.

Getting parliamentarians' attention is a challenge for most PTA organisations, not just the independent institutes. To capture the attention of politicians, it is never sufficient to have a formal channel that allows direct access. A good understanding of political decision-making processes and communication are also necessary to have an effect on parliament. One recent trend is that most PTA organisations appear to have become more effective in getting the attention of parliament as a result of learning processes and further professionalization of these organisations.

Nevertheless, measuring the effects of PTA reports and PTA meetings to parliamentary decision-making is a problem, because parliamentary decision-making processes have inputs from a great variety of sources and 'success often has many fathers'. In practice the effects of PTA on decision-making depend very much on the available resources for TA activities, the way they are able to use the media and the degree of involvement and stature of the responsible parliamentarians.

Exploring perspectives for pan-European activities in the field of PTA

Pan-European co-ordination and collaboration of PTA organisations has significant potential since all PTA organisations have to deal with the same technological developments, now that scientific and technological developments have a global character. Working together can improve economies of scale or efficiency benefits and contribute to a higher quality of the work, as more experts work on the issue from different angles.

Perspectives for future pan-European cooperative activities have been explored by (preparatory) interviews and a conference with a targeted audience of members of national and regional parliaments and the European Parliament (EP), representatives of PTA organisations and TA scientists. The main outcomes are related to various aspects of pan-European PTA cooperation: its added value, main themes of future trans-national projects, and the various actors that could be involved and their roles in upcoming mutual efforts.

A number of themes and domains have been selected for pan-European cooperation. Firstly, based on the available expertise in European PTA organisations, this concerns two themes that can benefit from co-operation at a pan-European level. The first theme would be Nanotechnology, addressing for instance the health and safety issues of nano-materials, the nano-code for researchers and the issues of responsible governance. Secondly, global warming would be another important theme, since it is a cross-border issue that is comparable from country to country, although national or regional technological solutions and regulatory issues will not always be congruent.

The other proposed themes for pan-European cooperation include the three E's: Environment (trans-boundary pollution, sustainable development, ecosystems, water), Energy (trans-national/-regional supply, dependency, security, and resource choices) and Economy (globalisation of industries and its impact on quality and quantity of employment in high-tech sectors; collapse of financial markets).

The health and ageing population issue is addressed in trans-national projects that are executed by pairing partners from countries that do not have established PTA organisations with partners from countries that already have such organisations, under the PACITA-project umbrella. Three projects, namely Public Health Genomics, Ageing Society and Sustainable Consumption, will start soon.

In pan-European coordinative projects PTA organisations and members of parliament meet and work together. Where possible, civil organisations and the public are also involved. However, these will still be rather unique projects in which common practices of working together across national and regional borders have to be developed. The relation scientist - politician will especially need attention. Bringing politicians in contact with scientists through PTA can help to raise parliaments' basic knowledge on S&T issues and tackle politicians' pre-conceived ideas about new technologies.

Although politicians benefit from scientific PTA work, communication between the two is not that easy. There are some barriers to an effective relationship between them such as the discrepancies between long-term thinking in PTA work and short-term thinking within parliaments, the differences in the languages of science and politics, and the supply of lengthy reports by scientists when politicians need condensed, quick and easy to read outputs due to time constraints.

A true interactive approach is needed in which both sides are adaptive and responsive to each other. This way, TA can become more than the production of studies by scientists on various impacts of new science and technologies, but also include long-term, strategic reflections by both the scientific and political worlds.

In order to ensure successful pan-European PTA cooperation, several conditions have to be fulfilled. These conditions deal with having a PTA structure in countries all over Europe, the interface between scientists and politicians by creating a mutual language, the inclusion of the public and civil society organisations leading to new types of governance, the creation of a meeting place where all stakeholders have an easy access and, last but not least, the need for PTA to be mainstreamed within regional, national and European parliaments.

Through pan-European PTA cooperation countries can learn from each other. In countries where PTA is not (yet) institutionalised, PTA capacities can be built. Countries with a long track record in PTA can share best practices and points of view, exchange ideas and experiences, and compare results.

PTA cooperation can lead to an increase in the awareness of the importance of PTA among European citizens. This, plus the increased involvement of civil society organisations in national and regional PTA activities can lead to new forms of governance of science, technology and innovation on the regional, national and pan-European level.

1. Introduction

1.1 Background and objective of the study

1.1.1 Background of the study

Scientific and technological developments play an important role in the progress of European economies: they contribute to increased industrial competitiveness, environmental sustainability, better health care, improved labour conditions, higher welfare, and solutions for many other societal issues.

Based on the idea that technological development requires specific policies, technology assessment (TA) started in the late 1960s as a tool to inform members of parliaments about possible unintended negative effects of new technologies. Since then, TA has strongly developed. The role of TA changed from having a general 'watchdog' function to a tool for policy analysis of emerging technologies; it evolved into an instrument that supported parliament - but also many other actors - in decision-making and strategy development on science, technology and innovation (STI).

Parliamentary TA (PTA) in Europe has been initiated and developed first in northern and western parts of Europe and later also in Southern Europe. For the other parts of Europe where PTA is now being initiated or is in its first development stage it is very relevant to learn from the lessons of other European countries on how PTA can best be institutionalised given their specific national contexts (institutional, political and cultural). An overview and analysis of what the current situation is in Europe with a specific focus on institutional settings, methods, themes and effects of PTA might lead to insights for countries that want to start-up and expand PTA in their country.

Moreover, after many years of development of TA theory and practice there is a growing need for mutual-learning and strategic intelligence in Europe. This is due to a number of developments that can be summarised as follows:

Path dependencies:

- Due to path dependencies such as institutional settings and legislative regimes, a variety of approaches to PTA emerged in Europe during 40 years of TA at the political, societal and academic level. There is a need to map the practices and content of PTA in Europe;
- Because of the rise of democratisation of society, both a need for reinforced scientific and technological education, as well as a need for civic debates on technology emerged;
- A systematic approach towards technology requires an integrated approach of TA, research, education and cultural measures, requiring co-evolution of the broad European STI policy agenda and the PTA agenda.

Institutional changes:

- The tradition in PTA diversity in Europe is increasing, also because new EU Member States have added new PTA practices and new PTA needs to the portfolio;
- The European integration and the corresponding common European policies call for an integration of the European PTA communities;

- A pan-European approach towards PTA would foster alignment between the activities at the EU and national levels.

Changes in framework conditions:

- The post-industrial era, i.e. the shift from manufacturing to a high-tech and knowledge-based economy sets new needs for PTA that require new methods;
- Global problems (such as climate change, energy supply) could be solved with emerging technologies, which implies that international collaboration on EU level is an obvious step;
- Increased international competition due to the emergence of the BRIC countries (Brazil, Russia, India and China) ask for a pan-European strategy.

These developments in path-dependencies, institutional changes and framework conditions and the emergence of new TA practices in Europe have reached a level at which it is necessary to re-consider reinforcement and development of new perspectives for pan-European co-operation. A major driver is the growing significance of STI for the economy and society at large. The knowledge-based economy of today puts new and specific demands on the type of intelligence that is needed for informing parliamentary decision-making on science, technology and innovation. This study aims to provide a common basis for the process of formulating pan-European coordinated common activities.

In the study technology assessment is defined as a scientific, interactive and communicative process which (via its products) aims to inform and contribute to the formation of public and political opinion on societal, ethical, legal and economic aspects of science and technology. Parliamentary technology assessment is technology assessment specifically aimed at informing and contributing to opinion formation of members of parliament; here parliament is the main client of the technology assessment activity. Contrary to the definition of TA introduced by Decker and Ladikas (2004), which only includes the social aspects, in this study TA addresses a broad range of questions related to STI development. This has been summarised using the four interrelated aspects included in the definition: social, ethical, legal and economic.

1.1.2 Objective of the study

The main objective of the study is:

To trace the evolution of parliamentary TA from the OTA model ⁽¹⁾ to a future pan-European participatory TA and to deliver images of PTA future.

The study consisted of two parts. In Part 1, a review was made of the different existing PTA practices within the EU Member States. In Part 2, ways for common reciprocal beneficial actions have been identified in order to develop a common vision of a future pan-European PTA. The two parts are introduced in more detail in the next two sections.

¹ The historical roots of PTA in Europe lie in the United States where the US Congress established the Office of Technology Assessment (OTA) in 1972.

1.2 Part 1: Review of existing PTA practices in Europe

1.2.1 Objective

The main objective of Part 1 of the study is to provide an overview and analysis of the dynamics in PTA in Europe since 2000.

The review of PTA in Europe was made along the lines of three types of characteristics that cover the most relevant aspects of PTA in Europe: institutional settings of PTA, PTA practices and effects of PTA. These three interrelated characteristics refer to what PTA organisations are, what they do and what their main effects are on parliament.

The central question(s) and sub-questions that have been answered in this part of the study, are presented in the table below.

PTA characteristics	Main questions	Sub-questions
Organisational setting	What are the main modes of organisational settings of PTA in Europe?	What are the similarities and differences between the ways PTA is organised in Europe? Have there been important changes in the organisational settings of PTA during the last period and, if yes, which changes and how can they be explained?
Practices	Since the start of PTA in Europe: what was the development / evolution in the methods used in PTA. Have new modes been developed and how can they be characterised? In what domains are European PTA activities complementary and can gain benefits from more coordinated efforts on the pan-European level?	What have been the (relative) budgets for scientific studies, interactive projects, other new methods and communication and how has this evolved over time? Which types of stakeholders have been involved in the PTA process and how has this evolved over time?
Effects	What are the main effects of PTA activities in Europe and how has this developed over time?	Can a relationship be identified between the various organisational settings of PTA in Europe and the (types of) effects they generate? If so, how can this relationship be described? Can a relationship between the various methods applied in Europe and the (types of) effects generated be identified? If so, how can this relationship be described? To which extent and in which way do the various communication methods contribute to the generation of certain (types of) effects?

1.2.2 Methodology

Part 1 of the study was organised in two steps each using a specific method: desk study and interviews.

Desk research: definition of study and study domain

Based on desk research⁽²⁾ a conceptual framework was developed that described the domain of the study, the research questions to be addressed and the conceptual models to be applied for analysing the data collected.

For the institutional setting the focus is on the (dynamics in the) governance structure of PTA's, their mandate/missions, funding arrangements and organisational set-up: i.e., who decides on the mission, the strategy and the (multi-annual) working programme, who is responsible for the strategic and operational management, who pays for the PTA projects, and what organisational forms are used. It addresses the role(s) of the PTA organisation vis-à-vis parliament, the government, and/or other audiences and clients.

With respect to PTA practices a distinction is made between the methods used in PTA (scientific and interactive)⁽³⁾ and the communication activities to support PTA dissemination to clients and others. Also the content of the PTA activities are addressed: the specific technologies (such a Nanotechnology, Genomics) and/or the specific social or ethical themes (such as healthy ageing, sustainability). Also, it includes the stakeholders that are involved in PTA activities and the role of experts in PTA activities.

The effects are addressed by using a framework that distinguishes between three different types of outcomes and the specific aspects addressed in these outcomes.

The study domain includes PTA organisations in the following fourteen countries/regions: Belgium/Flanders (IST), Denmark (DBT), European Parliament (STOA), Finland (Committee for the Future), France (OPECST), Germany (TAB), Greece (GPCTA), Italy (VAST), Norway (NBT), Spain/Catalonia (CAPCIT), Sweden (PER, The Parliamentary Evaluation and Research unit), Switzerland (TA-SWISS), The Netherlands (Rathenau Institute) and United Kingdom (POST).

The conceptual framework was presented and discussed with the directors of the PTA organisations, who gave their endorsement and agreement to cooperate ⁽⁴⁾.

Interviews

Starting from the research questions in the conceptual framework questionnaires were constructed for the interviews with the directors of the PTA organisations and with the members of parliament.

² Desk research included scientific literature, website of PTA organisations, documents produced by EPTA (associated) members, and other relevant materials (such as papers for conferences, documents produced by members of parliament, government).

³ See also: Tran, Th.A. and T. Daim (2008) "A taxonomic review of methods and tools applied in technology assessment", *Technological Forecasting & Social Change*, Vol. 75, pp. 1396–1405.

⁴ During the Directors meeting of the EPTA-network on May 10th in Copenhagen.

The study has not investigated which other sources of information – other than those provided by PTA organisations – are used by members of parliament for informing themselves on new scientific and technological developments and their (potential) societal, ethical, legal and economic aspects and formulation of/commenting on options and actions in policy-making on STI. This would ask for a rather different approach, focusing on parliamentary decision-making processes and the role of different sources of information, agenda setting and policy formation.

The interviews were conducted in the period mid May – mid August 2010 (see Appendix A for the list of interviewees).

The preliminary results of the interviews were presented and discussed with STOA and the other EPTA members in a Workshop on 29 June 2010 in Brussels.

A draft version of the report holding the results of Part 1 of the study (issued on 30 September 2010) was checked by the directors of the PTA organisations for the information on their organisation. Based on their comments and corrections (received in the period May-July 2011) Part 1 of the study was finalised.

The results of Part 1 of the study are presented in Chapter 2.

1.3 Part 2: Explore future pan-European PTA

1.3.1 Objective

Given the urgency of a number of societal challenges (climate change, energy, health, ageing, degenerating cities, etc) and economic challenges (maintaining and strengthening Europe's competitive position), STI policy-making should be informed with intelligence that is geared to providing solutions to these challenges. TA may provide an important contribution to public policy-making on STI by - for instance starting from these grand challenges - evaluating how and which technologies can help to solve these multidisciplinary problems. Moreover, TA is especially suitable for providing intelligence to tackle these complex grand challenges, as it allows for a multi-disciplinary approach that is mostly used in impact analyses. These new approaches could also imply that other methods have to be used for TA, varying from ex-ante to ex-post impact assessment and forecasting and foresight methods, etc. In this way, PTA can help to provide strategic intelligence that helps to reinforce innovation policy-making aimed at shaping policies that help to improve Europe's competitive position in the knowledge-based economy and society of the future.

Following this reasoning, the main objective of Part 2 of the study was to explore the possible ways to develop and perform pan-European PTA.

More specifically, this second part of the study was aimed at answering the set of questions that is included in the table below.

Questions for Part 2 of the study
1. What main themes/domains should TA address/cover during the next five years, and to which clients/users should it be geared (parliamentarians, other politicians, governments, others)?
2. What are the main features of a future pan-European project (which national TA projects require a wider-than-national scope, other pan-European TA projects)?
3. What would the first pan-European TA projects entail, and who should be responsible for their coordination, execution and evaluation?
4. What roles should STOA and EPTA play in this new approach?
5. What are new forms of scientist-politician interaction in this new approach (such as M(E)P –Scientist pairing schemes)?
6. Can technology and its assessment provide a platform to work towards bringing together a European public audience?
7. Is a European audience for S&T matters a precursor to a federal Europe?
8. What are recommendations for future democratic governance of S&T policy based on the use of the new pan-European TA approach?

1.3.2 Methodology

The main method that was followed in this part was to organise a conference that was aimed at:

- informing members of parliament (European, national, regional) and those (preparing to get) involved in PTA activities about PTA in Europe;
- exploring and developing perspectives for pan-European activities in the field of PTA.

In order to prepare the conference and explore potentials for future pan-European (P)TA a number of preparatory interviews have been held with members of national parliaments and representatives of national and regional TA organisations. The interview questionnaire mainly followed the list of questions included in the table above.

The results of the interviews have provided input for the chairmen of the conference to prepare the panel discussion during the conference. The report of Part 1 of this study - 'PTA in Europe' - was another input to the conference. It was made available by STOA as a background document to all conference participants.

The p-EPTA conference was held on September 7th, 2011. The programme was designed based on the conference's two goals (see Appendix B). The conference consisted of three parts. First, the current status of PTA in Europe was discussed. Following this, perspectives for future cross European cooperative activities were on the agenda. Finally, a panel discussion was held to facilitate an exchange of ideas on future pan-European PTA cooperation between all participants. The conference was not a decision-making meeting, but rather a platform for interaction and collaboration.

The targeted audience consisted of members of national and regional parliaments and of the European Parliament, representatives of Parliamentary Technology Assessment organisations and scientists in the field of technology assessment and science in society. The date for the conference was planned in cooperation with the management of the PACITA project⁽⁵⁾ in order to ensure participation of the PACITA-project members consisting of a large group of PTA practitioners.

In total, 78 persons participated in the conference. Eight MPs were present: from Austria, Finland, Greece, Portugal, Sweden, Switzerland and the Walloon Region of Belgium and another three members of the European Parliament. In total, 18 European countries were represented. The complete list of participants is presented in Appendix C.

It was also possible to view the conference online, for those not able to be present in person. Various persons made use of this opportunity, which was indicated by numerous requests for the background report *PTA in Europe*⁽⁶⁾.

The results of Part 2 of the study are presented in Chapter 3 of this report.

⁵ PACITA stands for 'Parliaments and Civil Society in Technology Assessment'. It is a four-year EU financed project under FP7 aimed at increasing the capacity and enhancing the institutional foundation for knowledge-based policy-making on issues involving science, technology and innovation, mainly based upon the diversity of practices in Parliamentary Technology Assessment (PTA). PACITA has 15 European partners from national/regional parliamentary offices for science and technology, science academies, research institutions, universities and civil society organisations coordinated by a PTA institution, the Danish Board of Technology. <http://www.pacitaproject.eu/>

⁶ J. Deuten et al, 2011, 'PTA in Europe, Technology Across Borders Part 1' (Technopolis Group, The Netherlands)

2. Overview of Parliamentary Technology Assessment in Europe

This chapter presents the results of the first part of the study 'Technology across borders'. It provides an overview and analysis of the dynamics in Parliamentary Technology Assessment in Europe since 2000⁽⁷⁾. In Section 2.1 a short historical overview of evolution of PTA in Europe since the 1970s until 2000 is presented. Section 2.2 provides an overview of the current institutionalisation of PTA in Europe. In Section 2.3 the methods applied in PTA activities are presented and the main themes PTA organisations have worked on for the last five years. Section 2.4 analyses the effects of PTA activities on parliamentary decision-making and the last section (2.5) draws conclusions.

2.1 History of PTA in Europe

2.1.1 Start of TA in Europe

The historical roots of PTA in Europe lie in the United States where US Congress established the Office of Technology Assessment (OTA) in 1972. The US OTA model was transferred to Europe in the 1970s and 1980s⁽⁸⁾. National and supra-national governments in Europe began to show interest in PTA in the early 1970s, inspired by experiences in the US and Japan. The development of TA in Europe was, however, initially slow due to institutional and constitutional barriers. For instance, European parliaments were in a relatively weak position to take the initiative to start PTA, compared with the US Congress' position vis-à-vis the Executive Branch. In Europe, it was not customary to provide staff and resources for initiatives like OTA. Parliamentary committees did not have sufficient political independence and constitutional authority to influence most policies and in some cases constitutions did not allow the creation of new institutions attached to parliament or put limitations on parliamentary organisation. Unlike in the US, the separation of powers between government (the Executive Branch) and parliament (the Legislative Branch) is less clear in European parliamentary systems. The division is not so much between legislative body and government as it is between majority party/parties and government on the one hand, and minority party/parties on the other hand. Governments (and corresponding majority/coalition parties tend to be hesitant to increase informational and other resources available for parliament, because they benefit the opposition as well. Besides institutional barriers, the concept of TA itself was not clear and because of different political cultures in Europe there was no common notion of the proper role of the state in shaping technological developments.

⁷ The full report with the review of PTA in Europe has been published as a background document to the Conference (Part 2)

⁸ See Vig and Paschen (2000), Smits and Leyten (1991) and Smits et al. (forthcoming) for an elaborate account of the history of PTA in Europe.

Interest in TA, however, increased in the 1970s and 1980s as a result of growing public concerns on the effects of new technologies (such as nuclear energy, recombinant-DNA, ICT) and the growing demand of non-governmental organisations for accountability and their participation in STI policy-making. In addition, STI became increasingly seen as drivers of the economy. Technology became a strategic factor for stimulating economic growth, improving Europe's competitiveness and solving societal problems. The function of PTA changed from 'early warning' to PTA as an instrument to help guide technological developments towards better ('societal robust') outcomes. Public acceptance and societal embedding of new technologies became of strategic importance for ensuring higher economic growth. Consequently, PTA was not only perceived as an instrument of parliament to scrutinise government's STI policies, but also as an instrument to improve STI policies. This notion of PTA fitted better in European political contexts. Indicative of this change of perception was that, in some countries (e.g. The Netherlands), it was government that took the initiative to set up a PTA organisation.

In the 1980s, European several national parliaments discussed the concrete goals, functions, costs, and organisational structures of proposed PTA units. Political motivations for adopting PTA varied from getting more control over (nuclear) energy policy from the 'technocracy' of bureaucrats and experts (France); broadening the public debate on S&T policy to address public concerns over the societal impacts of new technologies (The Netherlands); to improving the understanding of STI issues among members of Parliament (UK). In some countries (France, UK, Germany) the debate on TA occurred mainly within parliaments themselves. This led to the establishment of PTA organisations that were designed to strengthen the informational (and political) resources of the members of parliament. In other countries (Denmark, The Netherlands) groups outside parliament (e.g. scientists, commissions, unions, NGOs, ministries) took the initiative as a result of concerns about societal impacts of new technologies. This led to orientations on broadening the societal debate of impacts of STI and democratisation of STI policy-making, rather than on informing or 'enlightening' parliamentarians.

Although the national PTA organisations within Europe did not get the strong constitutional position that OTA had in US Congress, the European PTA organisations found different viable institutional niches in which they could operate. The institutional settings of PTA shaped the type of work PTA organisations did undertake and the way in which this work was done. In addition, different social values and concepts of TA were embodied in the design of PTA agencies, resulting in different functions.

2.1.2 Broadening of TA concept and method

Since the late 1980s, the concept and methods of TA have broadened and a number of stages in the development of TA in Europe can be identified. The first stage was in the 1970s when TA emerged as a watchdog, based on the idea of anticipating on negative effects of technology (Smits, R. and Leyten, J.). The main function of these forms of what is now called 'traditional TA' or 'classical TA' has been promoting awareness of future technological developments and its potential (negative) societal impacts, and the development of policy options to anticipate them. TA was supposed to provide neutral and objective information as input into the political decision-making process. As experience with TA grew, it increasingly became clear that predicting the course of development of a technology and of its societal effects is problematic.

A second important stage in the development of PTA was taken in the 1980s: the notion of TA was broadened and its function evolved. Recognising the strategic role of technology and innovation as engines of growth in modern economies, TA became increasingly perceived as a means to better embed and integrate S&T in society. TA became a tool to help the various actors involved in technological development and innovation processes, both on the supply and demand side. In this period, the first PTA organisations were established in Europe (Van den Ende, J. *et al.*).

In the early 1990s, the toolkit of TA was further extended and links with S&T and innovation policy were strengthened (Smits, R. *et al.*). TA became recognised as a source of Strategic Intelligence for actors involved in innovation processes, both on the supply and demand sides. To make TA more relevant for innovation policy, new TA approaches emerged, including interactive TA and participatory TA. The development of TA occurred in a context in which innovation policy evolved from a linear model innovation to a systemic model of innovation. As a consequence, all actors involved in the development, diffusion and use of innovation became relevant for innovation policy-makers to take into account.

2.1.3 TA as strategic tool

Over the last few decades, TA has become more of a strategic tool aimed at strengthening the position of specific actors (e.g. parliaments, governments, industry, users) in a complex multi-actor process of socio-technical decision-making. Strategic TA should provide relevant information (strategic intelligence) to help actors in developing their strategies. Discussions and debates with relevant actors, based on analyses of technological developments and their consequences, became an integral part of TA studies (Smits, R. and Leyten, J.). Concurrently with strategic TA, participatory TA was developed which aimed at broadening the decision process (both in terms of content and of actors that are involved) about technological development, to shape the course of technological development in socially desirable directions. Alignment between technological and societal developments is the ultimate objective.

2.1.4 PTA organisations

The introduction of PTA in Europe not only manifested itself in national PTA organisations, but also in PTA organisations at the regional and European levels. In several European regions with a relatively large degree of autonomy in matters related to STI policy, PTA organisations were established to support regional parliaments (such as in Flanders and Catalonia). At the European level, the European Parliament established its own Scientific Technology Options Assessment (STOA) unit in 1987 to provide expert, independent scientific assessments of technology options.

The PTA organisations in Europe established their own European Parliamentary TA (EPTA) network in 1990. The founding members were the PTA organisations in Europe from the UK, France, Germany, Denmark, The Netherlands, and the European Parliament. EPTA was set up to strengthen the links between PTA organisations in Europe by promoting co-operation and exchange of ideas on TA across national borders. In addition, EPTA aims to advance the establishment of TA as an integral part of policy consulting in parliamentary decision-making processes in Europe.

Currently, there are 14 members and four associate members (Austria, Belgium, Council of Europe and Poland) (see Figure 1).

Figure 1 EPTA members

The members of EPTA (14 members, 4 associate members) include:

- Austria: Institute of Technology Assessment
- Belgium: OSTC - Belgian Federal Office for Scientific, Technological and Cultural Affaires
- Catalonia (Spain): Catalan Foundation for Research and Innovation
- Council of Europe
- Denmark: Teknologirådet - The Danish Board of Technology
- European Parliament: Science and Technology Options Assessment
- Finland: Committee for the Future
- Flanders (Belgium): Institute Society and Technology
- France: Office Parlementaire d'Evaluation des Choix Scientifiques et Technologiques
- Germany: Büro für Technikfolgen-Abschätzung beim Deutschen Bundestag
- Greece: Greek Permanent Committee of Technology Assessment
- Italy: Comitato per la Valutazione delle Scelte Scientifiche e Tecnologiche
- Netherlands: Rathenau Institute
- Norway: The Norwegian Board of Technology (Teknologirådet)
- Poland: The Bureau of Research
- Sweden: The Parliamentary Evaluation and Research Unit
- Switzerland: Centre for Technology Assessment at the Swiss Academies of Sciences
- UK: Parliamentary Office of Science and Technology

There is an increasing interest to participate in EPTA. MPs and institutes in the new Member States want to be involved. However, full membership is restricted to PTA organisations that pursue TA activities and operate in Europe, are devoted to TA or related activities, serve parliament, have their own budget and secretariat and have competence regarding issues with an S&T component. One way of working together is through 'common EPTA projects' (⁹).

⁹ "EPTA projects are based upon the 'Joint EPTA Project Framework', which makes use of a bottom-up principle, according to which three or more members can initiate a project if it is open for active participation from other EPTA members. The project is decided during a Directors' meeting or Council Meeting after being scrutinised by the boards of the members. The outcome of an EPTA project is the sole responsibility of the participating members." (<http://www.tekno.dk/EPTA/about.php>).

2.2 Institutionalisation of PTA in Europe

The overview and analysis of the dynamics in PTA in Europe since 2000 was made along the lines of three types of characteristics that cover the most relevant aspects of PTA organisations and activities in Europe: the institutional setting of PTA, PTA practices and the effects of PTA. These three interrelated characteristics refer to what PTA organisations are, what they do and what their main effects on parliament are. In this section we present the first aspect: institutionalisation.

Modes of institutionalisation of PTA in Europe are diverse. Each country – or in some cases region – has its unique setting, varying from an in-house activity of the national or regional parliament to independent organisations at arm's length from parliament. The previous section shows there are historical, political, cultural, and other reasons (see also Vig, N. and Paschen, H.) that explain when, why and how a PTA organisation was set up in a specific country or region and what its mission is. However, all have in common that they are an answer to the growing need in parliament to have an independent source of information on new developments in STI and their effects on the economy and society and to know the opinions of the relevant stakeholders on the issues at stake. This allows them to be better prepared for their task in directing and assessing policies in the field of science and technology.

The overview of PTA in Europe was given, by using three models of PTA organisations in Europe. These models were based on two dimensions: a) the organisational setting of the PTA organisation inside or outside parliament and b) the mission of the PTA organisation: to inform parliamentarians (and others) in matters related to S&T and/or stimulate (public) debate on S&T and its impacts. The models will be presented in more detail below.

The Parliamentary Committee model

A dedicated parliamentary committee is in the lead of PTA. The governance model is closely linked to the internal organisation on the functioning of the parliament. PTA organisations in this model include: France (OPECST, since 1983), Italy (VAST, since 1997), Greece (Greek Committee of TA, since 1997) and Finland (Committee for the Future, since 1993).

Characteristics are:

- Internal body (office, committee, research unit) to Parliament
- Main aim: support political decision-making on STI policy
- Parliamentarians actively involved on a permanent basis
- Small staff/ secretariat (typically 1 to 3 FTE¹⁰)
- Small budgets (<€ 100.000 / year)
- Relatively simple governance structures (no Board)

¹⁰ Full-time equivalent

The Parliamentary Office model

Parliament has its own office or support unit for TA studies on request of parliament. Usually, these offices are inside parliamentary structures - such as: European Parliament (STOA, since 1987), UK (POST, since 1989), Sweden (PER, 2007) and Catalonia (CAPCIT, 2008) -, but sometimes the office is contracted out to an external research organisation such as in Germany (TAB, since 1990).

Characteristics are:

- Within or closely linked to Parliament
- Main aim: support political decision-making on STI policy
- In addition to politicians, experts are involved on a permanent basis
- Staff: 3 - 10 FTE
- Budget: € 0.5 – 2 million / year
- Governance structures include a Board which may comprise non-MPs
- Some degree of autonomy

The Independent Institutes model

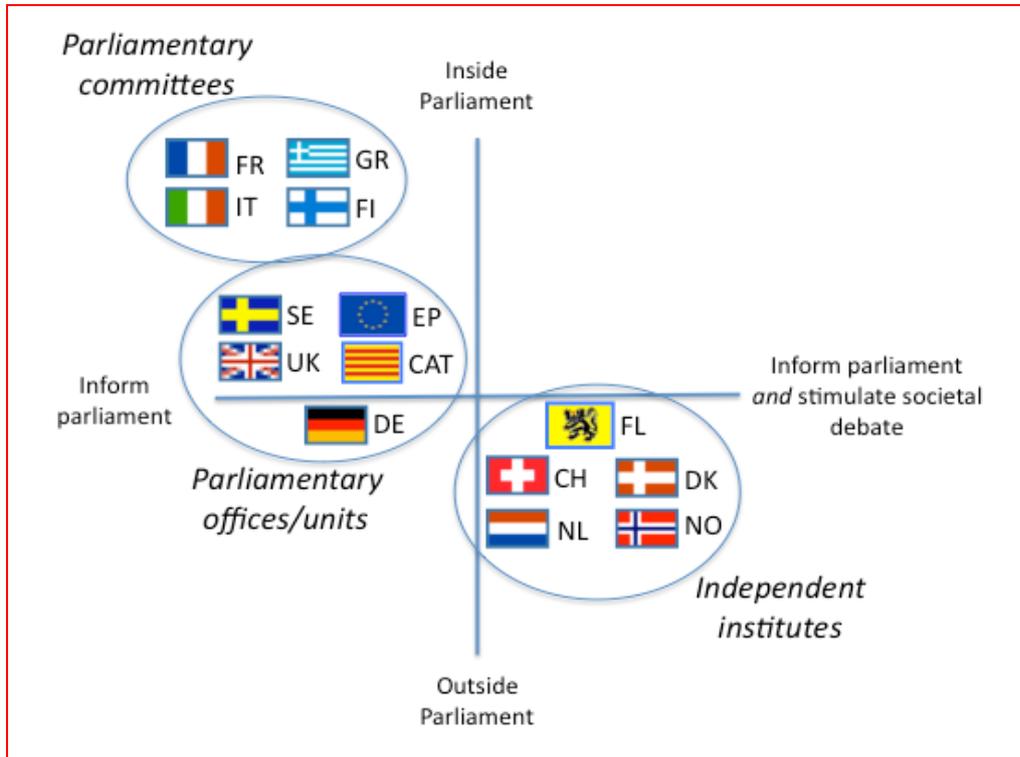
The TA organisation operates at a distance from parliament, but parliament is its main client. In most cases also other target groups are considered as client. Typically, these institutes have missions that go beyond informing parliament and also include stimulating public debate on STI issues. Countries with this PTA model include The Netherlands (Rathenau, since 1986), Denmark (DBT, since 1995; successor of TB, since 1986), Switzerland (TA SWISS, since 1992), Norway (NBT, since 1999) and Flanders (IST, since 2008; successor of viWTA, since 2000)

Characteristics are:

- Independent institutes, at a distance from Parliament
- Main aim: support political decision-making and stimulate debate
- Broader set of audiences, addressees (incl. government, public)
- Specific attention needed to keep parliamentarians involved
- Staff: 8 - 25 FTE
- Budget: € 1 - 3 million / year
- Governance structure with separate Board
- Relatively large degree of autonomy

It should be noted that within each model group there still are considerable differences between the PTA organisations. It can be expected that in the next period this richness of PTA institutions will even be enlarged when new countries will start PTA activities. See Figure 2 with the overview of the model and countries.

Figure 2 Classification of PTA organisations



Legend: CAT=Catalonia, CH=Switzerland, DE=Germany, DK=Denmark, EP=European Parliament, FI=Finland, FL=Flanders, FR=France, GR=Greece, IT=Italy, NL=The Netherlands, NO=Norway, SE=Sweden, UK=United Kingdom.

Source: Technopolis Group

2.3 PTA practices in Europe: methods and topics

In the analysis a distinction is made between the methods used in PTA (scientific and interactive) and the communication activities to support PTA dissemination to clients and others.

Scientific methods are used for gathering and validating information about specific aspects of the technology, such as for exploring future social, legal and/or economic impacts of new technologies (for instance of synthetic biology). Decker and Ladikas (2004) mention as examples of scientific methods: expert interviews, expert discussion; modelling, simulation, systems analysis, risk analysis, material flow analysis (for understanding the socio-technical system to be investigated); trend extrapolation, simulation, Delphi method, scenario technique (for creating knowledge to think about the future); discourse analysis, value research, ethics, value tree analysis (for evaluating and uncovering the argumentative landscape); etc.

Interactive, participatory or dialogue methods have been developed to organise social interaction in order to bring together the different stakeholders involved in and affected by a technology (mainly those belonging to the two main subcategories: producers and users, sometimes also public policy-makers are involved) with many different purposes (such as: providing information, discourse and decision-making). Methods used include: consensus conference; expert hearing; focus group; citizens' jury; future search conference; etc.

The overview of PTA methods used across Europe (see Figure 3) shows that the scientific methods (mostly in terms of academics providing expert information on the specific S&T developments and their societal, ethical, legal and economic aspects) are in use in each country, often in combination with participatory methods. Most engaged in participatory methods are the countries with independent PTA institutes. This relates directly to the mission of these organisations as they not only inform parliament, but also stimulate public debates. Typical for the PTA organisations that follow the Parliamentary Committee model is that they apply scientific methods and combine this with a workshop, hearing, or seminar in which experts and stakeholders are invited to inform parliament. This gives the PTA activity an interactive character. The Parliamentary Offices mainly use scientific methods.

Figure 3 Overview of PTA methods used in Europe

PTA model	Country/ Institution	Description	Scientific Methods	Participatory Methods
Parliamentary Committee	France <i>OPECST</i>	Primarily use of scientific studies and reports. In addition to this, public hearings are organised, as well as visits managed by rapporteurs and organise public events (50-50). The rapporteurs lead hearings and visit and communicate and promote report conclusions. Most of the visits (and also public hearings) have a focus on experts.	+++	+
	Finland <i>Committee for the future</i>	The main methods used are scientific; there has been experimenting with participatory methods, but constraints in resources often hinders ample use. Main methods are scenario building, expert interviews and Delphi methods, expert hearing, roadmaps. Incidental use of focus groups. Increasing use of flexible and less informal methods. Also experiment with a discussion over the internet.	+++	+
	Italy <i>VAST</i>	Main methods are scientific studies, such as impact assessments of decisions regarding scientific subjects and round tables (seminars) Most of the seminars and hearings are held with representatives of technological organisations and institutes.	+++	+
	Greece <i>GPCTA</i>	Primarily use of scientific studies, with addition of elements of participatory methods.	+++	+
Parliamentary Office	European Parliament <i>STOA</i>	Commissions its studies to TA institutes via framework contracts with a number of contractors, within which the assignments are executed jointly by several partners (consortium members or subcontractors). STOA projects are predominantly scientific studies, but also encompass participatory studies such as civilian surveys.	++	+
	United Kingdom <i>POST</i>	Predominant use of scientific methods: mainly expert analysis. Methods used moved away from early warning to providing balanced analysis of public policy issues. Broader involvement of scientific disciplines such as economics, social sciences, etc.	+++	0
	Germany <i>TAB</i>	Strong scientific methods: involvement of lay people is not desirable as Parliamentarians are representatives of the people. Research is supported by TAB, but supportive institutions (i.e. ITAS, FhG-ISI) carry out in-depth research. TAB integrates the TA work and then analyses and appraises it and to look for inconsistencies and expert dilemmas. After this they identify options for Parliamentary actions.	+++	0
	Sweden <i>PER</i>	Scientific studies are commissioned and conducted with help of external reviews. Methods include reviews of literature with input from experts. Frequent use future oriented expert work.	+++	0
	Catalonia	CAPCIT only requested scientific studies; S&T institutes conduct these studies. Methods are assessment of scientific options by experts and desk study. Issues on perceptions of society at large were also dealt with in scientific studies.	+++	0

PTA model	Country/ Institution	Description	Scientific Methods	Participatory Methods
Independent Institutes	Denmark <i>DBT</i>	By far the largest share of work is conducted with participatory methods. Although the Parliament is the main customer, DBT often targets society at large (see mission Ch. 2). Political cycle influences the methods used; after elections many Parliamentary hearings are organised. Mainly participatory	++	++
	The Netherlands <i>Rathenau Institute</i>	Use all types of methods, depending on the needs for the study or project. In the early days, the institute primarily conducted studies. Use of both participatory as well as scientific methods from the start.	++	++
	Switzerland <i>TA-SWISS</i>	Both scientific methods and participatory/interactive methods are used. In scientific studies expert groups are involved for advisory or as a sort of steering group. In citizens' projects, citizens participate in the projects; MPs can keep in touch with the views and considerations of the people they represent. Lastly, projects are carried out to develop new methods, or to analyse or benchmark methods.	++	++
	Norway <i>NBT</i>	All methods are used and often combined, depending on question and issues. Expert groups include stakeholders from industry and NGOs as well as academic experts. Substantial emphasis is put on communication of results and societal debate through the media and public meetings.	++	++
	Flanders <i>IST</i>	All methods are used and often combined, depending on the assignment, question, or issues. Societal organisations are strongly organised and integrated in the Flemish system, as a result participatory studies are relatively easy to organise and important. Development of methodologies is also an important activity of IST.	++	++

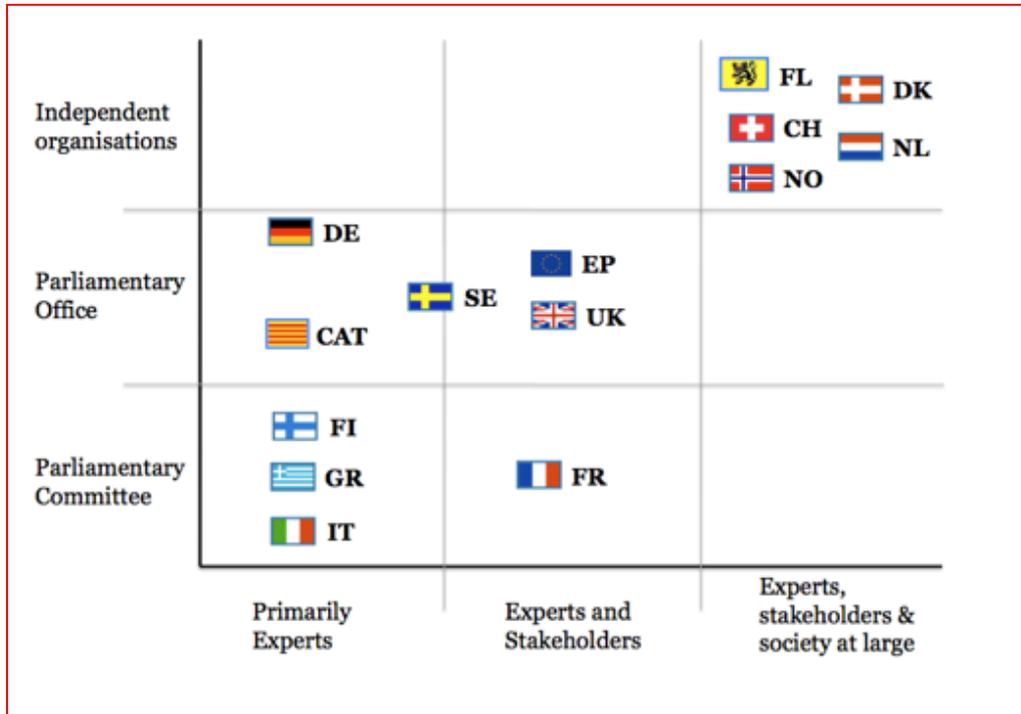
Legend: 0 method is seldom used; + method is used, together with other methods; ++ method belongs to the core methods; +++ only this method is used.

Source: Technopolis Group

Since 2000, two main trends in the use of methods can be observed. The first trend deals with the use of participatory methods: in some countries this has decreased because of budgetary considerations, in other countries new participatory methods have been developed that target more efficiently the specific groups of stakeholder groups. The second trend is the introduction and growth in the use of a set of new types of methods such as forecasting benchmarking, macro indicator analysis, bibliometric studies and road mapping. This trend can also be related to the broadening of the PTA activities in some countries: from an 'early warning' function (identifying possible negative effects, mostly providing input into new/ changed regulation or legislation) to a more strategic function (identifying also positive effects and thus providing also input in sector-specific STI policies). The broadening even goes towards upstream and downstream aspects of STI policy-making (providing input in generic aspects of STI policies, addressing for instance public R&D infrastructure, quality of public R&D, technology transfer).

PTA organisations under the Parliamentary Committee or Parliamentary Offices model mostly involve experts, stakeholders and parliamentarians in their activities (see Figure 4 for involvement by model). The Independent Institutes tend to address a broader set of stakeholders as also the public (society at large) is involved.

Figure 4 Stakeholders' involvement in PTA activities.



Source: Technopolis Group

The analysis of topics addressed in the PTA projects (see Figure 5) shows that almost all PTA organisations have projects specifically aimed at Climate Change and Energy, Sustainability, Ecology & Environment, ICT and Human Health. Also technologies that (potentially) lead to controversies such as Nanotechnology, Biotechnology and GMOs are or have been on the agenda of most PTA organisations. Other domains that receive a lot of attention are ICT (security, privacy, data protection, ICT divide) and sustainability. The ICT projects range from straightforward impact assessments of a certain ICT (e.g. the hazards of mobile phones) to societal issues such as the digital divide due to ageing. Sustainability studies also have large national differences – some projects are about the sustainability of industry or transport (e.g. Germany and Flanders), while other projects focus on eco-systems and use of natural resources (e.g. Sweden and Norway).

Figure 5 Important current topics for the national/regional PTA organisations

Country/Region	Current topics
France OPECST	Energy, Environment, Emerging technologies, Life sciences
Finland Committee for the future	Energy technologies, Nanotechnology, Education, Welfare & poverty, Climate change, Forests
Italy VAST	Aerospace, Energy policy
Greece GPCTA	ICT, GMO, safety, Climate Change
European Parliament STOA	Eco-efficient transport, Sustainable Management of Natural Resources, Security of Internet
United Kingdom POST	Biological Science, Health, Physical Sciences, ICT, Science Policy
Germany TAB	Biotechnology (incl. gene tech), Environment, Energy, Health, Sustainability, Innovation barriers
Sweden PER	ICT, Renewable fuels, Ageing, Climate change, Fish populations, Social welfare
Catalonia CAPCIT	Limited number of studies (GMO, a health topic and Nanotech)
Denmark DBT	Renewable energy, Sustainable transport, ICT, Synthetic biology; Obesity, Water supply
The Netherlands Rathenau Institute	Biotechnology, Synthetic biology, Converging technology, Nanotechnology; Usable body, Resource dependency, Security and Privacy
Switzerland TA-SWISS	Life sciences and medicine, ICT, Nanotechnology, Climate change/mobility (biofuels), Social and cultural TA
Norway NBT	Ageing and telecare, Nanotechnology, Synthetic biology, Cognitive enhancement, ICT; Health, Sustainability & Climate change, Security and Privacy
Flanders IST	ICT, Transport, Energy, Life sciences, Ageing

Source: Technopolis Group

2.4 Effects of PTA in Europe

In this study the Hennen and Ladikas' (2009) typology of effects was used to map the main types of effects that the various PTA organisation have. This typology distinguishes between three types of impacts: raising knowledge, forming attitudes/opinions and initialising actions. This effect dimension is combined with an issue dimension that identifies S&T aspects, societal aspects and policy aspects.

The main effects of PTA activities of organisations of the Committee model are in terms of 'raising knowledge' and some moderate effects in terms of 'forming attitudes and opinions'. However we also found some examples of effects in terms of 'initialising actions' and of initiation of dialogue between 'political world' and 'S&T world'. For the Office/Unit PTA model 'raising knowledge' is the main effect; in the two other effects groups hardly any effects were found. Effects of PTA activities of the independent model are well beyond that of the other two models towards 'initialising actions'. A main conclusion is that the main type of effect of PTA on parliament is in the dimension of raising knowledge.

This corresponds to the fact that all PTA organisations have the function to inform parliament on S&T issues. PTA organisations with a broader mission that includes stimulation of public debate tend to have effects in the other dimensions as well, but these are often less direct and also less visible. Attribution of the effects of PTA reports and meetings to parliamentary decision-making is a problem, because parliamentary decision-making processes have many inputs from many various sources and 'success often has many fathers'.

The interviews with parliamentarians suggest that independent PTA organisations appear to have the most visible effects in term of 'raising knowledge' and 'forming attitudes/opinions'. Effects in terms of 'initialising actions' are much less visible and more indirect. One of the reasons is that PTA is only one of many sources that are used by parliamentarians in their decision-making. Another reason is that in most countries it is the government that undertakes actions with parliament focusing on scrutinising government's policies.

2.5 Conclusions

Overall, the trends in European PTA confirm Vig and Paschen's (2000) conclusion that the concept and philosophy of PTA in Europe as compared to the USA, is aimed at making TA more 'usable', more 'useful' and more 'democratic'. In Europe more attention is paid in PTA to the opportunities of science and technology. After the early phase of 'traditional TA' (focusing on potential negative and undesirable effects of technologies), the 'awareness raising' function of TA became important. Moreover, 'problem-driven' or 'user-driven' assessments that respond to social, economic, resource, or environmental problems, have become more prominent.

Very important in European PTA is that it has become a main task of TA to provide support for strategic decision-making on STI and for improving the legal and other framework conditions for innovation. PTA stimulates a societally robust co-evolution of STI, economy and society. As a consequence, participation of affected individuals and groups and the public at large has become more prominent. Non-expert participation aims to improve the cognitive basis, credibility, acceptance and conflict-resolving potential of TA studies. It contributes to the 'democratisation' of STI policy in Europe.

We can conclude that the typology of PTA models we have developed has been useful for creating some order in the large diversity of PTA settings, methods and effects in Europe. The institutional settings of PTA organisations (and the related missions) shape the type of impact these PTA organisations can have. PTA organisations that are inside or closely linked to parliament have a direct access to members of parliament, which helps to get their message across to individual parliamentarians and parliamentary committees and to raise their knowledge on S&T issues. In turn, this creates conditions for changing attitudes and opinions, which might lead to changes in policy-making or legislation. The interviewees indicated that in practice the effects on decision-making depend very much on the available resources for TA activities and the degree of involvement and stature of the responsible parliamentarians.

A close link to parliament also puts constraints on PTA organisations in terms of the questions that can be addressed, the methods that can be used and the effects they can have, especially on the dimension of forming attitudes/opinions and initialising actions. Independent institutes lack such a direct formal access to parliament, but have the advantage that they have more freedom in terms of the questions and target groups they want to address and the methods they can use. This implies that they have also been able to add new issues on parliamentary agenda.

Getting parliamentarians' attention is a challenge for most PTA organisations, not just the independent institutes. To capture the attention of politicians, it is never sufficient to have a formal channel that allows direct access. A good understanding of political decision-making processes and communication is also necessary to have an effect on parliament. One visible trend of the last decade is that most PTA organisations appear to have become more effective in getting the attention of parliament and to play a role in parliamentary decision-making processes as a result of learning processes and further professionalisation.

This overview may serve as a source of inspiration for developing new PTA initiatives at a pan-European level and as a source of information for new PTA entrants. Countries and regions where PTA now is being initiated can learn from this overview and draw conclusions on how PTA can best be organised given their specific institutional, political, societal and cultural contexts. These new PTA activities might lead to even greater diversity in Europe of how TA intelligence on science and society supports decision-making in national/regional parliaments

3. Exploring future pan-European PTA cooperation

Potential benefits of cooperation based on content and methodology motivated former POST Director and Vice-Chairmen in the UK, Lord Kennet, to take the initiative in founding the European Parliamentary Technology Assessment (EPTA) network in 1989. However, at the time, it showed that the specific demands for each country or region were considered too different, leaving no common added value for a cooperative effort⁽¹¹⁾.

However, the specific situations that dominated the decision for non- or only limited co-operation of PTA's in Europe have changed since that time. A number of developments - such as the increased process of internationalisation of science and technology, tightening budgetary constraints and more experience in working together - could imply that the cooperative effort as put forward by Lord Kennet in 1989 is much more feasible in the current situation. In this chapter we explore the possibilities and conditions for pan-European cooperation in PTA.

Based on the results of the preparatory interviews, the conference and additional desk research, we will address the specific questions of Part 2 of the study. These questions (see Section 1.3) have been clustered under three headings and will be discussed in the following three sections:

- themes and methods for pan-European approaches and activities of PTA (Section 3.1);
- roles of stakeholders (EPTA members, new PTA entrants, parliaments) and civil society organisations and their interactions in developing such approaches (Section 3.2);
- conditions for a successful pan-European PTA approach and the future governance of STI policy based on this approach (Section 3.3).

3.1 Themes and methods of pan-European PTA projects

The preparatory interviews for the conference, and the interviews that were held for Part 1 of the study, all show that pan-European collaboration between PTA organisations is still rather limited. This is mainly due to the specific national and regional settings of the activities of PTA organisations. Each PTA organisation has found its specific institutional niche, which was the result of a - sometimes long - historical process in which multiple factors have played a role. Their activities are fine-tuned to the specific needs and demands of their national or regional parliaments and other clients.

¹¹ Norton, M., 2000. Origins and functions of the UK Parliamentary Office of Science and Technology. In: Vig and Paschen, 2000. Parliaments and Technology: The Development of Technology Assessment in Europe, Albany: State University of New York Press

3.1.1 Arguments for pan-European cooperation in PTA

There are several arguments that do speak for trans-national or trans-regional cooperation in PTA across Europe. First of all, all PTA organisations have to deal with the same technological developments, as these developments have an international character. Cooperation could therefore lead to benefits arising from improving economies of scale and higher efficiency. As development of science and technology is globalised, PTA organisations can cooperate in the exploration of technological developments. Projects aimed at describing the technology and its societal, ethical and economic impact require gathering of knowledge and data on the technology and its various impacts. The results of study activities such as desk study and literature reviews could be shared and used in other countries, or could even be developed jointly in order to prevent unnecessary duplication.

Barriers to increased cooperation are mainly related to issues of timing and incentives, as PTA organisations are often dependent on legislative agendas. Additionally, caution is due to not translate country-specific studies directly to other Member States without taking appropriate consideration of its context.

Secondly, besides improved economies of scale, pan-European cooperation in PTA would also lead to higher quality of PTA work. Since the analytical capacities of a national or regional PTA organisation are limited, the PTA work can be enriched by experts working in or for other PTA organisations working on the same subject.

A third argument for pan-European cooperation mentioned by interviewees from both PTA organisations and national parliaments, deals with fact that the national or regional scale is inappropriate for an increasing number of issues. Pan-European co-operation is necessary to address trans-national and global issues such as environmental issues that cross borders, reliable energy supply from neighbouring countries and economic policy.

Finally, synergies are to be found in the definition of problems and of methodology. Sharing of methodological knowledge and experience is essential for the PTAs to stay up-to-date and to deal with PTA projects in the best way possible. Coordination of methodological knowledge sharing happens in the EPTA network and in other less formal ways. Especially less experienced PTA organisations could benefit greatly by working with their more experienced peers.

3.1.2 Themes for future pan-European projects

The overview of PTA in Europe showed that there is a huge overlap in the themes that the European PTA organisations have been working on for the last five years. All PTA organisations have projects on climate change and energy, sustainability, ecology and environment, ICT and human health. Technologies that potentially lead to controversies such as Nanotechnology, Biotechnology and GMOs are or have been on the agenda of most European PTA organisations. This shared knowledge of a number of important societal problems and new technological developments could be a good starting point for cooperation between already existing PTA organisations and for new PTA organisations to join. Two topics that would be useful in particular are Nanotechnology, a hotly debated technological development, and global warming, a common societal issue that is of growing importance.

Nanotechnology is a technological topic that is addressed by most of the PTA organisations. According to the EPTA database, PTA projects on Nanotechnology have been carried out since 2004. The countries and regions that started Nanotechnology projects are Denmark, Flanders, Germany and The Netherlands; most belong to the group of so-called Independent Organisations. This could be an indication that the Independent Organisations are well capable of signalling new trends. Because they have more in-house expertise in technological fields than Parliamentary Committees and Parliamentary Offices and thus are better equipped to identify new trends⁽¹²⁾, they are also better able to influence the parliamentary agenda setting process. Although accents may differ from country to country, Nanotechnology seems to be a rather coherent field of study. Within the projects that address Nanotechnology, common issues are potential consequences for health and the environment. Another issue often addressed in the projects are regulatory issues related to the new characteristics of nano-materials. Also frequently studied is the convergence of Nanotechnology with other fields like Biotechnology, Information and Communication Technologies, and Cognitive Sciences (NBIC). Furthermore, a number of the projects have an education and communication function (Flanders, Denmark). Nanotechnology is clearly a topic that is more and more addressed by PTA organisations. As part of these projects deal with the technical aspects of Nanotechnology, it could serve as an entrance point for synergies at European level. Additionally, as in a number of countries public debates are being held on the health aspects of nano-materials, the code of conduct for research in Nanotech and for responsible governance of innovation in Nanotech, pan-European projects could address these issues.

Global warming is a societal issue that is high on the PTA agenda, according to the interviewees and the EPTA database search. Moreover, it is a pivotal issue to one of the so-called Grand Challenges that EU research policies aim to contribute to. Global warming is an area that is quite intensely addressed by a number of PTA organisation especially in the UK, France and Denmark in-depth studies have been done. Issues addressed are nearly all related to energy efficiency or renewable energy sources. The projects address technological solutions for emission of greenhouse gases (e.g. in transport), behavioural and legislative issues and public opinions on the problem of global warming. The technological solutions and regulatory issues that are dealt with in the studies are however not always congruent. Global warming is relevant at the pan-European level since it is a cross-border issue and the problem is comparable from country to country. Overall, global warming is a field that can benefit from co-operation and coordination of PTA activities at a pan-European level.

Apart from these two suggestions for pan-European PTA projects, a number of suggestions for pan-European projects were made during the interviews with MPs of national parliaments and during the conference. These include trans-boundary environmental issues, energy supply and dependency between counties, health and ageing population, globalised economy, homeland security and cloud computing.

¹² The last argument also counts for Germany, because the studies are conducted by the TA institute ITAS.

Within the PACITA project, a number of existing PTA organisations work together with potential (P)TA organisations, the latter mainly from Central-European countries. The project is specifically aimed at increasing the (P)TA capacity in Europe and enhancing its institutional foundation in other countries. Most activities will be executed by pairing partners from countries that do not have established PTA institutions with partners from countries that already have such institutions. Three projects, namely Public Health Genomics, Ageing Society and Sustainable Consumption, are planned based on activities at the national or regional level, but coordinated and synthesised at the pan-European level. The methods used in each of the three projects represent the main methodological clusters in PTA, which are expert-based methods, stakeholder involvement and citizen consultations.

We propose that new pan-European PTA projects should preferably address the Grand Challenges for 2020 for Europe: clean energy, transport, sustainable consumption and production, and health and ageing. Given the above suggestions for pan-European projects and the three pan-European (PACITA) projects that will start soon addressing mostly health and sustainability issues, the themes that should preferably be covered by new additional pan-European projects are:

- Environment: trans-boundary pollution, global warming, sustainable development, ecosystems, water;
- Energy: trans-national/-regional supply, dependency, security, and resource choices;
- Economy: globalisation of industries and its impact on quality and quantity of employment in high-tech sectors; collapse of financial markets.

An important motivation for pan-European cooperation is that countries can learn from each other. For countries in which PTA is not yet institutionalised, cooperation at the pan-European level is seen as a way to help them to build PTA capacity in the country, including the development of PTA structures and thereby raising awareness about the importance and role of PTA in tackling various issues. For countries with a long track record in PTA cooperation, this can lead to learning from each other by sharing best practices and points of view, exchange of ideas and experiences, and comparing results. Another reason for cooperation mentioned by interviewees was learning in the sense of gaining knowledge of the different institutional settings in which PTA has been successfully implemented and mainstreamed. Trans-national efforts and cooperation help to allocate resources and information in a more efficient manner and increase the quality of the work of members of parliament.

When collaborating between countries and transferring PTA practices from one country to another, it is necessary to take into account the context in which the practises have been developed and to which they are transferred. It requires some effort to translate it from one country to another and make it fit for the specific context in which the PTA practice is to be used. How difficult this might be, experiences in one country can be very inspirational for developing PTA practices in another country and should not be overlooked.

3.2 Role of different stakeholders in pan-European PTA projects

In this section the role of PTA organisations and members of European, national and regional parliaments will be discussed and the desirability of new types of scientist-politician interactions.

Three types of various stakeholders that should be included in future pan-European PTA activities, include:

- (P)TA experts - from national PTA organisations and STOA - and others performing PTA and researchers that are involved in science and technology development;
- Government:
 - The European Parliament, and relevant committees;
 - National governments, national and regional parliaments at the administrative and policy levels, and specific parliamentary committees dedicated to PTA;
- Civil society organisations and the public.

During the conference several MPs reflected on how to shape the various forms of PTA collaboration, especially with countries where there is no institutionalised PTA as of this moment. MPs from national and regional parliaments expressed interest in learning more about mobilising PTA in parliament, getting the media involved and the various possible methods to achieve these goals. The overview of how PTA was institutionalised in Europe using various models has inspired other countries to develop PTA practices.

Summarising the MPs' contributions to the conference, the issue seems to be centred on how to increase PTA's impact on parliamentary decision-making by creating awareness about and fostering support for PTA with MPs in the first place. An important challenge is how to stimulate MPs becoming aware of the opportunities and to integrate PTA in their decision-making process.

Representatives of PTA organisations and MPs in countries where PTA has been institutionalised for quite some time made various suggestions to this end. Most important to realise, they argued, is that it is a learning process to understand MPs' needs, and being able to accommodate these needs with PTA work. After a start-up period during which time is taken for this process and PTA work has had time to prove itself to MPs, MP awareness and support should increase. Another barrier could be the fact that parliaments are often conservative, status-quo loving institutions to which new technologies can come across as a threat. In Finland, for instance, within the Parliamentary Committee involved in TA, first a group on foresight of new technologies was started in order to get accustomed to this new technology domain. After that, it took 30 years before a formal institution was established. The power of vision and long-term determination is therefore certainly needed.

PTA/scientist - politician interactions

An important issue relating to the stakeholders involved in trans-national PTA cooperation is the relationship between scientists and policy-makers. Bringing politicians in contact with scientists through PTA can help to raise parliaments' basic knowledge on technology issues and tackle politicians' pre-conceived ideas about new technologies.

There are, however, some barriers to an effective relationship between politics and science, such as:

- the discrepancies between long-term thinking in PTA work and short-term thinking within parliaments;
- the differences in languages of scientists and politicians;
- the supply of lengthy reports by scientists when politicians need condensed, quick and easy to read outputs due to time constraints.

A true interactive approach is needed in which both sides are adaptive and responsive to each other. This way, TA can become more than the production of studies by scientists on various impacts of new science and technologies, but also includes long-term, strategic reflection by both the scientific and political worlds.

A better interaction between politicians and scientists will help to create awareness on and foster support for PTA. First of all, members of parliaments could be included in the decision-making process on new PTA projects. By including them in the process by which the project portfolio is made, their awareness will be increased and the process will stimulate support for PTA among MPs. This must be a two-way process rather than being purely responsive to parliaments' needs, first connecting technology and society trends, checking what other PTA organisations and research institutes are working on to prevent duplication of efforts, and subsequently presenting the list of priorities to MPs for feedback. By including MPs from an early stage in project formulation, a sense of ownership of the project is created as well. By creating a meeting place for all stakeholders, the various functions of TA will be fulfilled and its impact on parliamentary decision-making will increase.

Communication plays a very important part. It is important to understand how the media work, how to reach the politicians, and especially, to make sure that outputs of PTA work are digestible for MPs by ensuring that they are concise and written in the politicians' language, taking into account their different backgrounds. PTA organisations could also develop more responsive products, catering to the needs of politicians who require quick answers. This way, a relationship can be built in which parliaments experience the benefits of TA and come back for more. Essential to this is that PTA organisations have a broad spectrum of interaction methods and products at their disposal.

3.3 Conditions for a successful pan-European PTA approach

This last section deals with a number of more generic questions concerning the overall conditions for successful pan-European projects, bringing together a European public audience and leading to a future democratic governance of science and technology policy in Europe.

PTA has undergone an evolution from being science-based, to being evidence-based, and finally to being knowledge-based. Consequently, broad-based PTA is one way to provide parliamentarians and policy-makers with input for their decision-making processes on science and technology. New science and technologies and their potential societal and economic impacts create an increasing number of options for policy. Because of this, the role of PTA in European policy-making has become more important. With this role, certain conditions have to be taken into account:

- the decentralised nature of the decision-making process in Europe;
- the evidence provided by PTA is only one source and needs to be made relevant for policy;
- there is a risk of overrating the challenges Europe faces due to the growing complexity and changing nature of technological challenges, which make the future unpredictable;
- raising the awareness of MPs is an important task; raising political relevance must be part of PTA in every stage.

PTA cooperation provides opportunities for co-ordinated actions at a pan-European level, such as introducing and training of parliamentarians in the field of TA-related issues. The Lisbon Treaty gives national parliaments a bigger role in European decision-making. All proposals of the European Commission have to be sent to the national parliaments of the EU Member States for a subsidiarity and proportionality check. For issues concerning science and technology and their social, ethical, legal and economic impacts this implies that the absorptive capacity (capacity to deal with these issues in a sufficient manner) of parliament has to be at a certain level in order to fulfil this task sufficiently. Thus, the Lisbon Treaty offers opportunities for co-ordinated actions at a pan-European level, such as introducing and training of parliamentarians in the field of TA-related issues and, on the basis of that, developing common PTA projects for those issues where parliamentarians need independent information and advice.

Pan-European PTA cooperation is an opportunity for improved cooperation between national Members of Parliament (MPs) and policy-makers, and via that, for European cooperation in general, resulting in the reduction of discrepancies among Member States with respect to policy and regulation, and to knowledge gaps and S&T innovation. Also, pan-European initiatives can be seen as a way to increase the awareness of the importance of PTA among European citizens. This, plus the increased involvement of civil society organisations in national and regional PTA activities has induced new forms of governance of science, technology and innovation that have also their impact on technology assessment, on the national and on the pan-European level.

PTA has a role in a number of specific issues that are important to the European Parliament, such as efficient transport, sustainable energy, and social networks and government Internet security. Especially coordination of national parliament standpoints and views is relevant here. For this, it is necessary to have PTA structures in all European countries, which, unfortunately, is currently not yet the case. Also, the European initiatives aimed at Joint Programming and the development of a joint European Research Area could very well profit from a common and co-ordinated input from PTA organisations in the agenda-setting process of the relevant programmes and networks because of their expertise in the field of societal, ethical, legal and economic issues related to new technologies.

Finally, pan-European PTA cooperation can be considered as an instrument to boost Europe's competitiveness and move towards an innovation union. It would do this by facilitating ambitious aims for research and development with political and financial support to provide for increased development of the EU's knowledge-based economy. Especially considering the risks of standing still or even getting behind, and the rise of BRIC and other (Asian) countries growing stronger on the global market, pan-European PTA has an important role in boosting Europe's major comparative advantage: its knowledge-based society.

Conditions for a successful pan-European PTA cooperation

Various conditions need to be fulfilled to ensure successful pan-European PTA cooperation.

- Firstly, it is important to recognise the lack of PTA structures in countries in which PTA is not yet institutionalised. In such countries, conditions for pan-European PTA cooperation are, in fact, basic conditions for PTA activity in itself.
- Secondly, an interface between science and policy characterised by communication between researchers and decision-makers ensuring a mutual language facilitating understanding between the two groups.
- Thirdly, the public and civil society organisations should be included on a greater scale. This implies not only creation of awareness for the importance and urgency of PTA activity, but also new forms of STI governance with an increased public participation in the S&T decision-making process.
- Fourthly, creation of a meeting place is needed. A fruitful cooperation requires European policy-makers, academics and other professionals in the field of PTA to meet at regular intervals as to share information and experiences.
- Finally, a need has been identified for PTA to be mainstreamed within the European Parliament and among the MEPs.

These aspects of potential co-operation mentioned above might not be new and some of them have been mentioned on different occasions also by several EPTA members within the framework of recent EPTA-network activities. However, a common denominator of all opportunities for cooperation mentioned above is that the expertise and experience in PTA organisations can be highly valuable for others to share with and to bring (pan-) European policy-making processes on science and technology at a more informed level.

Via pan-European PTA collaboration on these types of issues, input in the demand-driven innovation processes in Europe can be provided. This relates to one of the trends that have been identified, that of using TA also for tracking the opportunities of new scientific and technological developments for solving societal problems and for increasing the competitiveness of national or regional economies and employment. New methods that are being used for these types of PTA activities, and that have been included in the TA toolbox, are technology forecasting and road mapping. Here PTA activities are an input for STI policy-making in terms of initialising new R&D programmes that address research themes that need further development in order to solve these societal problems and strengthen competitiveness of national or regional economies.

The national PTA organisations, which have excellent knowledge of both the character of these challenges and the technologies involved, can be considered as a valuable resource for developing inputs into demand-driven European science and technology and innovation policies addressing these challenges. PTA organisations also have knowledge of the national strengths and weakness within Europe concerning these specific challenges.

3.4 Conclusions

Pan-European co-ordination and collaboration of PTA organisations has significant potential since all PTA organisations have to deal with the same technological developments, now that scientific and technological developments have a global character. Working together can improve economies of scale or efficiency benefits and contribute to a higher quality of the work, as more experts work on the issue from different angles.

There are a number of themes and domains that have been selected for such pan-European cooperation. Firstly, based on the available expertise in European PTA organisations, this concerns two fields that can benefit from co-operation at a pan-European level. The first theme would be Nanotechnology, addressing for instance the health and safety issues of nano-materials, the nano-code for researchers and the issues of responsible governance. Secondly, global warming would be another important theme, since it is a cross-border issue that is comparable from country to country, although national or regional technological solutions and regulatory issues will not always be congruent.

The other proposed themes for pan-European cooperation include the three E's: Environment (trans-boundary pollution, sustainable development, ecosystems, water), Energy (trans-national/-regional supply, dependency, security, and resource choices) and Economy (globalisation of industries and its impact on the quality and quantity of employment in high-tech sectors; collapse of financial markets).

The health and ageing population issue is addressed in a number of trans-national projects that will start soon under the PACITA-project umbrella.

In such pan-European coordinative projects PTA organisations and members of parliament meet and work together. Where possible, civil organisations should also be involved. However, these will still be rather unique projects in which common practices of working together across national and regional borders have to be developed. The relation scientist - politician will especially need attention. Although politicians benefit from scientific work that provides input in PTA projects, with scientists acting as experts from PTA organisations, communication between the two is not that easy. A true interactive approach is needed in which both sides are adaptive and responsive to each other. This way, TA can become more than the production of studies by scientists on various impacts of new science and technologies, but also include long-term, strategic reflection by both the science and political worlds. This way, a relationship can be built in which parliaments experience the benefits of TA. Essential to this is that PTA organisations have a broad spectrum of interaction methods and products at their disposal.

Through pan-European PTA cooperation countries can learn from each other. In countries where PTA is not (yet) institutionalised, PTA capacities can be built. Countries with a long track record in PTA can share best practices and points of view, exchange ideas and experiences, and compare results.

PTA cooperation can lead to an increase in the awareness of the importance of PTA among European citizens. This, plus the increased involvement of civil society organisations in national and regional PTA activities can lead to new forms of governance of science, technology and innovation on the national and on the pan-European level.

In order to ensure successful pan-European PTA cooperation several conditions have to be fulfilled. These conditions deal with having a PTA structure in countries all over Europe, the interface between scientists and politicians by creating a mutual language, the inclusion of the public and civil society organisations leading to new types of governance, the creation of a meeting place where all stakeholders have an easy access and last but not least the need for PTA to be mainstreamed within the regional, national and European parliaments.

Appendix A Interviewees (Parts 1 and 2)

Country	PTA Organisation / practitioners	Member of Parliament
Austria		Ruperta Lichtenecker
Bulgaria	Ventseslav Kozarev (Project Officer at Applied Research and Communications Fund, Sofia)	
Catalonia (Spain)	Ferran Domínguez Garcia	Ernest Benach I Pascual
Czech Republic	Lenka Hebakova, Ondrej Pokorny (Technology Centre AS, Prague)	
Denmark	Lars Klüver	Anne-Grethe Holmsgaard
European Parliament	Theodoros Karapiperis	
Flanders (Belgium)	Robby Berloznik	
Finland	Paula Tiihonen	Jyrki Kasvi
France	Marie-Christian Flosse-Bloch Eric Szij	
Germany	Armin Grunwald	
Greece	Costas Papadimitriou	
Italy	Elisabetta Mirra	
Norway	Tore Tennøe	Alf Holmelid
United Kingdom	David Cope	
Sweden	Helene Limén	Karin Svensson Smith, Lars Tysklind
Switzerland	Sergio Bellucci	Jacques Neiryck
The Netherlands	Jan Staman Frans Brom	Godelieve van Heteren

Appendix B Conference programme

Conference on pan-European Parliamentary Technology Assessment

7 September 2011, 15:00-18:30, European Parliament, Brussels, room A5G-3

15:00 Opening

Words of welcome by:

- Mr P. Rübig, MEP, STOA Chairman,
- Mr. C. Tabajdi, MEP, STOA, project supervisor
- Prof.dr. W. Bijker, Chair of the Conference

15:15 PTA in Europe

- *Overview of PTA in Europe*, by Christien Enzing, co-author of the report 'Parliamentary Assessment in Europe', Technopolis Group, The Netherlands
- *Examples of PTA in Europe*, by representatives of national and regional PTA organisations. The presentations will show the different models of PTA and cover different European regions, illustrating the diversity in PTA approaches across Europe:
 - Oras Tynkkynen, Vice-chair, and Paula Tiihonen, Committee Counsel, Committee for the Future, Finland
 - Frans Brom, Head Technology Assessment, Rathenau Institute, The Netherlands
 - Ferran Domínguez Garcia, Secretary of CAPCIT, Cataluña, Spain

16:35 Pan-European approaches and perspectives

- *Potential and challenges for PTA in policy-making*, by Mr. António Correia de Campos, MEP, STOA Vice-Chairman
- *Transnational TA in Europe*, Gerhard Banse, Karlsruhe Institute of Technology, Institute for Technology Assessment and Systems Analysis

17:30 Panel discussion

With members of parliament (regional / national / European), Lars Klüver (EPTA, PACITA), Gerhard Banse and others

18:15 Closing by Mr. C. Tabajdi, MEP, STOA

Appendix C List of conference participants

Name	Organisation	Country
Anders Jacobi	Danish Board of Technology	Denmark
Andreas Bühler	EP administration	
António Correia De Campos	EP-STOA (MEP)	
Asimina Gerasidi	Greek Parliament administration	Greece
Belen Lopez	FICSR Catalan Foundation for Research and Innovation	Spain
Benedikt Roskamp	University of Liège - SPIRAL	Belgium
Brenda Aendekerck	Institute Society and Technology	Belgium
Bruno Dias Pinheiro	Representative of the Portuguese Parliament to EU	Portugal
Christien Enzing	Technopolis Group	The Netherlands
Christine Hafskjold	Norwegian Board of Technology	Norway
Csaba Sándor TABAJDI	EP-STOA (MEP)	
Csilla Ferenczy	Hungarian Academy of Science	Hungary
Damir Plese	EP-STOA	
Danielle Bütschi	TA Swiss	Switzerland
Donaat Cosaert	Institute Society and Technology	Belgium
Esa Eravallo	EP administration	
Fabien Moreau	Walloon Parliament administration	Belgium
Fernando D. Garcia	CAPCIT	Spain
Frans W.A. Brom	Rathenau Institute	The Netherlands
Frederic Adam	University College Cork	Ireland
Frederic Gouarderes	EC-DG RTD	
Georg Magerl	Austrian Parliament administration	Austria
Gerhard Banse	Karlsruhe Institute of Technology, ITAS	Germany
Gian-Marco Rignanese	Communauté Wallonie-Bruxelles	Belgium
Gilbert Fayl	The Global Round Table	
Helene Limén	Parliamentary Evaluation Research Unit	Sweden
Ioannis Amoiridis	Greek Parliament (MP)	Greece
Isak Ohrlund	EP-STOA	
Jacques Neiryck	Swiss Parliament (MP)	Switzerland
Jan Staman	Rathenau Institute	The Netherlands
Jana Machajova	EP-JRC	
Janka GAUGEZ	Hungarian Academy of Science	Hungary
Jasper Deuten	Technopolis Group	The Netherlands
Joëlle Kapompolé	Walloon Parliament (MP)	Belgium

Johan Evers	Institute Society and Technology	Belgium
Johan Wallin	Parliamentary Evaluation Research Unit	Sweden
Jose Ribeiro E Castro	Portuguese Parliament (MP)	Portugal
Judit Castellà	FICSR Catalan Foundation for Research and Innovation	Spain
Jurgen Ganzevles	Rathenau Institute	The Netherlands
Katalin Fodor	Hungarian Academy of Science	Hungary
Kathy Riklin	Swiss Parliament (MP)	Switzerland
Katrien D'Haseleer	Institute Society and Technology	Belgium
Lars Eriksson	Swedish Parliament administration	Sweden
Lars Klüver	Danish Board of Technology, PACITA	Denmark
Lars Tysklind	Swedish Parliament (MP)	Sweden
Lenka Hebakova	Technology Centre TC AS CR	Czech Republic
Leonhard Hennen	Karlsruhe Institute of Technology, ITAS	Germany
Lieve van Damme	Institute Society and Technology	Belgium
Linda Nierling	Karlsruhe Institute of Technology, ITAS	Germany
Mahshid Sotoudeh	Institute of Technology Assessment	Austria
Mara Almeida	Institute of Technology of biology and chemistry (ITQB)	Portugal
Maria Gorska	Representative of the Polish Parliament to the EU	Poland
Marian Deblonde	Institute of Technology Assessment	Belgium
Matias Kallio	EP-ALDE	
Micheal Rader	Karlsruhe Institute of Technology, ITAS	Germany
Miklos Györffi	EP-STOA	
Mircea Sbarna	Representative of the Romanian Parliament to the EU	Romania
Mirosław Gwiazdowicz	Bureau of Research to the Chancellery of the Sejm (BAS)	Poland
Monique Rijnders-Nagle	Technopolis Group	The Netherlands
Neth Dano	ETC Group	
Ondrej Pokorny	Technology Centre TC AS CR	Czech Republic
Oras Tynkkynen	Finnish Parliament (MP)	Finland
Paidi O'Reilly	University College Cork	Ireland
Pat Mooney	ETC Group	
Paul RÜBIG	EP-STOA (MEP)	
Paula Tiihonen	Committee for the Future	Finland
Peter Ide-kostic	EP-STOA	
Peter Raeymaekers	Lyragen	Belgium
Pia Nieminen	Representative Finnish Parliament to the EU	Finland
Pierre Delvenne	University of Liège - SPIRAL	Belgium
Ria Bouadeaud'hui	Institute Society and Technology	Belgium

Rinie van Est	Rathenau Institute	The Netherlands
Robby Berloznik	Institute of Technology Assessment	Belgium
Roberto Fasino	Council of Europe	
Ruperta Lichtenecker	Austrian Parliament (MP)	Austria
Serge Evrard	EP-STOA	
Theo Karapiperis	EP-STOA	
Walter Peissl	Institute of Technology Assessment	Austria
Wiebe Eco Bijker	University of Maastricht	The Netherlands
Zivile Pavilyonyte	Representative of the Lithuanian Parliament to the EU	Lithuania
Zoya Peniuva Damianova	ARC Fund	Bulgaria

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